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- WELDING

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Workholding and automation solutions with bespoke options

Workholding, automation equipment and drill sharpening specialist, 1st Machine Tool Accessories will show its extensive range of products at MACH 2018 for raising production output and maximising return on investment from machine tools.

A theme of this year's stand will be the company's ability to provide an array of customised solutions. Such bespoke equipment can solve complex production problems or, in standard applications, substantially reduce setup and idle times. The results are extra versatility, fewer clampings and higher levels of efficiency, accuracy and repeatability.

Specific innovations will be announced, including the availability of a new zero-point clamping system from the Czech Republic under a new agency agreement with V-Tech and Industry 4.0 functionality for bar magazines manufactured by lemca, Italy, which is represented in the UK and Ireland by 1st MTA.

New zero-point clamping system

The highly repeatable zero-point clamping system from V-Tech has outstanding versatility, allowing easy integration with existing workholding equipment and enabling drastic reductions in setup times.



Intended primarily for highly accurate, safe clamping of workpieces on CNC machining centres, the pneumatic, quick-change system features powerful, 24 kN retraction of the clamping pin in each receiver and a positioning accuracy of better than 5 microns.

Mechanical vices, clamping chucks and bars, and special workholding fixtures can be accommodated in the receivers and positioning slots allow precise 90-degree indexing. The self-clamping mechanism, which uses high power springs to secure the workpiece and fixture, ensures that the force is still applied after the air has been disconnected. Pneumatic power is only required again for release.

Advances in barfeeding

lemca, which manufactures short and full-length bar magazines, is known for introducing regular upgrades across its product range and for creating new technical solutions to improve functionality, reduce setup times and shorten lathe cycles. The latest announcement is that an Industry 4.0 connection is available for any new lemca barfeed, allowing constant remote analysis of its condition and operation. Data is continuously transmitted via an internet link to a PC, tablet or smart phone.

An Industry 4.0-compliant Boss bar magazine with bundle loader will be demonstrated on the stand at MACH.

1st Machine Tool Accessories Ltd Tel: 01725 512517
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To read more, go to page 44

Sir Ben Ainslie set to open MACH 2018

The largest manufacturing and engineering exhibition in the UK, MACH 2018 is set to open in April at the NEC in Birmingham. This five-day celebration of UK manufacturing will be officially opened on the 9th April by the most successful sailor in Olympic history, Sir Ben Ainslie. Sir Ben won medals at five consecutive Olympics from 1996 onwards, including gold at the four Games held between 2000 and 2012.

Sir Ben has a keen interest in manufacturing and the technology behind it, with his British America's Cup team, Land Rover BAR employing the latest manufacturing processes in the creation of its foiling race boat for the America's Cup.

James Selka, CEO of the MTA, says: "We are delighted to welcome Sir Ben to open MACH 2018. We know how much hard work and engineering excellence has been employed in the creation of the Land Rover BAR team. They are a fine example of world class British engineering and sporting know how. Sir Ben is a true legend and we are honoured to have him opening the UK's premier manufacturing and engineering showcase."

Sir Ben Ainslie says: "At Land Rover BAR, we bring together huge resources of technical, design and engineering knowledge to create something truly British and unique. We invest in technology and innovative skills to find solutions for long-term issues in sustainability. I'm very much looking forward to opening the MACH 2018 exhibition and seeing the latest

innovations coming out of the UK's manufacturing technologies sector."

What's on show?

The 2016 edition of the exhibition was hugely successful, boasting sold-out exhibitor space, a 10 percent increase in visitors on 2014 and over £150 million worth of business attributed to the show.

The overriding theme running through the show is interconnected technology and the future of manufacturing. MACH showcases live working machinery and brings together the industry's finest manufacturers across a range of technologies, including milling, turning, metrology, additive manufacturing, tooling and Industry 4.0 technologies.

As well as all the technology on show, there is a vibrant seminar programme, which includes leading speakers from academia, as well as industry, marrying together the theoretical and practical aspects of 21st century manufacturing. With live demonstrations and a packed seminar programme, MACH 2018 is the place to get business done.

So far, 90 percent of exhibitor space has been allocated for the show, a positive reflection of the health of the UK manufacturing market.

James Fudge, head of events at the MTA, says: "MACH is a great barometer for judging the health of the UK's manufacturing sector. Exhibitions are a



fantastic way to do business, and we feel we have created the perfect environment for that to happen at MACH 2018."

MMMA Metalworking Village

The MMMA is very excited to announce that there will be over 550 square metres within the Metalworking Village for MACH 2018, featuring over 20-member companies.

Visitors to the Metalworking Village will be interested to see a number of leading-edge technologies on display. These will include technologies from: Press-Form Machinery; Midland Power Press Services; PressCare; Bruderer UK; Roemheld UK; Schuler Presses; P J Hare; Worcester Presses; Decade Monitoring Solutions; Worlifts; I-Mach; Crescent Machinery Company; Oerlikon Balzers Coating; ASC UK; Cotswold Machinery Sales; Group Rhodes; AP&T; Ortlinghaus UK; AIDA; TMA Engineering; Industrial Clutch Parts; Voith Turbo; MTL Engineering; Press Techniques; and Ross UK.

James Fudge says: "We are so pleased to see the expanded MMMA Metalworking Village at MACH 2018. It is a key sector for the advanced manufacturing industry, with some great exhibitors on board already. The Metalworking Village is one of the long-standing attractions of the exhibition and, once again, will be at the heart of the show."

MACH 2018 takes place between 9th-13th April and visitors can register for their entrance pass and fast track entry pack now, via the MACH exhibition website at www.machexhibition.com.

Further information about the MTA and its members can be found at www.mta.org.uk



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XYZ unveils several MACH debutants

XYZ Machine Tools will have several MACH firsts on its stand, including two major developments in the company's product range, which will be announced closer to the exhibition dates. The key machine tool debuts at MACH are the recently announced LR and HD ranges of vertical machining centres along with XYZ's ground-breaking UMC-5X 5-axis machining centre.

With the arrival of the UMC-5X, a gantry-style simultaneous 5-axis machining centre, XYZ Machine Tools moved the goalposts when it came to price/performance ratios on this type of machine. The specification and capability of the UMC-5X sets it apart from similar priced machines and puts it ahead of many costing significantly more. It is available with either the Siemens 840DSL Shopmill or Heidenhain iTNC 640 HSCI control systems, with market leading machine control software such as Traori and Kinematic functions during 5-axis simultaneous machining, for improved accuracy. The UMC-5X also sets itself apart with its machining capacity, a table configuration and machine design that allows a full 500 mm of Y-axis travel forward of the table when it is rotated 90 degrees towards the rear with the component facing forward. This allows larger workpieces to be machined in comparison to many competitor machines, including those that quote the same, or bigger, axis travels than the UMC-5X.

In 2017, XYZ Machine Tools launched its LR and HD ranges of vertical machining centres and both ranges will be represented at MACH. The LR series of machines feature, for the first time for XYZ, linear rail slideway technology which now meets XYZ's



stringent performance criteria and allow a relative low-cost entry into VMC ownership. While the LR series is competitively priced, machine specification and performance is still high across the range which consists of the XYZ 500 LR, XYZ 750 LR and XYZ 1000 LR with the designation relating to X-axis travel.



The LR specification includes use of the latest Siemens 828D control, with the optional ShopMill Advanced software package, which provides a standard 8,000 revs/min spindle with higher speed spindles as options across the range. Other generic specifications include feed-rates up to 20 m/min in all axes and 12 or 20 position carousel toolchange as standard, dependant on machine size, with the option of a 24-position arm type on the two larger

machines. It offers table capacity of 250 kg, 500 kg and 800 kg respectively. This detailed specification will be sufficient to cover most applications in a typical machine shop. XYZ Machine Tools expects the XYZ 750 LR to be the most popular choice and this model, with its axis travels of 750 mm by 440 mm by 500 mm, 8,000 revs/min 10 hp/ 7kW, BT40 spindle and 20-position carousel toolchanger will be demonstrated on the stand as well as an XYZ 500 LR.



The addition of Linear Rail technology complements the box slideway machines offered by XYZ Machine Tools which are now designated the HD series. This seven-machine range extends from the compact XYZ 660HD machines, with axis travels of 660 by 450 by 500 mm, through to the 'super-heavyweight' XYZ 3010 HD, with its axis travels of 3,000 by 1,000 by 800 mm, with the Y-axis supported on six hardened box slideways for improved rigidity and accuracy. The HD series will be represented on the stand by an XYZ 800 HD and an XYZ 660 HD. In addition, visitors will also be able to see the quality of the machines construction with a cast base and column without any guards being displayed. This display machine is from the XYZ 1100 HD, which benefits from a completely new structure that provides exceptional support to the X and Y axes and increases table load capacity from 800 kg to 1,500 kg.

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Innovation and sophistication from Mills CNC

Mills CNC is to showcase 16 high-performance Doosan lathes and machining centres, an advanced automation solution and sophisticated machine monitoring technology on its innovative stand at MACH 2018.

The company has always viewed the MACH show as a critically important element of its marketing programme and, historically, has used the event to launch a number of new Doosan machines into the market as well as showcasing a range of its latest customer service initiatives to visitors. Mills also invests significant resources in its presence at MACH and regularly has the largest stand at the event.

At this year's show it's a similar story, with Mills showcasing 16 advanced Doosan lathes and machining centres from its 600 m² stand. The stand is also the location where visitors can see a sophisticated automation solution in action and get the low-down on the latest 'factory of the future' machine monitoring technology from US-based Predator Software Inc.

Mills CNC's managing director, Kevin Gilbert says: "We will be showcasing an impressive cross-section of Doosan lathes and machining centres on our stand, many of which are new machines making their UK and/or MACH debuts. Doosan machine tools set new benchmarks for performance, productivity, reliability and best value. The machines we're taking to MACH highlight all of these attributes."



Doosan lathes and turning centres

Whether you're machining small or large components, there is a Doosan lathe that will more than meet your requirements. Mills is showcasing eight lathes on its stand. These include the new 10" chuck Puma 2600SY sub-spindle Y-axis Mk II, the recently launched 12" chuck Puma GT 3100LM equipped with driven tooling capability and the latest addition to Doosan's impressive vertical turning lathe range, the powerful Puma V8300M with driven tools and automatic tool changer.

All three models are available with a choice of the latest FANUC or Siemens controls and will be under power at MACH, performing a range of challenging machining demonstrations.

For precision manufacturers looking for larger turning solutions, Mills is showcasing a Puma 4100LMB and a Puma 700LM on its stand. For small parts production, two Lynx lathes, a Lynx 2100B and a Lynx 220LYSC are being exhibited.

Doosan machining centres

There are eight Doosan machining centres being exhibited on Mills' stand at MACH.



These comprise 5-axis machines that include the new DVF 5000 machine that was recently launched to wide acclaim at EMO 2017, one large-capacity NHP4000 horizontal machining centre with a 60-tool magazine, one VC 3600 twin-table vertical machining centre and four of Mills' best-selling vertical machining centres from the popular DNM-series, including the new compact DNM 4000 that is making its UK debut at the show.

Machine monitoring technology

Late last year, the CNC Training Academy, Mills CNC's independently-operated training arm, concluded a deal with



US-based Predator Software Inc. to become the exclusive distributor of Predator software solutions in the UK and Ireland.

The power and sophistication of Predator machine monitoring software and factory floor control technologies will be demonstrated on Mills' stand at MACH with a number of the Doosan machines being networked to what is widely-regarded as one of the best-performing and easy-to-use 'factory-of-the-future' software solutions.

As well as being able to view, in real time, the status and access performance metrics of the Doosan machines installed with Predator Software, visitors can also visit the adjacent CNC Training Academy stand where more information on Predator software, training and support is available.

Mills CNC's stand at MACH is both different and innovative and has been designed as a venue within a venue, complete with roads, street signs and traffic symbols.

Kevin Gilbert concludes: "We can confidently say that our stand at MACH and the machines and technology solutions being showcased will pull in the crowds. Few, if any other, exhibitors will be showcasing such a broad range of machine tools and technology innovations as Mills and none, I'm sure, will have such a unique, appealing and interactive stand."

Mills CNC Ltd

Tel: 01926 736736

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MACH • Stand: H18-520/H18-622



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Ecological equipment for sawing to make MACH debuts

German metal sawing and storage equipment manufacturer, KASTO has introduced a high-performance, economically priced bandsaw optimised to extract the best possible performance from either a tungsten carbide tipped (TCT) blade or a bimetal blade. The KASTOwin pro AC 5.6 offers short cutting times, long blade life and intuitive operation. It is available in the UK and Ireland through the company's Milton Keynes subsidiary, which will exhibit the machine for the first time at a MACH show.

The automatic bandsaw is suited to cutting solid material, tubes and profiles, particularly in steel production and stockholding, machine manufacturing and the automotive industry. Compared with standard KASTOwin machines the bandsaw can increase production efficiency by between 50 and 100 percent, more in some instances, depending on the type of blade and the material being cut.

Having an installed weight of 4.3 tonnes and a rigid welded structure with vibration-optimised ribbing, the KASTOwin pro AC 5.6 ensures quiet, low-vibration operation, short processing times and accurate cutting. The saw band is driven by an 11 kW, frequency-controlled motor, delivering infinitely adjustable cutting speeds from 12 to 150 m/min and providing plenty of capacity for TCT sawing. Maximum size of stock that can be cut is 560 mm and the smallest dimension is 25 mm x 25 mm.



Shortest residual length is 10 mm for individual offcuts and 35 mm in automatic operation, enabling companies to minimise waste.

Helping to dampen vibration are guides mounted at the return side of the blade, inside the top of the saw head guarding on the side opposite from the cutting action, promoting accurate sawing and prolonging tool life. There is a retraction unit for separating the blade from the material to protect the cut surface when the saw head moves back. It also helps to minimise tool wear. Access to the machine is very good and it is compliant with CE safety standards.

The saw incorporates ecological design features that lower energy consumption, especially in the hydraulics. KASTO engineers have complemented this by developing electro-mechanical downfeed of the blade controlled via two ballscrews, each with a servo drive, for precise, infinitely variable control. The hydraulics system is therefore only responsible for workpiece clamping and saw blade tensioning, so is actuated far less than in the past, delivering an energy saving in this area of approximately 93 percent.

KASTOmicut

Another KASTO bandsaw to make a first appearance at a MACH show will be a representative model from the company's latest range of swing-frame, pivoting-bow bandsaws for workshops. The versatile KASTOmicut is designed for high accuracy cutting to length and mitre cutting of tubes, sections and solid materials.

Four model variants are available: manual (P 2.6); manual clamping with hydraulic downfeed (E 2.6); hydraulically actuated clamping and downfeed (U 2.6); fully automatic (A 2.6) with ballscrew-driven material feed, carbide blade guides and an optional chip conveyor. A torsionally rigid, vibration-damped, cast iron frame provides support for the saw blade, ensuring top cutting quality, even in difficult-to-cut materials.

The saws supersede six machine models



in the KASTOpractical and KASTOfunctional series, compared with which they have higher power motors and greater band tension, allowing a 50 percent increase in cutting force. Feed rate is constant throughout, avoiding lost productivity due to the blade slowing towards the centre of the cut. Blade speed is infinitely variable from 20 to 120 m/min, allowing a range of different materials to be processed cost-effectively.



KASTOmicut saws have a cutting range of 260 mm for rounds and 310 x 260 mm for flat stock. Shortest cut length is 6 mm, with a residual length of 15 mm for manually cut pieces or 40 mm in automatic operation. Cutting accuracy is 0.1 mm per 100 mm of height. Mitre cuts are possible at continuously adjustable angles from -45 to +60 degrees. Many accessories are available including a rotary table to support the material.

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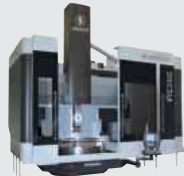
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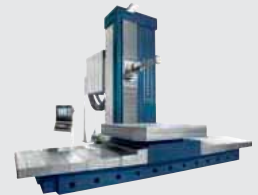
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Matsuura's automation big hitters on show at MACH 2018

Matsuura Machinery will be exhibiting three UK best-selling Matsuura machines at MACH. Each machine represents the pinnacle of three decades of unmanned machining technology. New to the exhibition and machining live, are the five axes multi-pallet trio comprising of the MX-520 PC4, MAM72-35V and MX-330 PC10. Also, on show is the Muratec Murata MT200 twin-spindle lathe.

Celebrating three decades of experience and knowledge in tower pallet automation, Matsuura was the originator, designing and defining the concept of tower pallet automation with the introduction of the MAM72 series of 5-axis machine tools over two decades ago.

The latest model of the MAM72-35V comes equipped with 32 pallets as standard, with up to 520 tools and is the proven solution for long periods of unmanned 5-axis simultaneous production. No other machine on the market has ever delivered to investor companies such a defined competitive edge; adding a reliable extra unmanned shift to its production and increased profit to its bottom line.

Launched in 2017, the MX-520 PC4 is a four-pallet automated version of the MX-520 single table 5-axis vertical machining centre model. Offering ease of use and reliable 5-axis machining, the MX delivers dynamic machining versatility, high accuracy, reliability and excellent cost performance. Currently, there are over 70 Matsuura MX-520 machines in successful and profitable service in the UK. A single-table version of the MX-520 will be

demonstrated on Renishaw's stand at MACH.

Also, on show is the MX-330 PC10 that is configured with 10 pallets and 90 tools. The MX-330 PC10 is the only high-quality entry level 5-axis on the market with OEM automation integrated within the machine at its inception. It brings 5-axis Matsuura automation to within reach of all budgets. A strong performer for Matsuura, the MX-330 PC10 shares the same Sandvik Coromant Capto P6 pallet clamping system as the MAM72-35V.

The Muratec Murata MT200 twin-spindle turning machines, with three turrets and optional gantry loader, has proven to be an excellent choice for UK facilities running complex parts and various part types through one machine. All configurations of the MT200 can accommodate both bar, billet or chuck loaded operations. With flexible upper and lower turrets, all tool stations are live and possess Y axes.

In the 3D Printing and Additive manufacturing zone, Matsuura has a stand dedicated to its LUMEX hybrid 3D metal printing and CNC milling machine.

Roger Howkins, managing director at Matsuura Machinery, says: "Undoubtedly, MACH 2018 is set to be a great show for Matsuura with the range of machinery we're bringing to the show, particularly the MAM72-35V which showcases our

experience and knowledge of tower pallet automation.

We've selected machines that continue to push the boundaries in terms of capability, quality, precision and of course deliver a great return for our customers. There are a range of solutions for everyone on our stand, regardless of budget. Our team of application engineers are busy creating new and



exclusive machining and turning demonstrations to showcase the capabilities of both machines."

Matsuura has manufactured in Japan since 1935 and has pioneered innovative design, development and manufacture of high-quality machining centres. Matsuura produces a range of outstanding, high-precision machining centres covering all industry sectors. These include horizontals and verticals in various sizes, configured with 3- and 5-axis, single table, twin and multi-pallet systems, modular tool changers, cell systems and its range of ultra-high speed linear motor machines. Matsuura is renowned for its design and manufacture of horizontal and vertical machine tools, configured in 3-, 4- and 5-axis and has experienced new market sector penetration with its single table, high-quality entry level MX Series of 5-axis vertical milling machines.

The company provides OEM's, SME's and subcontractors with the best machining solutions, innovative engineers and optimised manufacturing processes. This is backed by world class customer support and outstanding multi-skilled engineers.

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Machine Tool Solutions For Enhanced Productivity

Gosport-based Geo Kingsbury, the sole sales and service agent in the UK and Ireland for top-quality CNC turning, milling and grinding machines manufactured by eight different machine tool builders in Southern Germany, returns to MACH this year to promote its solution approach to machine tool sales.

The manufacturers it represents are Index and its subsidiary Traub, which offer CNC single- and multi-spindle lathes, Hermle, which builds 3- to 5-axis machining centres and four large prismatic metalcutting machine manufacturers, Burkhardt + Weber, F Zimmermann, SHW and Waldrich Coburg. The latter machine ranges are handled by Geo Kingsbury's large prismatic machines division in Warwick.

Furthermore, at the beginning of 2017 Geo Kingsbury set up a new grinding technology division, also based in its Midlands facility, following the company's appointment as agent for grinding machine manufacturer, Haas Schleifmaschinen. Use of the grinders is strong in the medical sector in Ireland, where Geo Kingsbury has a Belfast office, while in the UK, sales of the machines have seen rapid growth in the aerospace industry, particularly in the competitive field of turbine blade tip and root grinding.

The latest addition to the company's portfolio is its exclusive distributorship for AddUp Global Additive Solutions, a joint venture owned by two giants of French industry, Michelin and the Fives industrial engineering group. Geo Kingsbury's new additive manufacturing division takes it into a new area, as it is now able to offer production solutions based on powder-bed additive techniques that Michelin developed for tyre mould production.

Richard Kingsbury, managing director of Geo Kingsbury, says: "For over 60 years, we have been supplying the finest machines supported by the best people, trained to the

highest standards, to help customers achieve long term value and market success.

"Every one of our installations is a turnkey solution to some extent and often, to a considerable degree, designed to solve customers' production problems. We deliver the lowest possible cost of production at the highest levels of accuracy and repeatability, coupled with long-term value and reliability.

"MACH 2018 will give us a platform to showcase our technical expertise, research and development activities, product knowledge and industry experience, plus our comprehensive after-sales support.

"Our senior management team, sales engineers and specialists will be on hand to engage commercially and technically with managers and engineers from across manufacturing industry to answer general enquiries and undertake in-depth consultation regarding specific manufacturing projects."

Representatives from the machine tool factories will also be in attendance throughout the week. It is interesting to

note some of the comments they have made about their association with Geo Kingsbury.

For example, Franz-Xaver Bernhard, vorstand vertrieb, Forschung & Entwicklung at Hermle says, "We have been working with Geo Kingsbury for just over 12 years and in that time they have become one of our most trusted and capable partners. Their applications and service teams are of the very highest standard."

Matthias Fleischer, direktor verkauf at Waldrich Coburg offers: "Geo Kingsbury's breadth of engineering experience and market knowledge offer a tremendous asset for customers looking for advice on choosing the most appropriate and cost-effective option for producing larger workpieces requiring process rigidity, part quality, accuracy and long-term system reliability."

Martin Rathgeb, technischer leiter at SHW Werkzeugmaschinen states: "In our very sophisticated project business, we strongly rely on excellent sales partners and application engineers. The Kingsbury team delivers on both. Even final commissioning of our very complex machines and machine acceptances are always executed in a very professional manner."

Hans Koschig, leiter verkauf ausland at Index, which has been represented by Geo Kingsbury since 1957 adds: "It is not unusual, at times of high demand, that we ask Geo Kingsbury for applications support outside of the UK, such is the high regard we have for their team."

Norbert Hartwich, verkauf ausland at Traub concludes: "The requirement to send Traub specialists to the UK to address service issues in the field is extremely rare indeed."

It is this high level of competence that Geo Kingsbury will be looking to convey to visitors attending MACH this year.

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New measuring technology

Metrology has evolved in recent years with the advent of lasers, 3D scanners, and optical technology, all serving to change the way we measure things. Inspection is moving away from the metrology room, such that measurement is now being brought to the point of manufacture. The keys to this transition are equipment portability, simplicity, and flexibility. Therefore, it is no surprise that the focus of attention at MACH 2018 for UK supplier of metrology systems, Measurement Solutions Ltd (MSL), will be portable metrology and Automated Quality Control (AQC) using industrial robots.

As metrology moves closer to the production floor, simplicity and ease-of-use are mandatory to enable those who manufacture parts to also inspect them. Inspection is no longer a parallel procedure, but rather an integral part of the manufacturing process. One thing is for sure, 3D scanning is gradually replacing traditional methods for three major reasons: speed of acquisition is much faster, with thousands of measurements compared to single point CMM's; the density of information produces measurements across the whole part, not just at pre-determined locations; only a short time is required to characterise a complete part.

3D scanning can be applied across the whole of manufacturing, from initial product design right through to final inspection.



With this in mind, MSL has purposely separated its business activities to address the needs of the market, whether it is for portable hand-held systems or for fully automated inspection and measuring solutions. The company is using MACH as the launch-pad for two new business divisions, each dedicated to applications within the QC sector.

The new portable metrology division, which focuses on portable hand-held measuring systems, will be showing the latest Creafom 3D measurement and scanning systems. In particular, the MetraSCAN 3D is proving to be the fastest and most versatile portable scanning system available, being able to scan parts from typically 300 mm up to 10 metres in size and able to deal with any material or surface, castings, sheetmetal, composites, machined surfaces, plastics, in fact just about anything. When paired up with the hand-held HandyPROBE arm-free portable CMM, the combination provides everything a metrology engineer needs in terms of dimensional inspection.

Human intervention during production has, for several years, been replaced by automated robot systems in applications such as material handling, welding, assembly, etc., but measurement technologies have only recently been able to offer an open door to the world of industrial robots. While the traditional

method of measurement is to remove parts from the production line and measure them in a dedicated measuring room, demands from production are for faster "in process" measurements. However, programming robots is not easy, especially for metrology engineers and QC teams who are used to using CMM software. Similarly, experienced robot programmers do not have the necessary metrology experience to understand the requirements of QC and inspection.

In order to deal with this demand, MSL's new metrology integration division is dedicated to providing metrology solutions based on automated QC applications.



Irrespective of whether the requirement is for a traditional CNC CMM or for an in-process industrial robot, the division's engineers have the knowledge and software tools to "make it happen". Using the latest Metrolog X4 i-Robot software as the common software platform, any robot and any scanning device can be combined to create a high-speed 3D scanning solution.

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Nederman to clean up at MACH with new oil mist filters

Exhibiting at MACH for the first time, Nederman is a leading supplier and developer of environmental technology solutions for the manufacturing sector that protects people, planet and production. The company will be introducing a selection from its extensive portfolio of oil mist filtration, dust and fume extraction, swarf collection and re-cycling innovations that will help show visitors clean up machine shops whilst being compliant to H&SE directives, reducing costs and increasing productivity.

One machine that will be on the Nederman stand will be the Filtac OMF2000 series of extraction units. Regarded as the most efficient oil mist filtration range for the machine tool industry, the new Nederman Filtac Series is based around Nederman's patent-pending FibreDrain™ technology. Specially designed for continuous operation on turning, milling and grinding machine tools, the new OMF Series will be connected to an oil mist generating 'test-rig' at the exhibition to demonstrate how effective the

OMF series is at removing and controlling airborne oil mist particles within the machine envelope.

With high speed machining and high-pressure coolant both becoming more prevalent in the metal cutting industry, oil mist and smoke from machine tools is increasingly commonplace. To eliminate the negative effect that oil mist has on employee health, productivity, the production equipment and overall business revenue, the Nederman Filtac OMF range of oil mist filters can deliver a multitude of health and safety, productivity and consumable cost benefits.

It is acknowledged that there is a fundamental difference between oil mist and smoke. Oil mist is comprised of liquid droplets generally up to 20 microns in size



whereas high speed machining can generate mist drops that form a liquid smoke with droplets less than 1 micron. To effectively capture these extremely small droplets, Nederman has developed its unique, patent-pending FibreDrain technology. Incorporated into the new line of Nederman Filtac OMF units, the FibreDrain filters make it possible to capture even the smallest submicron droplets and drain them back to the process with maintained filtration efficiency. For the customer, the benefit of employing the Nederman Filtac OMF 2000 series is a reduced health risk, as exposure to oil mist for a prolonged period can cause a number of respiratory and skin conditions.

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H20-520

MAPAL to premiere new tooling lines at MACH

At MACH, MAPAL will demonstrate why its global sales are continuing to rise through the ongoing development of innovative new product lines. The manufacturer of precision tools will be using the exhibition to give its complete range of new products a UK exhibition premiere.

At the UK's showpiece manufacturing event, MAPAL will introduce its new c-COM cloud-based data platform, as well as launching its extended hole-making line. The arrival of the new CPR500/510 replaceable head reamer will be a centrepiece of the hole-making series with its optimised cooling channels. The new CVD coated reamers will significantly extend tool life as the solid carbide replaceable heads introduce a new coating technology that has been especially developed for cast machining.

Offered in diameters from 8 to 40 mm, a new development of the CPR500/510 is its optimised cooling sleeve. The issue of cooling is critical for cast machining due to the abrasiveness of the material. This is now resolved through the internal coolant supply and the outlets that direct fluid at the cutting edges.

Complementing the new reaming line will be a complete programme of ISO indexable inserts for boring steel, stainless steel and heat-resistant cast-steel. This new ISO indexable insert series will be available as standard or as special designs. The new product line incorporates new PVD and CVD coating developments and an optimised carbide substrate that permits users to find the best-fit solution for specific applications.

In 2016 MAPAL defined a new standard in drilling with its Tritan-Drill range. The drills with three cutting edges were extended at EMO 2017 with a specially adapted version for machining steel. This new line will make its UK show debut at MACH 2018. With the new Tritan-Drill-Steel, cost-effective hole-making with reliability and process stability is now a reality. The stability of the Tritan-Drill-Steel is due to the completely new cutting-edge design that is different to the universal use Tritan-Drill-Uni.

For manufacturers looking for innovative milling solutions at MACH, MAPAL will be extending its programme of solid carbide high-performance milling cutters for roughing applications with the new OptiMill-Uni-Wave. This full slot milling



series makes a groove depth of up to 2 x D possible. With the new milling cutter that can be used for many materials, the level of performance is significantly increased compared with previous existing HPC milling cutters.

To achieve this, MAPAL has developed a highly ductile carbide substrate with an extremely wear-resistant coating and special cutting-edge preparation. These developments generate 50 percent longer tool life than comparable HPC milling cutters. The five cutting edges of the OptiMill-Uni-Wave are divided unevenly, and the new line will be available in short, long, overlong and extra-long sizes in the HB shank form with a diameter range from 4 to 25 mm.

For face milling operations, MACH will see the UK arrival of a new generation of milling tools for cutting depths up to 4 mm. With replaceable PCD milling cartridges, the new PowerMill-Blue is the cutter of choice when machining aluminium in the automotive industry. The setting and clamping system of the milling inserts has proven itself beyond compare whilst the chip guiding geometry has been optimised for the new series. The chips are reliably removed resulting in better surface finishes whilst the coolant outlet is localised in the milling cassette to support swarf evacuation.

As well as these exciting new product lines, MAPAL will be introducing a host of other new developments such as the new features of the UNIBASE-M tool storage and management system.

MAPAL Präzisionswerkzeuge Dr. Kress KG is one of the leading international suppliers of precision tools for the machining of



practically all materials. The company, founded in 1950, supplies leading customers in particular from the automotive and aerospace industries and from machine and plant engineering. With its innovations the family-owned company sets trends and standards in production and machining technology. MAPAL sees itself as a technology partner, supporting its customers with the development of efficient and resource-conserving machining processes using individual tool concepts.

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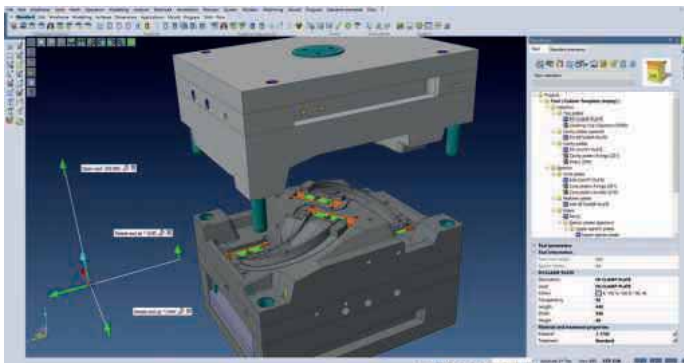
MACH • Stand: H17-420

Vero to demonstrate three of the best at MACH

Vero Software will be demonstrating the 2018 R1 releases of Edgcam, Radan and VISI, at MACH.

Edgcam includes updates to roughing cycles for milling, turning and MTM. And the prevention of unnecessary CAM regeneration is seen as being particularly important. When editing a tool command, the remaining instructions will no longer be automatically regenerated if the alteration does not affect the corresponding cycles with aspects such as coolant or high-speed.

Sheetmetal software Radan takes the increasing popularity in automatic bending into consideration, making fingerstops safer by allowing for improved part alignment in the press brake, and reducing the number of fingerstop movements required between bends. A new batch nesting system could improve material usage by around nine percent over a year with a revolutionary approach to optimising a range of nests, by looking at the entire nest run and reducing the number of overall sheets instead of focusing on how full each individual sheet is.

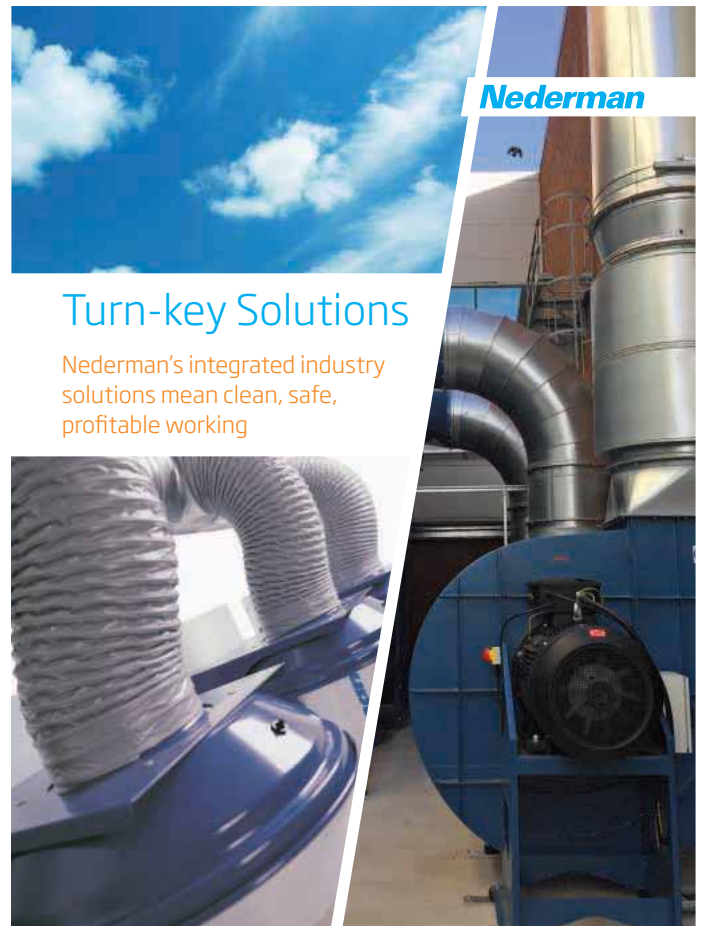


For the mould and die market, VISI provides greater flexibility when constructing supplier and non-standard tool configurations. Customisable templates, including the management of blank and predrilled plates, allow for easy tool layout creation and enhanced editing throughout the design process.

Headquartered in England, Vero Software designs, develops, and supplies CAD/CAM and CAE software that radically enhances the efficiency of design and manufacturing processes, providing its customers with exceptional value through high productivity gains and significantly reducing time to market. The company's world-renowned brands include Alphacam, Cabinet Vision, Edgcam, Machining STRATEGIST, PEPS, Radan, SMIRT, SURFCAM, WorkNC and VISI, along with the production control MRP system Javelin.

Despite the diversity of application, these solutions have one thing in common: they all address the rising challenges of achieving manufacturing efficiencies and bring huge value to the operations in which they are deployed.

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A show of strength

GF Machining Solutions, the EDM, 3- and 5-axis milling, laser texturing machine tool specialist, automation and tooling system supplier, will be showcasing a range of its advanced technology solutions on its stand at MACH 2018. To do this the company will be exhibiting six machines on the stand, all of them proven market-leaders, with several of them making a MACH debut at this year's event.

The machines comprise of two AgieCharmilles wire EDM machines, a CUT P 550 and a CUT 1000, two Mikron 5-axis machining centres, a MILL P 500U and a HSM 200U LP, an AgieCharmilles FORM P 350 EDM die-sink machine integrated with a System 3R WorkPartner 1+ automation system, and an AgieCharmilles LASER P 400 laser texturing machine.

In addition to the six 'physical' machines on the stand, GF Machining Solutions' product, technical and customer service staff will be available throughout the show to talk to visitors about the company's pedigree and prowess in delivering advanced manufacturing solutions to customers. These solutions include: micro-machining; additive manufacturing; dedicated 5-axis machining of turbine blades, impellers and blisks.



GF Machining Solutions' CUT P series of advanced wire EDM machines provide precision component manufacturers and mould makers with improved accuracies and repeatability's, cutting speeds and process reliability. At the heart of the CUT P 550 machine is a new, intelligent IPG (Intelligent Power Generator) that improves cutting performance, from previous models, by an impressive 20 percent.

The machine also features a number of 'onboard' automation solutions that improve machine tool utilisation and uptime as well as reducing operational costs. These include the machine's new and innovative Automatic Slug Management (ASM) and Automatic Slug Welding (ASW) capabilities.

The Mikron MILL P 500U is an ultra high-performance, simultaneous 5-axis machining centre that offers powerful and dynamic material removal capabilities, thermal stability and high stiffness, to deliver unrivalled precision and surface finish on complex parts.

The Mikron MILL P 500 U features a thermo-stable and symmetrical design, so that even when machining at a fast pace and over long production periods, accuracy and process reliability remain high and consistent.

The machine delivers fast acceleration (1.7g) and is equipped with a powerful 36 kW Step-Tec motor spindle that enables the machine to get down to business fast.

From faster rib machining to micro-machining, the AgieCharmilles FORM family of Die-Sink EDM solutions is evidence of GF Machining Solutions' continued and significant investments to advance Die-Sink technology.

The result of this drive and commitment is the AgieCharmilles FORM series of machines that deliver unrivalled performance irrespective of the electrode material used or preferred, copper or



graphite. Perfectly repeatable machining of micro-cavities is just one example of the manufacturing challenges that are resolved with the FORM P 350, while innovative, integrated technologies such as iGAP ensure the fast and accurate machining of rib cavities with a superior and homogenous surface finish.

Martin Spencer, managing director of GF Machining Solutions UK, says: We are showcasing a comprehensive cross-section of advanced technology solutions to visitors. Few, if any, machine tool companies can offer the depth and breadth of different, yet often complementary manufacturing technologies as GF Machining Solutions and the six machines being exhibited demonstrates that we are a company going from strength to strength.

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Citizen launches Cincom D25 sliding headstock turn-mill centre

The next generation of Citizen's advanced CNC system, featuring touch screen and qwerty keyboard, is to be launched at MACH 2018 as a key feature on the new Cincom D25-VIII and -VII sliding headstock turn-mill centre.

Operational flexibility is maximised for complex cycles with two gang vertical toolposts each with X-, Y- and Z- axes and one with a B-axis capable of both front and back machining. In addition, there is a back toolpost and opposite toolpost with a tool capacity of up to 59 tools, with the added advantage of removable guide bush for more economic material use on shorter components.

The Cincom D25-VIII is configured as a 10-axis sliding headstock 25 mm capacity machine, which also incorporates the added flexibility of 0 to 135 degree swivelling B-axis. This swivel axis is incorporated within the first, X1, Y1, Z1, axis gang toolpost capable of holding four double-sided driven spindles to service both the main and sub-spindles.



Citizen Cincom D25 sliding headstock turn-mill centre features new generation control, triple Y and Z axes plus B-axis swivel

In addition, a second gang toolpost, X2, Y2, Z2, is able to work independently or simultaneously with the, X1, Y1, Z1, toolpost to overlap for instance, rough or finish turning operations or apply in unison, drilling or milling based cycles.

Meanwhile, further flexibility for the tooling application is a (Y3) back toolpost axis with one fixed or three driven tools having 90-degree adjustment for face, radial or angle machining while the opposite toolpost is positioned alongside the sub-spindle, X3, Z3, to provide a further two fixed tool positions.

The power of the main spindle is 5.5 kW and 3.7 kW for the 25 mm capacity sub-spindle with both having a maximum speed of 10,000 revs/min. The gang driven tools are powered by drives of 2.2 kW with maximum speeds of 9,000 revs/min and the back driven tool speeds are 6,000 revs/min. Rapid traverse rates are 32 m/min with 24 m/min available on the Z2 gang toolpost.



Citizen's Cincom D25 has ten axes controlling two gang vertical toolposts plus back toolpost and opposite toolpost

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DMG MORI promotes digital workflows as a fundamental step towards the digital factory

John Barber reports from Pfronten, Germany

The annual DMG MORI Open House, held from January 30th-3rd February, was based around the theme 'Smart Factory'. The company demonstrated how its CELOS technology completely integrates the user with the machines, peripherals and links it to digitised production and automation solutions. With more than 70 high-tech machines on display, on over 8,500 m² of exhibition space, there was plenty for visitors to enjoy

A customer focused company

DMG MORI prides itself on providing the very best possible service to its customers. A key component of this is its employees, many of whom have worked for the company for years. There are 1,300 employees in total at the Pfronten plant and there is capacity to produce 1,500 machines a year. However, recruitment is certainly not on hold.

Speaking at the technical press conference, Christian Thones, chairman of the executive board at DMG MORI, said: "In the next six months we will recruit 200 new service team employees. We want to focus on quality and service with no compromises. Employees are really close to my heart and are the true strength of DMG MORI."

Dr Mashiko Mori, president, added: "We are not yet perfect, but our intention is to get the very best quality in our industry." The company is also committed to training the next generation as its successful apprenticeship programme currently represents around 10 percent of its workforce in Pfronten. There are 120 trainees who are trained in seven different job functions over the course of a two to three year programme.

Around 9,000 visitors were expected at the Open House across the week and most of the customers and visitors were attending from abroad. At the press conference there was an announcement regarding the company's master spindles which again demonstrated DMG MORI's customer focus. Dr Mori said: "We are very proud to announce 36 months warranty for Master spindles. They are produced in-house in Pfronten. This gives the customer a commitment from us that if something were to go wrong then we can guarantee the shortest possible delivery times."

Integrated digitisation solutions

DMG MORI has been at the forefront of



digitisation excellence for years now. It became clear, at the Open House, that the company is now ready to move to the next level as its innovative new solutions can testify. Christian Thones said: "We are a technology leader and a digitisation pioneer."

Dr Mashiko Mori, president, added: "The highlights at our Open House are automation, digitisation and additive manufacturing."

For Dr. Holger Rudzio, managing director of DMG MORI Software Solutions, the workshop is the central focus of all digitalisation. The greatest advantage from his perspective: digital transformation can take place step by step, meaning "bottom up" rather than "top down"; from machining processes through digital workflows to integral networked digital factories; one project after the other and from one success to the next.

The perspective is reflected by the "path of digitisation", which DMG MORI has declared to be its overall guiding principal

for the company and its customers. This is a guiding principle that has enormously increased in importance with numerous digital innovations and future projects. From January 2018, customers can experience "digital factories" with live demonstrations of the benefits of horizontal networking in DMG MORI showrooms. A digital tool box has been created from all these innovations and future initiatives. This will enable smaller businesses to take advantage of a simple and harmonious entry point into digitalisation as well as serve larger companies as an integrated and modular system.

Fully digitalised workflows

From spring 2018, the focus will be on integrated digital workflows with CELOS Version 5, from planning through production planning right up to monitoring. The CELOS APP package Digital Planning enables customers to efficiently organise job orders, while taking into account various dependencies. The CELOS Production

Planning app offers users a decisive plus when it comes to increased efficiency and reliability on the shop floor. Specifically, this covers the integral connecting of ERP systems, digital production planning and terminal-controlled factory production.

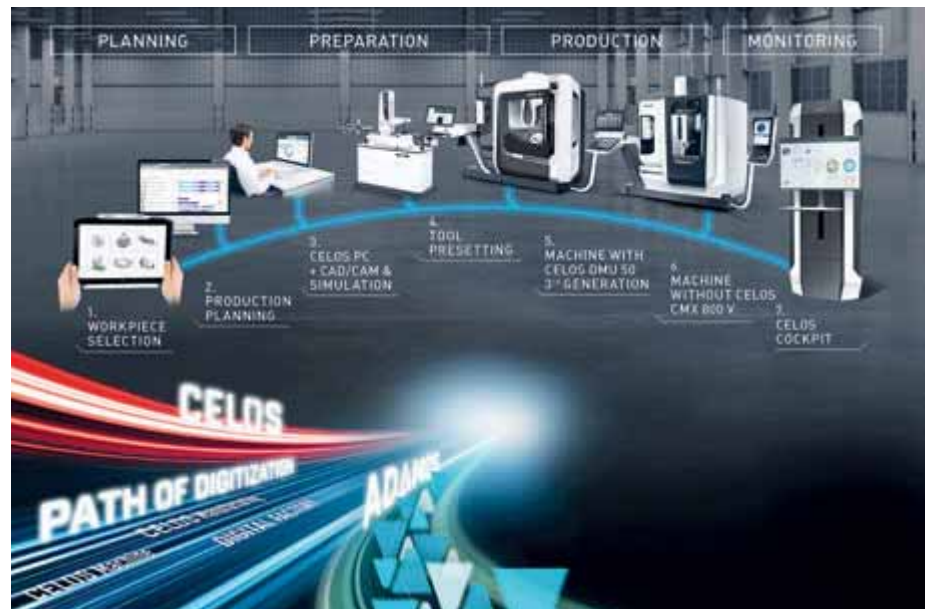
Dr. Rudzio said: "In combination with production planning, the consistent integration enables continuous process optimisation." In turn, this reduces setup and idle times and increases productivity for the long term. The increased digital transparency should ensure increased planning reliability.

Monitoring with additional benefits

The app package Digital Monitoring visualises all important information in the digital factory for more transparency during production. The CELOS Condition Analyser app offers recording, saving, analysis and visualisation of machine sensor data. The CELOS APP then makes it possible to analyse one or several machines, e.g. for early detection of machine problems. The Performance Monitor visualises current machine availability and efficiency, independent of the site. The CELOS APP thus offers transparency and monitoring options for basic production parameters, the so-called key performance indicators (KPIs).

World premiere

Exciting world premieres have been a highlight for visitors to the Open House for years. Once again, this year's event did not disappoint. Hot on the heels of the NTX 2500 2nd Generation, exhibited at EMO 2017, DMG MORI presented the latest model of its compact turning-milling centres in the form of the NTX 3000 2nd Generation in Pfronten. This machine is designed for larger bar diameters of 102 mm and is also capable of machining the most complex of components with a torque of up to 1,194 Nm. As with its smaller siblings, the experience gained from more than 1,000



installed NTX 2000s is also brought to bear in the NTX 3000 2nd generation. The latest model is therefore also endowed with high process stability and flexibility with a generous work area, 675 mm in the X-axis and +/-150 mm in the Y-axis, on a footprint of only 16.3 m². The decisive core component here is the B-axis with the company's in-house compactMASTER spindle for demanding 5-axis machining with up to 122 Nm. With 1,194 Nm torque and optional counter-spindle, the main spindle extends the performance of the NTX 3000 2nd Generation into the realm of 6-sided heavy-duty machining in the aerospace industry, the automotive sector and medical engineering.

Turn/mill machining centres are in the premier league of modern machining. This is also borne out by the new NTX 3000 2nd generation from DMG MORI. It is based on the robust machine bed together with stable roller guides. Added to this are comprehensive cooling systems in the spindles and ball screw drives. These ensure stable temperature conditions as a basic prerequisite for precision machining in continuous operation with five axes.

The NTX 3000 2nd generation embodies the trend towards automation from two perspectives. While the integral tool measurement and tool breakage monitoring system and tool measurement in the work area ensure efficient machining, a choice of needs-oriented handling systems takes care of tool loading and unloading, the robot version being just one example.

On the control side, the NTX 3000 2nd generation follows the path of digitisation, on the basis of which DMG MORI is promoting the digitalisation concept. The latest turning-milling centre is therefore also equipped with the CELOS APP-based control and user interface and large, 21" multi-touch display.

DMG MORI technology cycles are also available for the NTX 3000 2nd Generation. Easy Tool Monitoring enables spindle load and axis feed to be monitored. Technology cycles make it easy for operators to carry out demanding machining, setting up and measurement with universal machines as well as standard tools and fixtures. Special machines, programmes and tools were previously necessary for this.

Dr Mori concluded: "70 percent of our orders are coming as repeat orders from our existing customers. They are receiving the very best service possible in this industry. Keeping our customers machines running is both our mission and our duty. We welcome suggestions from customers in order for us to invest further in our service. As a first-class machine tool builder, we must keep producing new machines and providing innovative products and solutions to the customers. This is our commitment."

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MACH • Stand: H20-490

Aerospace gear specialist brings EDM in-house and gains Nadcap approval

Aldershot-based FT Gearing supplies the global defence and aerospace sectors with gears, miniature gearboxes and safety critical components for wing surface actuators, engine controls, instrumentation and fuel pumps. Many years ago, the manufacturer tried broaching the bore profiles in steel worm shafts to transmit the drive to thrust reversers, but the length-to-diameter ratios were too high and the tools broke frequently.

So the company put the work out to a wire-type EDM subcontractor in the Midlands. The service was expensive, partly because the firm needed to have Nadcap (National Aerospace and Defence Contractors Accreditation Program) approval, which is a requirement of primes such as Boeing and Airbus as well as tier-one aerospace companies, all of which FT Gearing supplies.

The situation has been turned on its head following the arrival, over an 18-month period, of three Makino wire EDM machines at an FT Gearing satellite facility close to the company's main factory. The machines were supplied by NCMT, UK agent for the Japanese machine builder. Within six months of the first arriving, the gear specialist had gained Nadcap approval, while the latest EDM machine installed mid-2017 provides capacity for internal



development projects and offering a subcontract wire EDM service.

Managing director Graham Fitzgerald, who started the business with his father Des Fitzgerald in 1978, says: "We chose U3 wire eroders from Makino after we employed a skilled EDM machinist that has a lot of

experience operating machines of the same make and rates them highly.

"He says that ISO programming on the Fanuc-based control is far easier than on some other EDM machines that employ two languages, macros are simpler to create and operations like rotation and mirror imaging are straightforward.

"From my perspective, quicker programming leads to higher productivity. The machines are also reliable, and their build quality means they sit well alongside top-end, 4- and 5-axis machining centres in our Unit 19, which we recently opened."

The latest Makino wire EDM machines are fitted with the Hyper-i CNC system, which contains an extensive library of cutting conditions that automatically optimises the erosion process, even for sealed and poor flush applications. The control employs so-called HyperCut technology, a process developed to produce surface finishes as fine as 3 microns Rz in standard tool steels in a three-pass process. Chris Elwick, manager of Unit 19, advised that the same result would take at least six passes on other makes of wire erosion machine.

This advanced technology is brought to

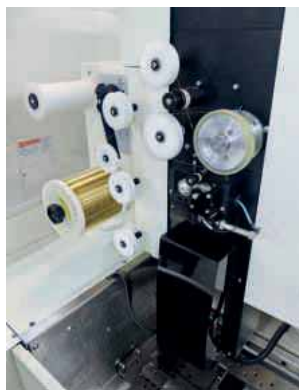


bear on FT Gearing's S106 and S82 aircraft steel worm shafts to produce bores of square, double-D, hexagonal and other shapes that provide the drive to the reverse thrust flap. Dimensional tolerance is to within 10 microns and cycle times range from one to three hours.

There is spare capacity to wire-EDM other components as well, such as internal gears, splines and keyways. Chris Elwick says: "Usually they require special gear cutters that can take up to 16 weeks to be delivered, but they can be put straight onto a Makino U3 without delay. Although machining takes a little longer, parts can be processed in their hardened state, so distortion and potential rework are avoided."



Makino's U3 wire EDM machine and the larger U6 were launched in the UK on the NCMT stand at MACH 2016. They offer competitive cycle times as well as high accuracy and surface finish, even using uncoated brass wire, and also feature low wire consumption. The machine is of stationary table design and the entire bed casting serves as the dielectric reservoir, reducing the footprint and eliminating the need for additional external fluid tanks.




Makino's optional High Energy Applied Technology (H.E.A.T.) is incorporated into the second machine installed in Unit 19, as it happened to be part of the specification of a model available at short notice from NCMT. A pair of high pressure, digitally controlled flush pumps and a large capacity, four-step filtration system provide even faster machining speeds and improved accuracy in cases that present difficult flushing conditions. It does not make much difference for FT Gearing's mainstream work but its benefits may be harnessed for future applications.

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MACH • Stand: H19-640

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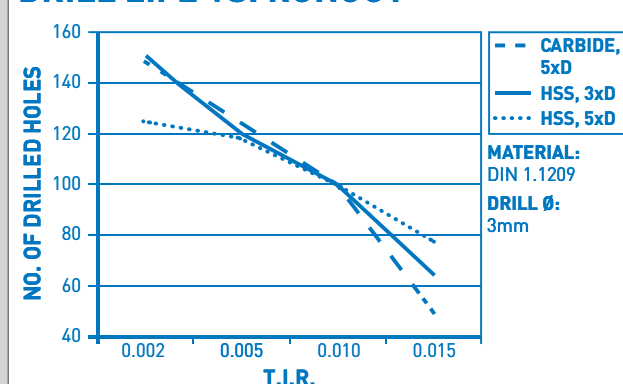
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DRILL LIFE VS. RUNOUT




T.I.R. (mm)	CARBIDE, 5xD (No. of Holes)	HSS, 5xD (No. of Holes)	HSS, 3xD (No. of Holes)
0.002	~150	~125	~100
0.005	~130	~115	~90
0.010	~110	~100	~80
0.015	~90	~85	~70


MATERIAL: DIN 1.1209
DRILL Ø: 3mm

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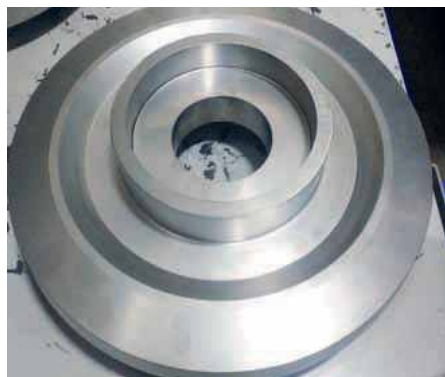
Renishaw reduces machining time for aerospace impeller manufacturer

Honeywell Aerospace, part of global commercial and consumer engineering conglomerate Honeywell, produces a large number of the impellers and blisks used in commercial aeroplanes. The impellers, which are essentially radial and axial compressors, rely on a workpiece datum being maintained throughout the machining process to ensure that they are suitable for use. If the workpiece datum point is not maintained, the impeller will be considered incompatible and will require rework, repair or scrapping entirely.

To help maintain accuracy in the machining process, Honeywell turned to global engineering company Renishaw to supply a RMP600 high-accuracy machine tool probing system and Productivity+™ PC-based inspection software for machining centres. The technology allows Honeywell to take measurements prior to machining and detect any axial displacement early in the process.

Honeywell conducts its impeller machining process at its manufacturing plant in Chihuahua, Mexico. Grinding, milling, turning and drilling processes are all carried out regularly and the facility is equipped with the latest machinery.

Impellers produced here come in various sizes from 14 inches to 17 inches in



diameter. The majority are made of titanium, except for one, which is manufactured in aluminium. The Chihuahua plant is a provider for the Honeywell assembly plant in Phoenix, Arizona, where aircraft turbines are assembled and tested.

If the workpiece datum of a finished part is off-centre, the impeller must be submitted for design analysis, in which a designer reviews the component and decides whether it can be used. Each analysis costs approximately \$66,900 per part and lengthens the manufacturing process. production alone can take up to 60 hours, and uses around 130 tools, including assembly in the machine. At Honeywell, this production time is scheduled over a two-week period. If the part is found to be off-centre after it is machined, the required analysis can take an additional week.

This leads to machine downtime and delays in the workflow, both of which have an impact on the production time and the cost of manufacture.

Raúl Barriga, sales director at Renishaw Mexico, says: "During the impeller machining process, Honeywell found that the workpiece datum was not being maintained axially, resulting in an increase in the time taken to finish a part

Axial displacement of the central point of origin can occur as a result of incorrect part setup, which can be caused by operator error, a damaged fixture, and/or burrs left on the part from a previous machining operation.

When the first cycle of Honeywell's impeller production process came to an end, Luis Adrian Gallegos, manufacturing engineer at Honeywell, discussed the ways that the company could reduce mis-

alignment during the machining process with his quality product engineer.

Luis Adrian Gallegos says: "After the first cycle, we knew that we needed to improve our machining process but didn't want to make a huge investment. "We met with Renishaw to discuss the possibility of using a high-precision compact touch probe, along with Renishaw software, to measure the parts prior to machining and detect any misalignment so that they can be corrected before machining.

"After exploring our options, we decided to purchase an RMP600 machine tool probe with radio signal transmission. This offered all the benefits of automated job setup and had the capacity to measure the geometry of complex 3D parts, such as our impellers."

During the machining process, the Renishaw probe touches the part in various places to identify whether there are any errors or misalignments.

Luis Adrian Gallegos continues: "The probe helps us detect any inaccuracies before a defect occurs. Previously, we had no way of identifying a problem until 16 hours of machining and over an hour of measuring had passed. We can now receive some warning that a part is incorrect and perform the necessary corrective actions before precious machining time and resources are wasted."

Raúl Barriga says: "As well as investing in a probe, Honeywell also opted for PC-based inspection software, Productivity+, for its machining centres. This provided Honeywell with an easy-to-use programming environment for incorporating inspection probe routines and in-process decision making into machining cycles.

Luis Adrian Gallegos says: "Since we started using the RMP600 touch-probe and Productivity+ inspection software, we have had no discrepancies, scrap or faults in production.

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MACH • Stand: H19-430/H20-150

Cutting processing times for finishing of blisks from several days to a few hours

For the efficient surface finishing of high value workpieces like blisks for airplane and land-based turbines, Walther Trowal has redesigned its CM vibratory system. It ensures that the workpieces receive a uniform, homogeneous high-quality finish with absolutely repeatable results. The surface finish of blisks, blade integrated disks, in airplane and other turbines affects to a large extent the airflow characteristics and, thus, the overall efficiency, fuel consumption and noise emissions.



To date, the surface finishing of blisks was done manually with grinding disks and other manually operated tools. Due to the "human factor", the quality of the final finish could greatly vary between workpieces. Frequently, it could even happen that certain surface areas were not finished at all.

For the consistent and high-quality finishing of circular high value components, Walther Trowal redesigned the rotary vibrator "CM" in close cooperation with leading turbine manufacturers to make it more suitable for treating all kinds of turbine components.

The "CM" system allows deburring and general surface improvement of components with diameters of up to 980 mm.

Single workpieces are mounted to the inner dome of the processing bowl. The height of the inner dome itself has been drastically shortened. After grinding media has been filled into the bowl, a vibratory motor causes the complete work bowl to vibrate. This causes a constant "rubbing" of the media against the fixed workpiece. Since the "rubbing" action is highly

homogeneous, a uniform, even finish on all surface areas of the disk and blades is achieved. After completion of the process, the surface roughness readings amount to $Ra = 0.2$ to $0.4 \mu m$.

Starting with an initial surface roughness of $Ra = 4$ to $5 \mu m$, the desired finishing results are achieved within about five to six hours. Compared to this innovative method, the manual finishing of blisks can take several days.

For finishing of blisks, Walther Trowal is recommending the special finishing media type V 2030. This media produces very smooth surface finishes on materials and shapes, which are typical for blisks. Of course, the V 2030 media is globally approved for the aerospace industry.

Walther Trowal GmbH & Co. KG

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Subcontractor gains AS9100 accreditation to target aerospace contracts

EDM subcontractor RST Engineering decided 20 years ago that a manual-tool-change Hurco Hawk, due to the ease of shop floor programming on its twin-screen control system, was the best CNC milling machine to take over from hand-operated mills for manufacturing copper electrodes, jigs and fixtures. A 10-minute demonstration on the Hurco stand at the MACH 1998 machine tool show was enough to convince RST's management that the power and simplicity of the software made it an obvious choice for this type of work.

The machine proved so fit for purpose that RST had no hesitation in replacing it in 2002 with an automatic-tool-change, 3-axis Hurco VM2 machining centre, which was equipped with a similar proprietary Ultimac twin-screen control as well as a 4th axis Nikken table.

Over the next decade, the subcontractor milled and drilled more and more of its customers' components on the machine, work that it was previously having to put out to another firm, thereby saving money and enjoying more control over production scheduling and delivery lead-times. The VM2 is now dedicated again to machining only electrodes, however, and is sited in the EDM shop alongside four wire erosion machines, the same number of die sinkers and a pair of EDM hole drilling machines.

In an adjacent unit, three additional Hurco machining centres, a larger 3-axis machine and two 5-axis models, have taken over production of RST's mainly aluminium, stainless steel and titanium prismatic components. All machines are fitted with Hurco's latest WinMax twin-screen control, which provides much greater functionality for conversational shop floor programming



and even generates 3+2-axis cycles. The machines have helped propel the milling side of the subcontractor's business to account for more than one-third of turnover.

RST was established in 1986 by Robert and Maureen Taylor and is now run by their three sons, Sean, Jason and Paul. It produces components for a wide range of industries including communications, aerospace, medical and scientific research as well as for more unusual customers making bespoke clocks and shotguns, for example.

Jason Taylor says: "Around 40 percent of our business is in aerospace, involving wiring, sparking and milling satellite communications components like waveguides and diplexers plus some second-tier work producing components such as gimbals and joints for military aircraft.

"Last December, we gained AS9100 aerospace quality management accreditation and are looking to expand in the sector by taking on long-term commercial aircraft contracts, hopefully building them to account for a quarter of our business in a few years' time."

The initiative had been in the company's sights for several years and so also was relocation, which took place in August 2016 to new 7,100 sq ft premises on the Young's Industrial Estate in Leighton Buzzard, two and a half times larger than RST's previous unit.

The move entailed a £300,000 investment that included the purchase of a coordinate measuring machine and a Hurco VMX60SRTi 5-axis machining centre of B-axis spindle design and 1,524 x 660 x 610 mm capacity. It joined a smaller 5-axis Hurco VMX30Ui of swivelling trunnion design purchased two

years earlier and a larger 3-axis Hurco VM30i installed the year before to cope with a wider variety of component sizes.

In the previous factory the VMX30Ui worked alongside a similar VMX30U 5-axis machine installed five years previously, in 2009, fitted with older technology drives and control. Jason Taylor was able to benchmark one 5-axis model against the other and was astonished at the improved performance of the more modern machine.

Jason Taylor says: "Cycle times were considerably reduced using the same program, for instance when machining a shotgun trigger guard, and the improvement in surface finish was very apparent, especially when milling surfaces and transitions.

"The gains were so great that it prompted us to part-exchange the older 5-axis trunnion model and buy the bigger B-axis machine, which has similarly improved drives and control system."

Only a small proportion of RST's 5-axis machining is fully interpolative, programming of these parts of cycles being done off-line at a VISI CAD/CAM station. 3+2-axis programming is shared between VISI and Hurco's WinMax control software on the shop floor using the latter's Transform Plane facility while 3-axis routines are produced entirely in WinMax.

Another feature of the software that all RST staff appreciates is NC Merge which allows 3-axis parts of a cycle to be prepared at the control and merged with 5-axis sections programmed in VISI. The load on the offline CAD/CAM station is reduced and, in any case, 3-axis programming is more efficiently completed conversationally in WinMax, according to Jason Taylor. It is even possible to program on the shop floor



and start running 3-axis/2D blocks of code on a machine and tack on 5-axis/3D blocks downloaded from VISI afterwards, saving time when proving out jobs.

Jason Taylor adds: "The latest Hurco B-axis machine is very versatile and well suited to subcontracting, as it is able to produce 5-axis parts up to 600 mm diameter on the rotary table and a second, 3- or 4-axis part on the fixed table to the side, giving Op1/Op2 possibilities.

"Alternatively, one large component up to 1.5 metres in X by 660 mm in Y can be 3-axis milled and drilled.

"The machine holds very tight positional and dimensional



tolerances down to ± 10 microns in 5-axis working and half that when interpolating three axes, with excellent repeatability.

"Together with our trunnion-type 5-axis VMX30Ui and the other 3-axis Hurco, which also have 12,000 rpm spindles, it places us in a good position to enter the civil aerospace supply chain now that we have AS9100."

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MACH • Stand: H6-180

5-axis machining of composite aircraft components

Large composite components for the Airbus A350 family of wide-body jetliners are being machined in a pair of German-built Zimmermann FZ33 portal machining centres at a specialist subcontractor in England.

Supplied by sole sales and service agent, Geo Kingsbury, each machine has a working envelope of 16 m x 3 m x 1.5 m and an installed weight of 168 tonnes.

The carbon fibre epoxy matrix parts are some of the largest composite components in the world, up to 12 metres long, 25 mm thick and weighing as much as 200 kg. The 5-axis machining cycles, involving edge trimming, face milling and drilling, take up to 16 hours across two operations.

The cycles include a significant amount of on-machine probing, first of the vacuum fixture position and then of the secured component during set-up, followed by post-machining inspection. Dimensional accuracy over a full 12-metre span is within ± 0.2 mm. All parts then go for ultrasonic inspection before being shipped to Airbus, Broughton.

The Zimmermann FZ33s are fitted with a Weiss 45 kW, 25,000 rpm, HSK-A63 spindle mounted in a slimline head that provides 220 degrees of A-axis rotation and the direct-drive rotary C-axis. X/Y/Z travels are actuated via rack and pinion drives, with twin motors in X. Linear scales are employed for accurate positional feedback to the Siemens control. A pair of video cameras has been fitted to allow the operator to



conveniently monitor the large working area.

Composite machining results in high cutting loads and rapid tool wear, so carbide and polycrystalline diamond cutters are used. Dry milling and drilling of such materials create a lot of dust, which the FZ33 removes efficiently, both via the extraction and filtration unit at the rear of the machine and through a brush enclosure around the spindle head.

Geo Kingsbury

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One of the Zimmermann FZ33 portal, 5-axis machining centres for producing large composite aircraft components

Tool shanks with interior cooling - a challenging drilling task

TBT develops a special device for standard deep hole drilling machine with four degrees of freedom

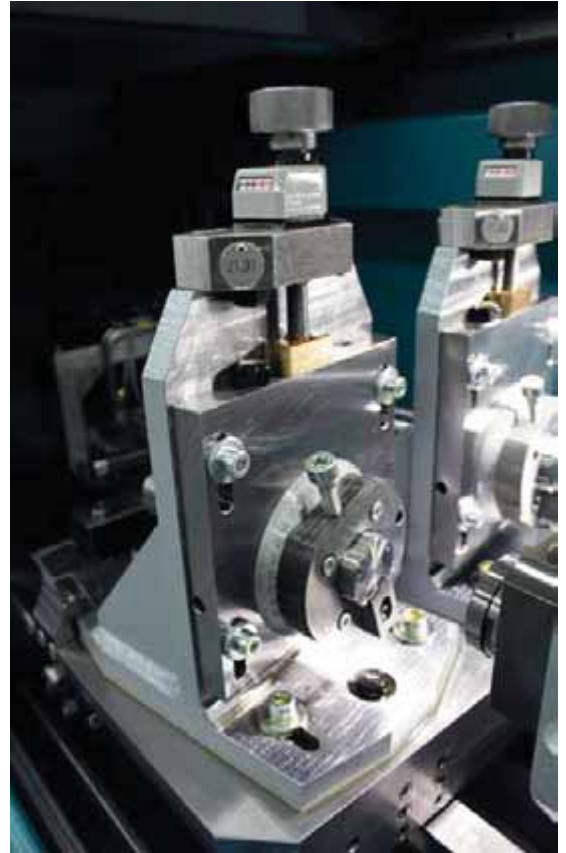
Cutting tools increasingly work with an interior cooling system. Manufacturing of such tool shanks becomes a challenge because cooling channels with a high length-to-diameter ratio have to be drilled. For some variants, the tool designers even intend drilling of inclined holes. For such drilling tasks, TBT Tiefbohrtechnik, located at Dettingen/Erms, has developed a special device to drill with single lip drills.

If the task was only to drill centric cooling channels, this would be a simple, hardly appreciable task, but tool shanks have become complex workpieces, since the cooling lubricant must be optimally fed to the edges of the drilling or milling tool. Therefore, a centric cooling hole is not sufficient. As a result, one manufacturer of such shanks was confronted with increasing requirements. This manufacturer had to produce several variants of shanks, with different shank lengths and diameters, as well as versions with eccentric holes, sometimes running inclined to the workpiece middle axis and in various distances to the middle axis. The diameters of the coolant holes vary with each tool for which they are intended, ranging mostly from 1.5 to 6 mm. This results in rather large length-to-diameter ratios. The technology of deep hole drilling with single-lip drills is

best suitable for this task, as single-lip drills are much better than conventional spiral drills regarding deviation and straightness and hence mostly the better tools with regards to process reliability.

Since the manufacturer of the tool shanks was already using several type ML200 deep hole drilling machines from TBT Tiefbohrtechnik in Dettingen/Erms, he wanted to produce the new workpiece variants again on this machine type. The machine is perfectly suited for tool shank applications. It is provided by TBT with one or several spindles, corresponding to drilling diameters of 0.8 to 12 mm. In this way, flexibility in both directions is given, if the diameter range from 1.5 to 6 mm is not sufficient.

TBT Tiefbohrtechnik not only manufactures machines but is also a contact partner for all questions around deep drilling. This also applies for devices. As a consequence, this tool shank manufacturer requested a suitable solution from TBT which could be adjusted to the new,



different workpiece versions and fit exactly with the intended ML200 in a two-spindle variant.

For the specialists at TBT, designing devices is a daily business. However, providing a highly flexible solution in this instance was a challenging task. The drilling device had to provide four degrees of freedom: 360° rotation of the workpiece around the middle axis, height adjustment, cross adjustment and angle adjustment for the inclined holes in a horizontal direction. Cross and angle adjustment could be synchronous for both spindles. However, the rotation and height adjustment for both workpieces had to be adjustable separately for each spindle.

Andreas Schlegel, sales manager at TBT, says: "Our claim is, to supply complete and 100 percent functioning solutions, consisting of deep hole drilling machines, drilling tools and all other machinery components. Beside this device, that may



Sunnen Products Company acquires BTA Heller

US-based honing systems manufacturer has acquired the premier deep hole tooling and systems manufacturer to provide complete bore creation and finishing solutions

Sunnen Products Company has acquired BTA Heller Incorporated, a US-based manufacturer of deep hole tooling and systems for primary hole generation. This move aims to expand Sunnen's leading honing expertise to include tooling for initial hole creation and other complementary bore sizing and finishing processes. The company will retain the BTA Heller name as a wholly owned subsidiary of Sunnen Products Company, as the companies build on natural synergies to offer complete bore creation and finishing solutions.

Chris Miltenberger, president and COO of Sunnen Products Company, says: "BTA Heller is a natural fit for Sunnen. Our companies complement each other very well and BTA Heller's reputation in the industry for deep hole drilling expertise is unsurpassed. The transfer of knowledge between the two companies will create a unique value proposition for our customers. Also, with this acquisition, no other deep hole/BTA company will have Sunnen's global presence for technical and post-sale support."

The Heller roots trace back to Germany more than 100 years ago. BTA Heller started in 1952 in Troy, MI as American Heller. In



BTA Heller president Mark Sollich (L) and Chris Miltenberger (R), president Sunnen Products Company make Sunnen's acquisition of BTA Heller official, as Matt Krieder (C), chairman Sunnen Products Company, looks on

2007, the company name changed to BTA Heller, and it has continued to produce unique tooling and processes for gun



The new Sunnen SHD-series bore-sizing machine incorporates the BTA Heller skiving and roller burnishing tooling. Sunnen expects the acquisition of Troy, MI-based BTA Heller to create a company unique in the industry, combining years of both deep hole drilling and honing expertise

drilling, single tube, BTA, and double tube/ejector drilling systems, among others.

Mark Sollich, president and CEO of BTA Heller, says: "We have developed various tools and systems for creating intricate internal profiled deep hole drilling from 0.5 in. to 36 in. diameter. To combine forces with Sunnen and its bore geometry expertise creates a company not found anywhere else in our industry. No one company can provide a total bore solution from the creation of the primary hole to the final bore finish specifications like we can. Mark Sollich will continue at the helm of BTA Heller after the acquisition, under the Sunnen Products Company umbrella.

Sunnen is the world's largest vertically integrated manufacturer of honing systems for precision bore sizing and finishing. Core technical competencies include automated and manual honing systems, custom system development and integration, abrasives, tooling, lubricants, and gaging. The company recently introduced the new SHD series skiving and roller burnishing system with tooling supplied by BTA Heller.

Headquartered in the US, Sunnen employs 650 people worldwide, with offices, manufacturing and tech support facilities throughout Europe, the UK, China,

Brazil and India. Sunnen has the largest sales and technical service network of any company in its industry to ensure full global support for its multinational customer base.

From the beginning, Sunnen Products Company has concentrated on advancing honing technology and related equipment for industrial applications. Sunnen's honing products include a complete line of industrial honing machines from simple manual hones to fully-integrated systems that can provide every necessary function for most applications. For the engine building market, Sunnen provides the industry's most popular honing systems. Sunnen also manufactures a wide range of abrasives, lubricants and gages for both markets. Sunnen's tooling and abrasives are manufactured for use on Sunnen systems as well as machines manufactured by other companies.

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MACH • Stand: H19-580

Deep hole drilling for reaming and rifling

The origin of marksmanship is made in Germany

Manufacturing a precision rifle barrel requires comprehensive process reliability. The barrel is deep-drilled and then reamed with combined Tibo deep-hole drilling/reaming E-series machines in their multi-spindle version, that is the basis for the subsequent accuracy. Next, the highly precise rifling in the deep-hole-drilled and reamed barrel is rifled on a DR series rifling machine. Through the rifling in the barrel, the projectile is set in rotation around its longitudinal axis on its path from the chamber to the muzzle and is stabilised in its trajectory as it exits the barrel.

With Tibo's DR-series rifling machines, the touch panel control can be operated very easily and intuitively. Different rifling gradients and lengths can easily be programmed and stored in the data memory for recurring orders. The DR-series is available in diameter ranges up to \varnothing 40 mm and for different barrel lengths up to 4,000 mm and for a rifling force of up to 200,000 N.

The possible procedures include the cold-reshaping button rifling with so-called drawing nut, or machining procedures such as single-edged cutting of the rifling with a hook knife or multi-edged cutting of the rifling with a crown knife.

TIBO Tiefbohrtechnik GmbH is a company with operations throughout the world that has specialised in the design and production of modular deep hole drilling machines. Founded in 1994 and with its headquarters in the town of Pfullingen in Baden-Württemberg to the south of Stuttgart, today it is one of the leading suppliers of single-spindle and multi-spindle gundrilling and BTA deep hole drilling machines for a broad range of applications.

Embedded into a medium-sized group with currently 13 companies and more than 1,000 employees its customers benefit from shortest reaction times in all aspects of the deep hole drilling machine.

As a South German machine constructor, the company manufactures exclusively in its



own plant at the headquarters in Pfullingen. Its suppliers also manufacture mainly locally, which means the company can proudly claim that its machines are made in, Germany.

Together with its collaboration partner, Gehring Technologies, it is able to offer complete process solutions from deep hole drilling right through to honing.

TIBO Tiefbohrtechnik GmbH
Tel: 0049 7121994260
Email: info@tibo.com
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Mollart engineers BTA drilling solutions with application service and support from Chessington

The BTA or STS self-piloting drilling process for larger holes is able to create bores from 18 mm diameter up to 100 or more times length-to-diameter ratios. Through Mollart Engineering and its tooling partner Botek, a leading company in deep hole drilling systems and tooling, the Chessington, Surrey-based deep hole drilling specialist will provide application engineering support involving drill heads up to 1,000 mm diameter.

Chris Barker, director of tooling, explains: "The BTA drilling process originated from the Boring and Trepanning Association formed through a group of European manufacturers in the 1940s. The BTA process is also known as the single tube system (STS) covering deep hole solid drill heads, pull-boring and counterboring heads, step and form boring tools and trepanning heads."

Due to the different tool head types, each providing a more effective deep hole production solution over conventional drilling and boring, they need to be configured and applied to optimise results. In order to provide this level of support, Mollart Engineering has created its BTA Application Centre based in Chessington with two 'local' regional specialists in the Midlands and North of England to also provide direct support to customers in

Scotland. The new centre is also able to draw upon Mollart's international expertise in advanced deep hole machine tool development and build, tooling and subcontract manufacture.

Due to its configuration and hole size capability, BTA drilling requires more power than gundrilling. Both drill from solid using high pressure coolant to directly lubricate the cutting zone and importantly, efficiently evacuate chips away from the head of the drill.

There is a marked difference in the design of a gundrill and a BTA tool. Gundrilling uses a solid carbide tool head brazed to a tube through which coolant is pumped under pressure to the cutting edge of the tool head. Chips are evacuated via a deep vee shaped flute in the drill head which extends back along the exterior of the tube between the drill and the drilled portion of the workpiece.

The BTA system has a rigid drill head secured to a support and feed tube with either brazed solid carbide or indexable inserts where coolant is pumped under pressure to the cutting edge between the outside of the tube, the cutting head and the newly created bore in the workpiece material. This pressure forces the chips to be efficiently flushed back through the drill head, tube and machine spindle for



collection. In both BTA and gundrill systems, guide pads in the drill head support the cutting action enabling continuous feed rates to be applied to achieve straight, round and accurately sized holes with high degrees of surface finish.

As chips are evacuated through the internal bore of the BTA drill head and tube, fluting or grooving is not required which enables a greater cross-section of tool that increases rigidity and hence stability under cutting conditions with the ability to maintain geometry and performance over extended hole depths.

Pull-boring is a BTA-based process used to accurately enlarge existing through bores to maintain, for instance, a constant wall thickness, tolerance or surface finish. The process uses a tensioned BTA boring head but with the wear pads set ahead of the cutting inserts in order that the cutting tool can be drawn or pulled-back through the workpiece.

Counterboring is a very effective operational use of BTA operation to open up existing pre-bored holes where the BTA drill head can achieve a more precise diameter or concentricity of a bore or provide an additional feature such as a bearing or oil seal diameter.

While gundrilling can be used for creation of micro bores as small as 0.5 mm in diameter, BTA holes start at 18 mm due to the size required for the drill tube but it's



design criteria is able to create bore lengths in excess of 100 times depth-to-diameter ratio. In addition, the use of a trepanning style head extends the BTA concept to machine bore diameters up to 1,000 mm. However, while the trepanning operation creates chips from the cutting action it also produces a central core of material which can be used for further production and is especially economic on high value materials.

BTA drill heads comprise a series of supporting guide pads and can be fitted either with brazed carbide inserts that can be re-ground or carry a series of carbide indexable inserts which enable greater efficiency due to the multiple cutting surfaces. The drill head is larger than the tube and is screwed into the end of the rigid drill tube. This construction of the tool means it is ideal for difficult materials such as exotic alloy steels and stainless steels and is able to support and maintain drill penetration rates several times faster than more conventional drill types.

As a result, the BTA system has been widely adopted by the oil and gas, nuclear and defence sectors as well as general engineering. Indeed, with certain of these sectors having demanding components such as premium precision tube for use in hostile or extreme environments, BTA drilling is the chosen process to create the standard of bores demanded.

Recent applications at Mollart Engineering, involving the BTA drilling process, include a second order from a European aerospace contractor for producing a series of deep and blind holes in a range of aircraft actuation devices.

Ian Petitt, sales director, says: "The success in our application engineering for the first machine, won against intense world competition, put us very quickly on the shortlist for the follow-on order."

The Mollart HDI-1500 BTA machine with 22 kW drive has a capacity from 18 mm to 50 mm diameter by 1,500 mm depth. It is processing a series of blind and through holes between 20 mm and 47 mm in 15-5PH stainless steel bar where holes can be up to 1,200 mm deep. Geometric tolerances are within 0.2 mm for straightness, 0.05 mm TIR for concentricity and 0.025 mm for roundness with surface finish within 0.8 micrometres.

Mollart Engineering's Acubore deep hole drilling centre, installed at its Chessington subcontract facility, was used to produce 63.5 mm diameter bores from solid using BTA tooling technology in demanding oil industry Super Duplex materials. The oil industry destined parts were produced out of 250 mm diameter by 2,180 mm long, 13 percent chromium Super Duplex stainless steel bar with each component weighing some 900 kg.

The design of the Acubore machine incorporates the flexibility to drill both on centre line as well as off-centre using either or combinations of gundrills and BTA tooling. This extends the



flexibility of the process and drilling capability to suit the workpiece and the level of accuracy required.

The Acubore machine was developed by Mollart for power drilling with a 30 kW motor able to create up to 666 Nm of torque with a top speed of 5,000 revs/min. This enables the machine to accommodate both large and smaller hole sizes with the power to drill exotic materials and higher speeds for freer machining materials.

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MACH • Stand: H20-120



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Broadbent Stanley extends range with large capacity double column machining centres

Halifax-based Broadbent Stanley is continuing its strategic expansion of the products it can offer to customers with the announcement that it is partnering with Starvision, a Taiwan-based manufacturer of large capacity double column machining centres. With X-axis travels up to 36 metres and 5.7 metres in the Y-axis, as well as five-face or full 5-axis capability, the Starvision machines provide a wealth of opportunity and capacity for customers.

The extensive Starvision range covers box-way machines, linear guide machines, moving beam, moving column and 5-axis variants. These can be equipped with a range of milling heads that can be automatically changed to suit specific machining requirements.

Graham Thomas, managing director of Broadbent Stanley, says: "The addition of the Starvision range fully complements our existing range of bridge mills and will open up significant opportunities across the industrial sectors that we serve. We have probably had 10 enquiries in the past 12 months for machines of this size, so the appetite for machines of this size is there. We have already quoted for the first Starvision machine and are hopeful of a successful outcome of that soon."

The Starvision range also combines Taiwanese manufacturing technology with German design input, with Starvision having a technical cooperation agreement with A. Monforts Werkzeugmaschinen GmbH. Using advanced design systems, including FEA (Finite Element Analysis), in machine design to enhance structural rigidity and

eliminate as far as possible any machine deviation. In addition to the machine design eliminating any potential issues, Starvision also monitors accuracy over these long bed lengths by use of Autocollimator technology. This ensures the straightness of long-stroke axes are precisely fabricated, even when the worktable is loaded with a heavy workpiece, meaning dynamic accuracy is still maintained along with high-performance.

The standard range of machines goes from the Compact series with tables sizes from 600 mm by 600 mm through box way and linear guideway machines with tables ranging from 2,000 mm by 1,400 mm up to 10,000 mm by 3,500 mm and on to the moving column machines with tables measuring up to 36 metres in length. In addition to these standard machine configurations, Starvision will work to a customer's requirements, whether to fit an available space or to meet the needs of specific applications. Two recent examples of this tailor-made approach are a machine with an 8,000 mm table with the X-axis travel set to 9,000 mm to meet special machining requirements, while another customer was supplied with a 3,000 mm bed machine, but with a modified column in order to give a maximum clearance of 2,100 mm from the spindle nose to the table.

Graham Thomas says: "What attracted Broadbent Stanley to the Starvision range was this variety of machines to suit a broad range of applications and the willingness of Starvision to adapt existing machines to suit customer needs. Machines at this size are rarely standard and it is important to have a manufacturer so obviously willing to listen to customers and deliver machines that meet all their expectations. With our knowledge of industries such as power generation, oil & gas, rail, construction, and aerospace



across markets as diverse as the UK and Ireland, Kuwait, Bahrain, Oman, Qatar, the Kingdom of Saudi Arabia, Egypt, Libya, Iran and North Africa, we are confident that there are many opportunities to develop sales of these machines."

With a heritage dating back to the 1870's, Broadbent Stanley has a worldwide customer base, today exporting more than 70 percent of its products, with users in the power generation, rail, construction, aerospace, chemical and oil and gas industries. Wherever there is a need for large capacity turning applications Broadbent Stanley can generally offer a solution.

Product development is high on the list of priorities with newly available CNC and hollow spindle lathe models designed specifically for the oil and gas industries. An additional range of large capacity, heavy duty CNC slant and flatbed lathes has also been added, complementing the company's existing products.

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New 5-axis machining centre for training

An advanced training machine designed to raise the skill level of horizontal machining centre operators away from the shop floor has been introduced by Heller Machine Tools. Available for demonstration in the new customer area at the company's Redditch factory, the latest CNC ProfiTrainer builds on the capabilities of an existing 4-axis version with rotary table by offering the option of an additional +30/-120 degree A-axis.

The fully configured, functional machine, which is powered by a single-phase electrical supply, is likely to be of interest to industrial training establishments, colleges and schools, especially as it is small enough to be transported between different educational centres if necessary. Larger OEMs and subcontractors may also choose to adopt the machine for operator training. There is a rental option, with payments subtracted from the purchase price if a customer later opts to buy the machine.

The realistic simulator is fitted with a full version of the Siemens 840D sl control and is now also available with Fanuc and

Heidenhain equivalents. Having 200 mm linear travels driven by servomotors at up to 15 m/min over linear rails, the machine is designed to mimic realistically the operation of a full-size Heller machine tool. However, it can also be used to provide training for any make of prismatic machining equipment in a safe environment.

The multifunctional spindle is new. Driven by a 9,000 rpm / 2.75 Nm motor, it offers the options of an ER16 collet as well as manual and automated inserts for holding HSK25 tools. Even functions that cannot be performed on the training machine, such as operation of a tool magazine, can be simulated using control runtimes.

The facility, which is designed to tolerate operating errors, provides skills training without tying up a machine on the shop floor, which would result in lost production. Furthermore, the risk of a crash occurring on a real machine is eliminated, avoiding potential repair costs. Another benefit of the training unit is that its small size encourages trainees to try out new things.

ProfiTrainer is equally useful for



mechanical and electrical maintenance courses, as the use of original components supports realistic handling of fault situations. Feedback from thousands of students who have used previous iterations of this unit over the past decade confirms the success of the concept.

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MACH • Stand: H20-470

Mazak for Siemens users

Yamazaki Mazak has revealed its latest alternative CNC option for those manufacturers who have standardised on Siemens control.

Mazak's latest machine to feature a Siemens CNC is its VTC-760C vertical travelling column machining centre, which is controlled by the new Siemens 828D control.

The travelling column design of the VTC-760C provides optimum machining flexibility, including dual load configuration. The machine benefits from a compact footprint, along with a long X-axis stroke and large 2,300 mm fixed table that provides excellent stability.

Most importantly, the VTC-760C is a highly productive machine, powered by a 12,000 rpm spindle and rapid traverse rates of 42 m/min in the X-, Y- and Z-axes.

The inclusion of the new Siemens control represents an entry into the commodity market, as the 828D control panel is a mid-range CNC for turning and milling machine tools. The 15.6" touch screen display runs on SINUMERIK Operate 4.7 and

features a built-in QWERTY keyboard with USB and ethernet access.

The CNC benefits from a number of intelligent operations, including ShopMill, which automatically compiles machining step programs to enable multiple clamping with fewer tool changes. In addition, a built-in onboard maintenance planner is included which facilitates easy integration of regular maintenance schedules into production. The control communicates in over 20 languages and can also be programmed to send SMS messages to operators, machine setters, or service and maintenance technicians to provide alerts for tool life, availability of blanks and upcoming maintenance schedules.

The machine is ideal for those customers looking to integrate Mazak's advanced machining solutions into their factory or machine cell, but who may already have standardised on a Siemens operating system. Crucially, as the control is able to provide automatic feedback on a range of machine diagnostics, which can lead to reduced downtime and improved



production efficiency; it also ensures that manufacturers adopting Industry 4.0 design principals can still harness the precision cutting and speed of operation synonymous with Mazak.

The VTC-800/20SR is equipped with an 18,000 rpm main spindle and delivers rapid traverse rates of 50m/min in the X-, Y- and Z-axes. It also comes equipped with an automatic tool changer with 30 tools as standard.

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MACH • Stand: H20-760/H20-790

Large bridge machining centre moulds the future

Consistency of production cycles, enabling extended unmanned running while maintaining accuracy and precise levels of surface finish and repeatability, are critical to elastomeric rubber seal, gasket and moulding specialist TRP Sealing Systems' mould production at its Hereford headquarters. The company has been able to maintain high levels of overall productivity during the last three years following the setting up of its own toolroom and the installation of a Wele large bridge-type (LB series) LB421 gantry machining centre.

Supplied by 2D CNC Machinery of Hinckley, the investment was critical to the business to bring often very complex mould production and refurbishment operations in-house as front-line support to its seal moulding and gasket production. Here, rubber mouldings weighing up to 5 kg are produced in 'made-to-order' batches of up to 250,000 a year from mould tools that can vary in size between 300 mm square to 3,900 mm by 1,700 mm. These variations in mould sizes are all now machined complete in a single operation on the Wele machining centre.

Jo Privett, quality manager, says: "We design and develop each mould to suit the material specification which can also include cross-blended types, direct from customer supplied 3-D models or drawings of the gasket or seal they require. This can be extremely demanding and often draws on our 35 years of production expertise where finished component thickness can vary between just 2 mm and 20 mm. However, there are added complexities due to geometry applied to the form, special radii and especially transition between areas into both bottom and top halves of each mould."

This is why machining accuracy and especially consistency is important to TRP. While the final moulded component can be to a tolerance of ± 0.15 mm, to ensure maximum production life from the mould, process sizes are normally maintained very close to bottom of the designed tolerance band which can mean within 0.08 mm. However, even more demanding is that tolerances of form in the mould which can be as tight as 0.03 mm.

Here, the accuracy and repeatability of



the Wele LB421 has proven critical and is now well-proven, even when the 4,000 mm by 2,000 mm machine table is fully loaded with mould plates. These are retained in place using magnetic pads and tolerances have to be maintained across the whole table area. This is aided by the 15-tonne capacity table design that incorporates triple sets of ultra-heavy, linear roller guideways on the X-axis a major advantage for stable machining against most machines of this type which have only two.

Recently, following almost three years of continuous production, as part of the company's regular quality audit, it was decided to lightly reskim the 1,225 magnetic pads which are fitted to the table. These provide a datum and hold each mould in place giving total access to the top surface of the mould plate and eliminates the use of clamps. When completed, the inspection report qualified the total area of the table had been machined within 10 micron.

Originally formed in 1981, TRP Sealing Systems has progressively grown to become a global business while still maintaining 80 percent of its sales within Europe. It has formed manufacturing operations under Hereford control in China and India to serve the Asian and Middle East markets plus a facility in Romania. As a private company it

employs some 750 people worldwide with 300 based in the UK where all design and process engineering takes place. With customers in the automotive sector, it is also a regular supplier to electronics, biotechnology, food, medical, chemical, marine, power generation, oil and gas, aerospace and defence sectors.

An important part of its success is the advanced laboratory for compilation of material specifications and seal development involving the tailoring of special polymers to suit specific and often ground-breaking applications such as those required by chemical customers and to meet the latest environmental demands. This ties in with its in-house tool design and prototyping service where the latest rapid prototyping equipment including laser and 3-D printing is installed. There is also a facility to produce bonded metal components.

The Wele LB421 has axis travels of 4,060 mm in X, 2,180 mm in Y, 2,800 mm is optional, and 800 mm in Z, up to 1,400 mm is optional, and each has high accuracy positioning through Heidenhain linear scales. The direct drive spindle motor is powered by 30 kW motor providing a maximum speed of 15,000 revs/min. A 32-tool magazine is standard and included

in the machine specification is a Renishaw OMP60 optical transmission probing system for automatic workpiece measurement. Control is by Fanuc 31iMB with an AICC (1,000 bps) data server.

Previously, TRP used external UK mould suppliers but now 99 percent of production is within the business. Once set, production is continuous. It is unmanned at night and through weekends. Dean Sletcher, machine programmer and setter-operator, has the machine's Fanuc 31i MB control connected to his mobile phone to alert him should the process stop, at which time he returns to the factory to reset and continue the production cycle.

Milling cycles form the majority of the production processes using standard carbide cutters between 0.4 mm diameter for profiling and 63 mm diameter for face mills. Mostly depths-of-cut tend to be around 4 mm. U-drills of 14 mm, 20 mm and 24 mm diameter are used for producing mould clamping holes.

Dean Sletcher concludes: "Due to the predominance of small tools, we specified the machine with a 30 kW, ISO BT40 taper, direct drive spindle in place of the normal BT50 taper specification. This allows us



to effectively machine at speeds up to 15,000 revs/min as we perform extensive profiling and surfacing of seal features without the use of form tools. As moulds are compression types and run hot at 160°C, there is no requirement for drilling deep cooling holes."

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Lagun TM series offers large capacity and versatility for turning and milling

RK International Machine Tools' agreement to provide commercial and promotional support for Lagun's range of large capacity bed-type and moving column milling/turning machines is showing encouraging signs, with interest across the range from a variety of industry sectors. The capability and versatility of the Lagun range is key to its success, particularly the TM series of cross moving column machines.

The four machine TM range has X-axis travel up to 5,000 mm combined with Y-, Z-, and V-axis travels of up to 1,300/2,000/1,500 mm respectively. With travels of this size the machines are also built to handle large workpieces weighing up to 10,000 kg, and with the V-axis, that holds the digital spindle, fully retracted it is possible to fit components up to 2,500 mm diameter on the machine's rotary table. With the turning option specified this rotary table can rotate at up to 400 revs/min to create a highly capable turning system.

For milling, the TM series can be specified with a choice of six milling heads. Three of these are universal Hure-type heads with spindle speeds ranging from 3,000 to

6,000 revs/min. An orthogonal-style head can also be specified machine, which gives index increments of one degree in both planes of movement with positioning controlled by two encoders and Hirth couplings, making it ideal for turning operations. Alternatively, a choice of two horizontal heads, of differing length scan be specified.

With one of the Hure or orthogonal heads fitted, the TM series is capable of machining complete five sides of a component and, with either the 40 or 60 position chain-type toolchanger, complex parts can be machined without interruption. Given the large scale of the Lagun TM machines, the largest weighs 29,000 kg with a footprint of 9,200 mm x 7,371 mm and spindle travel of 2,700 mm (Y + V axes) and 2,000 mm in the Z-axis, guarding also needs to be taken into consideration. Here, Lagun can provide various options, one being to fully enclose the machine or, alternatively a more cost-effective option is to use side curtains and fencing to separate the operator from the working environment.



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MACH • Stand: H19-314

Modular design helps Starrag break new ground

Starrag has broken new ground in affordable, yet highly productive and high-speed 5-axis machining, with the launch of a new series of Heckert horizontal machining centres that have traverse rates up to a staggering 80 m/min.

The new H45, H50 and H55, L40, L50, L55 and X40 machines not only have a smaller footprint of up to 30 percent less than traditional horizontal machines, which results in an estimated 15 percent increase in productivity per unit area, but they also boast acceleration rates of 1.2 g, tool change (chip-to-chip) times down to 2.2 secs and pallet change times down to 8.5 secs.

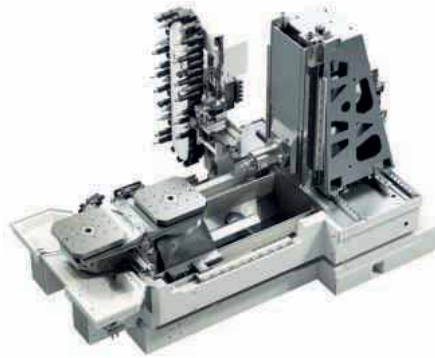
The modular design enables the use of different pallets, of either 400 mm or 500 mm, while spindle and column options allow users to specify versions for either highly dynamic machining of, for example, aluminium, using the universal HSK63 spindle on a lightweight aluminium column, or a high-torque HSK100 unit, which utilises a steel column, for processing materials such as titanium.

The result is an affordable machine range that is incomparable in terms of speed and productivity, can easily be configured to user demands and is available on extremely short delivery timescales within just 12 weeks. This enables users to install machines to meet even the most demanding delivery schedules.

Many aspects of Starrag's well-proven machine construction principles are applied to the machines, which share a common platform, including a mineral bed for optimum temperature and vibration resistance, linear guideways and a centralised swarf conveyor, as well as unified and easily accessible coolant and lubricant systems. This results in minimal downtime and therefore high levels of reliability.

Starrag went back to the drawing board for the development of these machines, as Dr Marcus Otto, managing director of the Starrag plant in Chemnitz where the new Heckerts were developed, explains: "We wanted to develop a series of machines that would meet all our customer demands of readily-available machines that can be configured exactly to individual needs and with optimised machining operations and speed, plus with a small footprint to maximise productivity on a production output per ft² of floorspace level.

"We've achieved exactly that by



The new Heckert H50 has X, Y and Z axes travels of 700 mm by 750 mm by 780 mm and can accommodate workpieces up to 900 mm high and weighing 800 kgs

rethinking design attributes, which include the positioning of the swarf conveyor, re-arranging the coolant and lubrication systems, and using a one-piece sheetmetal machine 'skin.'

New machines now available:

Heckert H40, H50 and H55

The machines have X, Y and Z axes travels of 560 mm by 650 mm by 680 mm (H40) and 700 mm by 750 mm by 780 mm (H50 and H55) and are able to accommodate workpieces up to 900 mm high and

weighing 600 kgs (H40) and 800 kgs (H50 and H55). The up to 20,000 revs/min spindle offers torque values of up to 453 Nm.

Heckert L40, L50 and L55

These machines come with X, Y and Z axes travels of 560 mm by 550 mm by 680 mm (L40) and 700 mm by 550 mm by 780 mm (L50 and L55) and are able to accommodate workpiece heights up to 600 mm and loads of 600 kgs (L40) and 800 kgs (L50 and L55). The up to 20,000 revs/min spindle offers torque values of up to 453 Nm.

Heckert X40

The machine features X, Y and Z axes travels of 700 mm by 750 mm by 750 mm and is able to accommodate workpiece heights of 500 mm and loads of 400 kgs. The up to 30,000 revs/min spindle offers torque values of up to 350 Nm.

In all cases there's an optional NC rotary table, up to 900 revs/min, for turning operations in the same setup, and all machines can be supplied as 4-axis models as well as 5-axis.

Different tool magazine options are available up to 320 tools and the new 24-inch multi-touch CNC screen presents Integrated Production System (IPS) functionality that, in line with Starrag's Industry 4.0 strategies, has Profinet and



The new linear models, including the L40, above, boast productivity gains over twin-spindle competitors because traditional twin-spindle machines usually only achieve productivity levels that equate to 1.5 spindles, due to inefficiencies and the consequences of losing two spindles when the machine stops

IO-Link integration for networking/ digitisation and direct links into ERP software, for instance. Starrag's IPS is applied across all Starrag product ranges and embraces, for example, cutting force monitoring, and tool and workpiece management.

Dr Marcus Otto also highlights the 'cutting floorspace' productivity advantages of the linear (L) models over twin-spindle competitors:

"Users of traditional twin-spindle machines usually only achieve productivity levels that equate to 1.5 spindles, due to inefficiencies and the consequences of losing two spindles when the machine stops. But with our L models, the productivity from a single spindle is at least 10 percent higher."

Starrag Group is a leading company in manufacturing high-precision machine tools for milling, turning, boring and grinding workpieces of metallic, composite and ceramic materials. Principle customers are internationally active companies in the aerospace, energy, transportation and industrial sectors. In addition to its portfolio of machine tools, Starrag Group provides integrated technology and maintenance



The X40 has X, Y and Z axes travels of 700 mm by 750 mm by 750 mm and can accommodate workpiece heights of 500 mm and loads of 400 kgs

services that significantly enhance customer productivity.

The products are marketed under the brand Starrag and include the product ranges Berthiez, Bumotec, Dörries, Droop+Rein, Ecospeed, Heckert, Scharmann, SIP, Starrag and TTL. Headquartered in Rorschach/Switzerland, the Starrag Group operates manufacturing plants in Switzerland, Germany, France, the UK and India, and has established a network of sales and services subsidiaries in the most

important customer countries. Starrag Group Holding AG is listed on the SIX Swiss Exchange.

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M-CNC invests £2.75 million to offer unique advanced manufacturing capabilities in the South West

Bridgwater-based M-CNC has ambitious growth plans and has invested £2.75 million in DMG MORI machine tools and automation.

Specialising in the manufacture of high quality, high value components for aerospace, motor sport, chemical, oil and gas and leisure industries M-CNC is set to triple in size since its launch in 2011.

Leigh Howarth, business development manager at M-CNC, says: "We are purchasing eight DMG MORI machines which will give us the ability to cut large 5-axis parts up to 2.5 m long and 750 mm diameter. We are completely automating our existing product lines and we are introducing a rapid response cell for a 10-day turnaround of orders. Our aim is to become a centre of excellence for the South West of England."

The company chose DMG MORI as its supplier and machine tool partner because of the range of machines it offers, its dynamic product development, the

aesthetics of the machines themselves and the support offered by DMG MORI.

The company already employs 17 people with four apprentices and is actively seeking more skilled engineers to work in its state of the art facility.

To complement its investment in DMG MORI machines, M-CNC is also investing in Edgecam CAD/CAM software and Javelin ERP and MRP. This will integrate with the DMG MORI CELOS software and, together with further investment in modular storage, tooling and inspection equipment, will enable the company to work towards Industry 4.0.

Leigh Howarth says: "We aim to achieve zero defects by engaging the workforce in the complete manufacturing cycle. We are already very close to that target and our mantra is to 'be the best we can be at all times'. The investment we are making will motivate our staff and inspire them to take



full advantage of the capabilities of the advanced machinery we are installing, enabling us to deliver excellence to our customers."

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Rotary tables and workholding from Kitagawa

At MACH 2018, 1st MTA will promote its Kitagawa sole agency range rotary tables, which add 4th and 5th CNC axes to a 3-axis machining centre. The number of separate machining operations needed are consequently reduced, improving component accuracy and increasing the complexity of parts that can be produced.

On show will be the Japanese manufacturer's latest TT150 tilting type compound table with 150 mm faceplate. It is designed to be interfaced directly with a machining centre control or operated via a MAC mini controller. Featured also will be the heavy-duty GT series models that deliver extreme rigidity, fast operation and clamping torques up to 2,800 Nm. Dozens of table variants are available, including multi-spindle versions for machining several components at once. Table diameters range from as small as 100 mm up to 630 mm.



Many options are available to complement the rotary table range, such as manual, pneumatic or hydraulic tailstocks, tail spindles with built-in clamping system, trunnion assemblies, rotary joints, air/hydraulic intensifiers, and manual, pneumatic and hydraulic chuck systems.

Another area of Kitagawa's business is workholding, illustrated by the recent introduction of the KEM series of expanding mandrels for ID clamping, allowing full access to the outside profile of a component for machining. The number of operations can be reduced and the Takt time shortened, leading to more economical production and better accuracy.

A typical example of a special workholding arrangement using this equipment is a dual sleeve expanding mandrel mounted on a lathe for internally gripping thin-wall pipe. Parallel expansion offers optimum accuracy and grip force and the expanding sleeves are fully sealed for complete protection.

An extended range of collet chucks from Kitagawa will also be promoted, including standard short and long versions as well as

quick-change variants, along with steady rests for shaft machining on lathes and grinding machines.

Chick parts clamping

US workholding specialist, Chick, represented in the UK exclusively by 1st MTA, offers a number of versatile solutions for clamping products quickly on a machining centre. For example, an Indexer SubSystem (ISS) will be demonstrated to show how more components can be presented to a spindle by adding a fourth axis, a configuration that has the potential to increase a manufacturer's profitability enormously.

The system on a vertical machining centre typically comprises four Chick Qwik-Lok twin-station workholding units mounted on the faces of a Multi-Lok square section column held horizontally between a rotary indexing table and a tailstock clamped to the machine table. On a horizontal-spindle, 4-axis centre, the Multi-Lok is clamped to the rotary table.



In this way, a minimum of eight components can be milled and drilled in a single CNC program, while if machined soft jaws are used, many more can be offered to the spindle, resulting in fewer tool changes per component and even more efficient production.

Magnetic workholding

To underline its pre-eminence in the workholding sector, 1st MTA will also present permanent-electromagnetic clamping systems and materials handling products from Italian company, Tecnomagnete. The electrical supply is connected for only a few seconds to activate and then deactivate clamping of the workpiece, which during machining is gripped by the power of the high-energy permanent magnets.



There will also be a focus on the company's range of compact, low profile MillTEC Grip magnetic workholding systems for 5-axis and 5-sided metalcutting applications. The low-profile, frameless elements have a double magnetic circuit that allows uniform clamping between the workpiece and the magnetic surface and at the same time between the magnetic system and the machine table.

A patented feature is the sealed construction with a monolithic, uniform, all-metal top section into which an array of magnets is embedded for holding down workpieces. There are no inserts, sealing resin or any filling compound, so the electric circuitry and magnets inside are protected from contaminants, leading to long, trouble-free life.

MillTEC eliminates bending and deformation that can be caused by mechanical clamping, ensuring stability and structural uniformity of the whole assembly. It leaves five sides of a component freely accessible for milling and drilling and the light weight of the clamping system means that heavier components can be processed for a given maximum table load.

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New toolholders offer a firm grip on progress

PrimeTurning now accessible on multi-task machines and VTLs

Cutting tool and tooling system specialist Sandvik Coromant has unveiled a new range of CoroTurn® Prime multi-task and axial type toolholders to help machine shops implement the new PrimeTurning™ methodology, which enables turning in all directions. The introductions allow users to maximise the benefits of PrimeTurning on multi-task turn-mill centres and vertical turning lathes (VTLs). Complementing the company's existing radial toolholders, Sandvik Coromant now has a complete offer for PrimeTurning operations.

One of the highlights of the range is the CoroTurn Prime Twin toolholder for multi-task machines. Both CoroTurn Prime A- and B-type inserts can be mounted together on Twin toolholders, allowing manufacturers to undertake roughing with a B-type insert before switching to finishing with an A-type insert, for example.

Håkan Ericksson, product manager for general turning at Sandvik Coromant, says: "Modern multi-task machines are intended for the complete machining of components but typically have a slow tool changing time, often around 15-20 seconds. As a result, the new Twin holder will save customers a considerable amount of time when changing tools."

As a further advantage, B-axis machining on multi-task machines permits the operator to program the angle of the tool in precise increments. When the machine cuts using its B-axis, a lot of accessibility is created using neutral holders. In combination with streamlined operations, this delivers the potential for huge time saving and productivity increases to help manufacturers reduce tooling inventories and achieve competitive gains.

Six new multi-task toolholders are being introduced, which are mounted at a 45°

angle for B-axis machining and can be used with either CoroTurn Prime A-type or B-type inserts. Options for multi-task machines include four toolholders, one-insert only, and two Twin toolholders, two inserts. The CoroTurn Prime Twin toolholder is available for use with Coromant Capto® C5-C8 size.

A range of axial toolholders for vertical turning lathes is also part of the range, which means that Sandvik Coromant now has a complete offer for PrimeTurning: axial, radial and multi-task toolholders. In total, eight dedicated toolholders for axial mounting are being launched. This type of toolholder is compatible with most types of vertical lathes and is available in Coromant Capto for use with either CoroTurn Prime A-type or B-type inserts.

Although PrimeTurning is applicable to the entire general turning area, machine shops with large batch sizes, automotive, are set to benefit most, as will those machining large components, aerospace, where there is a need to reduce tool changes, setup time and production stops.



Ultimately, the all-directional Prime Turning method and CoroTurn Prime tools will ensure that manufacturers can complete their turning operations in a much more efficient way. Compared with conventional turning, a 50-80 percent increase in productivity, along with 1.5 - 2 times more tool life, can be achieved.

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 8,000 staff, and is represented in 150 countries.

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MACH • Stand: H17-365

Rotomors tailor-made solutions now available from Leader

Workholding and productivity enhancing ancillary specialist, Leader Chuck Systems, recently announced its partnership with Turin-based tailor-made workholding and component manipulation specialist, Rotomors. The new partnership allows Leader to exclusively offer Rotomors bespoke solutions to manufacturing and precision engineering companies in the UK and Eire.

Rotomors was established in Turin in 1966, as a company that focused initially on the design and manufacture of special self-centring chucks for lathes for the automotive industry. Today, it is one of the world leaders in the design and manufacture of state-of-the-art workholding systems, the development of automatic pallet changing systems for vertical lathes and machining centres and die change shuttles for presses.



Employing around 65 highly skilled staff, the company has expanded to meet the technical challenges of the most demanding industry sectors and it has provided tailor-made solutions for OEMs and key players in supply chains across the globe. As Leader Chuck's managing director Mark Jones, states: "Founded on the requirements of the automotive industry, Rotomors has developed solutions for over 1,000 customers in industries as diverse as aerospace, energy and power generation, rail and mass transit, oil & gas, large diameter bearings and guide systems, as well as general precision engineering."

The headquarters in Turin comprises office space of 10,000 ft² for design and engineering, and 50,000 ft² of production floorspace. Here, Rotomors' staff work to guarantee customers a comprehensive support service for both installation, setup and ongoing maintenance of its technologically advanced solutions.

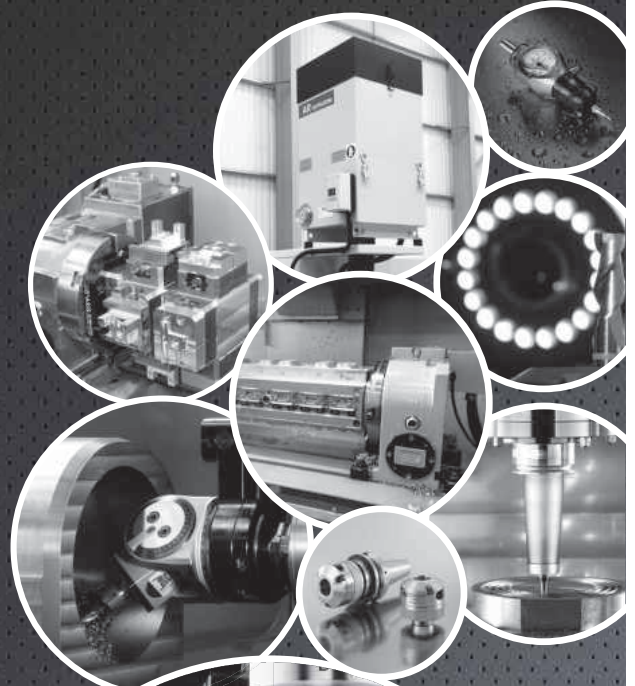
Mark Jones says: "Each project is developed according to the specific requirements of the individual customer. Because the offerings are specially designed they extend the range offered by Leader with pneumatic and hydraulically operated systems. Chucks start at 200 mm diameter and go all the way up to 7,000 mm diameter with many different styles to clamp just about any shape with variable clamping forces for thin walled components, as well as heavy duty clamping when required for aggressive machining applications."

Turning and milling centres, both horizontal and vertical, represent the natural opportunities for Rotomors equipment to make a positive impact on productivity. Each of the workholding and manipulation systems can synchronise with the Rotomors pallet changing systems to support automation and the drive towards Industry 4.0.

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BRG dives into the benefits of Hainbuch workholding

Just over three years ago, deep sea welder and fabricator Ben Goodwin gave up his dangerous day job to start BRG CNC Machining, a subcontract machine shop. The company was launched with a Hurco 3-axis machining centre and now, the company has taken its next step, installing a DMG MORI turning centre with Hainbuch workholding equipment.

The Market Weighton start-up has witnessed phenomenal success since it was formed, winning customers in the F1 & motorsport, agriculture, utilities, offshore and general subcontract sectors. As BRG CNC Machining has grown and become more successful, managing director Ben Goodwin has always strived to invest profits back into the business. This initially resulted in high-end OPEN MIND CAM software to drive the Hurco VM10 and more recently the arrival of the DMG MORI NLX2500-700 turning centre.

Nestled in the sleepy market town between York and Hull, BRG CNC was turning work away and missing opportunities by not having a CNC turning centre. Ben Goodwin recognised the need for a high end turning centre and did his due diligence.

Ben Goodwin explains: "I wanted a twin-spindle turning centre with a turning capacity up to 80 mm that could be bar fed. I spent an age reviewing the options, but the DMG MORI NLX2500-700 was the most productive and robust option for our business. I spent thousands on optional extras such as the sub-spindle, Y-axis milling, 70/30 bar coolant and 20 tool position turret to get the most productive



turning solution for my business. One key area of investment was the workholding solution for the main spindle, a Hainbuch Spanntop Nova Combi Fix collet chuck."

Like many subcontract companies, family owned BRG CNC is utilising the new turning centre for highly flexible small and medium batch work. The typical workflow on the new DMG MORI NLX2500-700 involves the machining of a huge variety of parts.

Ben Goodwin says: "This week we are machining 48-off parts for the utilities sector, 68-off 35 mm diameter components for a rape seed drill in the agriculture industry and motorsport components that are an urgent requirement. These parts are manufactured from 7075 aluminium alloy, S155 and EN24 steel, but in the main our work is generally aluminium, stainless and steel. To effectively machine the huge diversity of parts that any subcontract company is faced with, we had to have a machine with unprecedented flexibility and also workholding that facilitates fast changeovers with rigid and high clamping forces. For us, the Hainbuch Spanntop Nova Combi was the only feasible choice."

Recalling the reasoning behind selecting the Hainbuch Spanntop Nova Combi, Ben Goodwin says: "We really did our homework on workpiece clamping, as we appreciate the impact that rigid, robust and precise clamping can have on both the finished quality of the parts and the performance of the machine and the cutting tools. In addition, the engineers at DMG MORI recommended the Hainbuch clamping system. We spoke with Hainbuch engineers and it was their appreciation of our needs, the available options, the support and

service that were all key reasons behind our decision to buy the Spanntop Nova. The Spanntop is absolutely awesome."

"We are regularly machining 76 mm diameter batches of 100-off parts from 304 stainless and the clamping forces of the Spanntop are very impressive. Using the milling turret, we are rough milling parts with a Seco HF end mill at over 6,000 mm/min at a depth of 0.8 mm. Clamping the parts on less than 30 mm of material, the Spanntop is achieving clamping forces of over 3.5 mpa. In comparison, the hydraulic 3-jaw chuck on the sub-spindle only attains a clamping force of 1.6 mpa. The result of the high clamping



force is excellent surface finishes, extended tool life and we are achieving all this whilst running the jobs at speeds and feeds faster than we ever could have imagined."

Ben Goodwin concludes: "I am absolutely blown away by how easy the Hainbuch system is to use. The changeovers are remarkably fast, and the construction of the system minimises contamination and the need for cleaning. This guarantees we maintain 100 percent precision and repeatability."

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Affordable technology from YMT at MACH

If you operate machine tools, YMT Technologies suggests that a visit to MACH Exhibition will prove extremely beneficial. The company has a wide range of advanced, affordable machine tool accessories being demonstrated, including several advanced new products making their MACH debuts.

Since YMT's inception in 1981, the business has developed into one of the UK's most progressive machine tool companies. In addition to supplying high quality machine tools to the UK industry, YMT's profound understanding of machine tools and their applications has allowed it to source an unmatched range of cost-effective equipment that enables machine tools to realise their full productive potential. Rather than being an added cost, the efficiencies and production increases made possible by YMT machine tool accessories provide users with increased rapid ROI's and improved profits.

YMT exhibition staff at MACH will be demonstrating the advanced abilities of a Hedelius 5-axis machine, two YCM machining centres, one a 3-axis, the other a full 5-axis machine, a Goodway CNC turning centre and an Erowa automation system. These machine tools will be fitted with a range of YMT accessories to help illustrate the impressive advantages they provide.

Among several YMT products making MACH debuts is the Detron 5th Axis GFA210-S CNC Rotary table. Part of the large Detron range, this robust, accurate device features a super pneumatic clamp, a worktable diameter of 210 mm and a centre bore diameter 65H7. Also new at MACH, are the company's 5th axis RockLock zero-point fixtures. The robust, extremely secure manual system has a quick-change action and provides high levels of accuracy.



Another advanced YMT production aid making a bow in Birmingham is the Alfa-Set 33 Swift, bench-top tool presetting

machine. The accurate, cost-effective model has an X-axis of 250 mm and a 380 mm Z-axis. YMT's Alfa-Set range of presetting machines allow accurate tooling offset data to be supplied to CNC machines, enabling programs to be run at optimal levels and components to be produced within tolerance.



Ideal for high-speed, precision machining, YMT will be exhibiting the popular Kojex range of collet chucks. Suitable for use in demanding sectors such as aerospace, F1 and for medical applications, Kojex holds the record for the smallest outside nose diameter in the world for its mechanical collet chucks.



Carefully selected by the company's tooling division, Tuscan's competitively-priced high-quality vices and chucks will be exhibited. The comprehensive range meets all types of machining needs. From the popular 5th axis workholding and dovetail fixtures to single station vices, vacuum systems and Tuscan 3 Jaw and 4 Jaw chucks, Tuscan can fulfil the vast majority of needs. Also being shown will be the

well-established Zurn range of spindle tooling. The Zurn range of high-quality ER style collet chucks, BT-P30/40 face and taper tooling, Shell mill/ face mill holders and end mill/ side lock holders have earned a global reputation for their accuracy, reliability and the ability to withstand the day-to-day demands of modern machine shop environments.

Put through their paces at MACH will be YMT's highly efficient Diebold range of heat shrink machines and toolholders. This famous German brand encompasses more than 10 different cutting-edge technology inductive units. Diebold heat shrink units are available as fully automatic or manual units and higher specification models feature integrated water-cooling systems.

Visitors to the YMT stand will be able to see the innovative angle heads and speed increasers from the recognised world leader in the field – OMG. Following many years of development, OMG now produce a multitude of advanced angle heads to suit the majority of applications. The OMG TA series comes in a variety of designs, however if a customer needs a more specialised product, OMG will design and build an angle head to suit the most challenging of applications. In addition to angle heads, OMG supply the MO series of Speed Increasers that have a ratio of up to 1:8 and can run to an exceptional 35,000 rpm.

Given today's demands for production of ever more accurate components, the maxim 'it's not made until it's measured' has never been truer. YMT's ability to provide high-quality, cost effective products that cover all aspects of the manufacturing process, including inspection can be demonstrated by the range of precise Tschorn measuring instruments being demonstrated on the company's MACH stand.

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MACH • Stand: H19-600

A new flagship for quick-change pallet technology

SCHUNK, the specialists for gripping systems and clamping technology has now introduced two premium quick-change pallet modules with unique features. The VERO-S NSE3 138 quick-change pallet module and the VERO-S NSE-T3 138 tombstone module offers an optional spring-actuated cone seal that automatically locks the module's changing interface as soon as the clamping pin is lifted.

In combination with the cone seal, the quick lock prevents chips or dirt from lodging into the interface. Without changing the height, it locks the last gateway of the otherwise completely sealed modules.

SCHUNK has yet again boosted the performance characteristics of the VERO-S NSE3 138 as compared to previous top sellers. An enormous pull-down force of 8 kN or 28 kN with activated turbo function as well as increased dimensional stability for the module body have a positive impact on the rigidity of the clamping solutions. As a result, the highest tilting moments and transverse forces can be reliably absorbed when parts are clamped at the base for machining their height, for example.

Clamping and positioning of the premium modules is also carried out via a short taper with a repeat accuracy of <math><0.005\text{ mm}</math>. This ensures maximum precision even in the

most demanding applications. Due to the conical fitting, the clamping pins can also be joined into the modules eccentrically, making this process incredibly easy.

The actual clamping is done via spring force without requiring any external energy supply, as it is form-fit and self-locking. The workpieces remain safely clamped in case of a sudden pressure drop in the air system. A pneumatic system pressure of six bar is sufficient to open the clamping modules.

For maximum process reliability, both clamping slide positions "open" and "closed" can be monitored as standard using dynamic pressure. One option is a position sensor that can be used to detect locking without pins. Depending on the thread diameter of the clamping pins, holding forces of 35 kN (M10), 50 kN (M12) and 75 kN (M16) can be achieved.

All components are made of hardened stainless steel, making them absolutely corrosion-resistant and extremely long-lasting. Special support areas facilitate cleaning and ensure a perfectly flat contact



surface for the clamping devices and workpieces. The new premium modules are fully compatible with the previous VERO-S modular system, which now consists of more than 1,000 possible combinations for highly efficient workpiece clamping.

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Tool management is Industry 4.0 ready

The HAIMER Group, a leading company for shrinking and balancing technology, has become a complete system provider for tool management all around the machine tool. At last year's EMO show in Germany, HAIMER presented a complete tool management solution for machine tools. One of the many highlights was the Microset tool presetting technology with which the family-owned company expanded its product portfolio at the beginning of the year.

Managing director Andreas Haimer explains: "With our broad system range we want to make the entire work process as easy as possible for the machine operator. From tools and toolholders to shrinking, balancing and highly-precise presetting technology, we are now able to offer our customers the entire process chain from one single source."

Tool clamping and presetting belong together

The reason why the Microset presetting devices complement the well-known HAIMER products so perfectly lies in the high-quality and user friendliness. Furthermore, they cover a broad range of applications, a philosophy which HAIMER also follows when it comes to its shrinking and balancing machines. The product range of HAIMER Microset tool presetters includes entry level machines that are very profitable for the low volume users. The semi-automated machines with Autofocus are suitable for the average volume users. Last but not least, the product range includes fully automated presetting devices with linear drive which are especially designed for regular to high volume use. The presetting devices distinguish themselves through high-quality hardware,



best ergonomics and user friendliness. One of the many advantages is the thermostable cast iron construction which ensures that all operations are simple, easily repeatable and don't require re-calibration.

Continuously and network compatible

While the Microset presetting devices already have a network interface and can communicate with the machine tool, HAIMER exhibited shrinking and balancing machines that were equally equipped for the first time ever during the EMO show. A new Power Clamp series with a completely new design and software was introduced to the market. In order to improve the user friendliness of the shrinking machines, and make it even easier to use, they were further developed. From the outside, this developmental step is visible through a touch screen control panel with which the Power Clamp machine can be connected to the network.

Furthermore, HAIMER is developing a simplified tool management system that is designed for the combined use of the above mentioned HAIMER products.

Andreas Haimer explains: "For many small and medium-sized companies most tool management systems are too complicated and unstructured. We, however, offer a solution which is easy to use and provides a simple way to organise and digitise their tool presetting system."

HAIMER has been offering another solution for data transmission for some time. Upon individual requests the company equips toolholders with RFID Chips which enables the customer to save all the important tool data on it. In the future all HAIMER devices, at least optionally, can be purchased with a read/write station. This way they will be equipped for modern data exchange in accordance with Industry 4.0.



New Duo-Lock and solid carbide end mills for universal usage

Next to the digital developments, HAIMER also introduced many practical innovations at the EMO show, for example, the expansion of its solid carbide end mill portfolio. Aside from the Power Mill series, the HAIMER product portfolio also includes basic mill solid carbide end mills. These tools are reduced to the basics in terms of product characteristics and can be used in almost all materials. They are suited for a broad range of applications such as roughing, finishing, slotting, ramping (up to 45°) and even direct drilling. Compared to the performance optimised Power Mill series, the Basic Mill end mills are less expensive, but provide the same, well-known HAIMER quality. Furthermore, a number of new tool geometries and products for the Duo Lock interface were introduced. The patented and innovative thread design with double cone and an additional, third support area ensures high stability and resilience during the milling operation.

HAIMER is a family run, medium sized company located in Igenhausen, Bavaria near Augsburg, Germany. It designs, produces and sells innovative, high precision products for metal cutting as well as for other branches including automotive, aerospace, energy, rail and general machining. Next to its large offering of toolholders in all popular interfaces and lengths, including its shrinking and balancing machines, as well as its 3-D Sensors and solid carbide cutting tools, its product offering now also includes tool presetting machine.



Out of around 650 employees worldwide, 400 work at its only production facility in Igenhausen together with the most modern of machines and a high level of automation. At its second production site in Bielefeld, with around 35 employees, HAIMER Microset presetting machines are produced. Its experienced, dynamic and highly qualified employees guarantee the well-known and highest quality "made by HAIMER." As an active apprenticeship company, with almost 50 apprentices and a high rate of hiring, HAIMER is able to secure its future skilled employees and to fulfill its contribution to further educate young adults, as well as securing the future of its German manufacturing location. As a market leader in the area of toolholding technology, with a daily capacity of approx. 2,000 toolholders, keeping the technological edge of its products is very important to the company. Because of this, every year HAIMER



invests between eight and 10 percent of its revenue in research and development.

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Tooling updates from WNT

WNT focuses on new developments at MACH

The display of cutting tool technology at MACH 2018 from WNT, part of the Ceratizit Group, will focus on recently introduced products and the productivity benefits that these innovations can bring. Among these are WNT's Direct Cooling system for parting and grooving, the new WTX-Change Feed drilling system, WTX-Ti high-performance drills and CircularLine CCR-UNI solid carbide end mills.

The latest generation of parting and grooving blades from WNT feature its Direct Cooling capability to ensure cutting fluid is delivered directly to the cutting area. In directing the coolant in this way on its grooving and parting-off system improves machining performance in terms of reduced tool wear and thermal load, which in turn leads to improved process security, allowing users to maximise cutting data and improve productivity.

Available on WNT's blade-type toolholders, the direct cooling system has two exit points for cutting fluid, one positioned above the cutting edge, the other directly below, with the system being effective when used with a variety of coolant pressures and, even at <20 bar the benefits of reduced flank and crater wear are evident. With higher coolant pressures, additional gains such as greater swarf control also come into effect. The result is that cutting speed can be increased by



between 20 and 40 percent dependant on the available coolant pressure.

The direct cooling system was developed alongside WNT's DC-SX clamping blocks into which the blades sit. The design of the DC-SX blocks allow them to be used with any coolant connection, reducing the requirement for additional pipe connections. Coolant is delivered through the block directly into the clamped side of the blade, ensuring a good seal and also allowing a variety of overhang lengths to be used, without any negative impact on coolant delivery performance.

The Direct Cooling system is available for use with inserts ranging from 2 mm to 6 mm in width, with a choice of carbide grades, either uncoated or with WNT's legendary Dragonskin coatings, which covers the majority of everyday grooving and parting-off scenarios. This is backed by a variety of blades for both specific and generic applications.

The new WTX-Change Feed drills are an amalgamation of the best of WNT's WTX-Feed and WTX-Change drilling systems to create a three-fluted drilling system with interchangeable carbide drill heads. The result of this is increased cutting data in the most challenging of applications, with feed rates between 50 – 100 percent higher than conventional drilling. The additional benefit is improved process security due to the new cutting geometry design, drill body material and the use of the proven Ti 750 tool coating.

WTX-Change Feed drills are available between 14 and 32 mm diameter in 0.1 mm increments, as well as two standard flute lengths of three times and five times diameter, all with through tool coolant as standard. The interchangeable carbide drill heads are manufactured from a carbide grade suitable for universal applications in steel and cast iron. The new geometry features innovative point thinning and self-centring chisel edge to ensure accurate positioning, even on angled surfaces up to six degrees and in intermittent cutting applications.

Solid carbide cutters in the WNT range fall into two main categories, Mastertool and Standard, with the Mastertool series representing premium quality tools for high



performance applications. Mastertool cutters are designed for specific applications and generate exceptional performance as a result, included within these is the new Circularline CCI-UNI range of cutters. CircularLine cutters deliver shorter machining times and longer tool life and are the 'go-to' choice for trochoidal milling where extended tool engagement and consistent average chip thickness are key. The design of WNT's CircularLine cutters ensures optimum and effective machining processes.

The latest addition to the range, the CircularLine CCR-UNI is available for universal trochoidal milling as a 4 x D end mill and a 3 x D end mill with a shorter chip breaker, to provide maximum chip evacuation dependent on application. Diameter range is between 6 mm and 20 mm dependent on the application and article selected. Customers that operate under challenging conditions that place high demands on production and quality, should consider the Mastertool series as a starting point.

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MACHINING **IN** DUSTRY 4.0
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Sumitomo adds AXMT special inserts and WEX type 1000 wave mill series of milling cutters

The specialist AXMT insert with the choice of seven grades of substrate and three chipbreaker geometries has been developed by Sumitomo Electric Hardmetal to meet specific machining demands where lower power machines or less stable application conditions are encountered.

The new inserts bring processing benefits with the ability to maintain high levels or surface finish and each insert has a high rake with a curved wave form to the cutting edge. With a greater width to the insert this creates a more stable seating to support the cutting action.

The seven grades: ACP100, 200 and 300, ACK200 and 300 and ACM 200 and 300, can cut to depths up to 5 mm. ACP100 has the latest ultra-smooth Sumitomo 'FF' chemical vapour deposition (CVD) coating, giving excellent wear and thermal resistance for high speed and light cutting of steel. ACP200 uses Sumitomo's 'Super ZX' physical vapour deposition (PVD) coating on a tough carbide substrate enabling milling to be maintained at rates up to 1.5 times faster than conventional inserts. This also has the added benefit of high wear resistance. ACP 300 too has 'Super ZX' coating and is designed for use under more arduous roughing applications.

The AXMT inserts extend the range of Sumitomo's successful WEX Wave Mill Series of milling cutter bodies by introducing the WEX Type 1000 for 90 deg shoulder milling applications that also enable pocketing, helical boring, slotting, shoulder milling and ramping cycles to be carried out with the same tool.

The three highly stable cutter body designs incorporate Short Type 'E' 'EL' and Shell Type 'F' which uses a smaller Sumitomo AXMT06 insert that has a high rake 'wave' style precision cutting edge. Inserts can be specified from seven substrates ACP, ACK and ACM and three chip breaker geometries –L with 25 degree, -G with 20 degree and higher edge strength –H which has 5 degree. Each is segregated to maximise performance when used respectively on high speed/light cutting, general purpose or roughing applications

Each of the three variants of cutter body provide greater resistance to abrasion and



Sumitomo Electric Hardmetal launches AXMT special inserts for lower power machines and less stable applications plus WEX Type 1000 to Wave Mill Series of milling cutters

corrosion with enhanced chip evacuation through internal coolant feed. Short Type 'E' is available from 10 mm to 25 mm diameter and has between two and seven insert pockets. Short Type 'EL' in diameters between 10 mm and 20 mm has between two and four teeth and Shell Type 'F' has outside diameters between 32 mm with eight teeth to 63 mm with 14 teeth.

ACP100 has the latest ultra-smooth Sumitomo 'FF' chemical vapour deposition (CVD) coating, giving excellent wear and thermal resistance for high speed and light cutting of steel. ACP200 uses Sumitomo's 'Super ZX' physical vapour deposition (PVD) coating on a tough carbide substrate enabling milling to be maintained at rates up to 1.5 times faster than conventional inserts.

The ACK200 geometry, with its 'Super FF' CVD coating, is for use in more general machining tasks involving grey and ductile cast irons and, when milling the same materials and heavy interrupted cuts are

involved, the ACK300, which is coated with Sumitomo's 'Super ZX', provides a solution able to generate even greater levels of productivity.

Meanwhile, ACM200 is coated with 'Super FF' to provide high orders of wear resistance when machining PH stainless steels and ACM300 should be the first choice with its 'Super ZX' coating when highly balanced wear and fracture resistance is required on materials such as stainless steel.

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Three-flute drills why are they better?

How has a supposed slow seller made it into the top league of high-performance tools for steel machining?

The idea of designing drills for higher feed rates by adding a third cutting edge is nothing new. However, due to the challenging chip evacuation, these tools have so far only been suitable for a few applications, such as machining cast iron. With a new design, the Hoffmann Group has now succeeded in harnessing the advantages of the three-flute drill for long-chipping steels and stainless-steel materials.

By Steffen Hedrich, director of drilling at the Hoffmann Group

Three-flute solid carbide drills have already been around for some time. The first tools of this kind came onto the market around 50 years ago. They are now used as part of a reliable process in the machining of cast iron. The advantage is that they have a higher feed rate due to the third cutting edge. However, as yet three-flute drills have been ill-suited for long-chipping materials because they could not evacuate the metal removal rate increased by the third cutting edge due to the design with smaller flutes. Because of the inadequate flow of chips, the risk of a chip jam is increased and there is a risk of tool breakage. As a result, three-flute drills have not been widely used until now and over the decades the idea has been put to bed so to speak.

Clean working zone

Last year, the Hoffmann Group introduced the new three-flute Garant MasterSteel Feed solid carbide drill for the first time. The drill produces a 50 percent higher feed rate per revolution, even in long-chipping steels and stainless-steel materials, as well as offering extraordinary durability. To achieve this, the shape of the point geometry, the capacity for precise chip breakage and chip evacuation, has been optimised in particular. The design of the point geometry is crucial when it comes to evacuating the chips away from the working zone quickly and reliably. The Hoffmann Group has achieved this goal with a new, patent-pending point geometry. As a result, the chips are sufficiently compressed in the area of the point geometry and are even broken when processing ductile materials.

World's largest L/D ratio

In order to evacuate the chips discharged by the three cutting edges as part of a reliable process, particularly large chip flutes are required. The Garant MasterSteel Feed drill has therefore undergone core tapering. This

enables larger chip flutes towards the end of the twist section, combined with sufficient stability of the core. The importance of the twist section design was also demonstrated by the structure of the longer 8 x D and 12 x D drills. The development of these tools took a particularly long time. As part of this, the spiral angle had to be optimised multiple times and was modified until the necessary process reliability was achieved. The new three-flute drills with the world's largest L/D ratio therefore came onto the market a year after the market launch of the first Garant MasterSteel Feed solid carbide drill. The chip evacuation is now so efficient that it functions as part of a reliable process in various materials. It was possible to demonstrate this in internal tests with materials such as St37, C45, 42CrMo4, X155CrVMo12.1, X5CrNi18-10.

Longer tool life with a convex cutting edge

To increase tool life, the Hoffmann Group has also transferred the convex cutting-edge design from the classic two-flute drills, known as the "S-cutting edge", to a three-flute tool for the first time.

With a convex cutting edge, this acts towards the tool in the area of the cutting-edge corner, thus stabilising the cutting-edge corners. With a concave cutting edge design, the opposite is the case and the cutting-edge corners are therefore more susceptible to breakage.

This was demonstrated by practical tests using the new Garant MasterSteel Feed solid carbide drill and conventional three-flute drills, including tests with alloyed heat treatable steel 42CrMo4. In the test, drills with a diameter of 8.5 mm and an overall length 6 x D competed against each other. They were clamped in hydraulic chucks and drilled at a feed rate of 0.44 mm/rev and a cutting speed of 140 m/min. The result: tool breakage during spot drilling and tool life travels that were

too short for the conventional three-flute drills; longer tool life travels for the drills with an adapted point geometry and concave cutting edge shape; 2,702 holes and a tool life travel of 102 metres with the new drill concept. The new drill was therefore the clear winner in this test.



Up to 50 percent higher feed rate

As well as reliable chip evacuation, the force and torque characteristics of three-flute drills must also be taken into account because there are higher feed forces due to the design. The test series have shown that with the same cutting data, different feed forces occur depending on whether it is a two or three-flute drill design. Depending on the tool, the difference was between 46 percent and 59 percent. This was mainly due to three cutting edges being engaged in the material at the same time rather than two.

The action of a third cutting edge enables an up to 50 percent higher feed rate per revolution. However, it is commonly known that an even higher feed force is produced as a result. Tests have confirmed this relationship: for the material 42CrMo4, a 57 percent higher feed rate, from 0.28 mm/rev to 0.44 mm/rev, produced a 40 percent greater feed force; for X155CrVMo12, the approximately 50 percent higher feed rate produced a 41 percent greater feed force; in the material, 16MnCr5, the higher feed rate of 64 percent increased the feed force by 35 percent.

If the two effects described above are now added to the feed force, the following conclusions can be drawn with regard to the field of application for three-flute drills: the workpieces and clamping should be stable and for tools with a diameter larger than



12 mm and the machine spindles should be able to provide high torques at low and medium speeds.

Precise spot drilling and accurate drilled holes

Due to the third main cutting edge, three-flute drills also offer significant advantages when spot drilling. The three main cutting edges run in curves to the centre of the tool and form a tetrahedrally shaped chisel point where they meet. However, in the case of the two-flute drill, the main cutting edges end in a chisel point that connects both the main cutting edges in a line. The difference can be seen in the spot drilling behaviour. In the case of the classic two-flute drill, the chisel point meets the material at several contact points at the same time; there is no clear fixed point. As a result, the tool may start to wobble. This happens in particular when spot drilling uneven surfaces. The three-flute drill, however, has a punctiform chisel point. The first contact between the material and the tool therefore takes place at a precisely defined position. Once the tool has penetrated the material, the process forces act on the "edges" of the chisel point and

also promote the self-centring capacity of the drill. It is therefore possible to prevent the tool from drifting, even on uneven surfaces. These features make the three-flute concept perfectly suited for the design of NC spotting drills. It is advisable to prepare the drilling position precisely for the following tool by spot drilling, particularly if deep holes need to be drilled with tools measuring 8 x D or even 12 x D. The Hoffmann Group has therefore developed the world's first three-flute NC spotting drill and, with a calculated point angle of 155 degrees, has optimally matched it to the subsequent Garant MasterSteel Feed drill.

Conclusion

Constructive improvements have made it possible to harness the high feed potential of the three-flute drill for more materials and even for long-chipping materials such as X5CrNi18-10 and for general structural



steels such as St37. Changes in the area of the point geometry and the spiral angle, convex cutting-edge shapes and a tetrahedrally shaped chisel point were the factors for success.

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MACH • Stand: H7-260

New re-engineered drill range increases tool life by 140 percent

Featuring a new re-engineered design, Seco's range of Perfomax indexable insert drills deliver exceptional drilling performance and longer tool life as well as improved chip control and evacuation. The range's innovative features include a new flute design with special anti-friction surfaces and laser hardened fronts that provide added strength, stability and accuracy.

The drills' flutes have larger helixes and centre chip areas along with smoother chip flute exits. A revolutionary engineered wave pattern helps minimise contact between chips and flute surfaces.

Perfomax drills generate shorter chips that can be evacuated quickly and thereby reduce the risk of chip jamming' which, if left unchecked, can damage the workpiece and have a negative impact on process security.

The new Perfomax design, which includes laser hardened (HRC 60) flute fronts that withstand the effects of chip erosion, is said to increase drill body tool life by up to 140 percent. The new design also features a larger radius at the bottom of the drills' insert pockets for extra rigidity.



Seco's range of Perfomax indexable insert drills deliver exceptional drilling performance and longer tool life

DS2050 and DS4050 insert grades recommended for use with the new Perfomax drills are specifically suited for drilling heat resistant materials like titanium and titanium alloys. These grades, with their recently-developed free-cutting MP and MC geometries, help increase productivity and extend tool life.

Perfomax drill bodies are available in a range of diameters, from 15mm to 59mm,



and in length to diameter ratios of 2 x D, 3 x D, 4 x D and 5 x D. They are also compatible with most spindle interfaces.

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New Mitsubishi end mills for intricate aluminium impeller machining

Machining components with difficult to reach areas and curved surfaces has always proven a challenge, especially when cutting materials such as the aluminium alloys used in the aerospace and automotive industries. Such challenges have now been simplified with the arrival of the new C4LATB solid carbide taper-ball end mill from Mitsubishi Materials.

Already recognised as the benchmark in aluminium alloy milling, Mitsubishi Materials has developed the new C4LATB end mills to match the evolution of new tool paths and machining strategies that are being developed by the leading CAM vendors.

To support these new developments, the R&D engineers at Mitsubishi Materials have introduced a new 4-flute end mill, the C4LATB with a 4-degree taper flute geometry to alleviate interference and provide extended reach. In addition, the four peripheral flutes are reduced to a 2-flute full ball geometry at the point for improved chip removal. This geometry has also been found to produce much better surface finishes than conventional products when profile milling and mostly negates the need for an extra finishing operation, therefore bringing cost savings.



This radical new geometry makes the C4LATB end mill the complete all-rounder that is suitable for slotting, side milling and profile machining. At present, the C4LATB is available with the choice of a 70 mm overall length and a 6 mm shank diameter or as a 75 mm long tool with an 8 mm shank diameter. Both variants have a 20-degree helix and an effective flute length of 20 or 30 mm. For intricate machining applications, the new C4LATB is available with a ball nose radius of 0.5 mm, 1 mm, 1.5 mm and 2 mm.

This high-performance end mill series from Mitsubishi Materials has been developed for applications on high speed, high performance machine tools. The Japanese cutting tool specialists

recommend that the C4LATB series is utilised at cutting speeds in the region of 20,000 rpm with a feed rate from 600 mm/min to 5,200 mm/min depending upon whether the customer is applying the new C4LATB to side milling, slotting or profiling.

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MACH • Stand: H6-320

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Milling cutter for perfect surface finishes in stainless steels

Now available from Floyd Automatic Tooling, the new CrazyMill Cool has been developed for milling small dimensions with the highest performance and quality. The new four tooth finish milling cutter with shank integrated cooling is available in the diameter range of 1 to 8 mm for milling depths of up to 5 X D. This milling cutter is suitable for machining all materials up to a hardness of 54 HRC and its development has been focused upon stainless steels, titanium, heat resistant alloys and nickel and chrome-cobalt-alloys. It is not surprising, therefore, that these tools are especially convincing with extremely high performances levels when working with these materials.

To control heat and ensure it is not absorbed by the workpiece or swarf, the latest Mikron Tool is offered with 3, 4 or 5 coolant ducts through the tool shank. This constantly delivers a massive coolant jet directly to the milling area, independent of the work position and possible interfering edges. The tool receives continuous coolant and does not risk any overheating. This

makes it feasible to simultaneously work at high speeds, feeds and working depths. This results in a high chip volume and excellent tool life. Another advantage is the continuous flushing of chips from the milling area. This avoids a repetitive cutting of chips and the subsequent damage to the milled surface.

The geometry is entirely focused on reaching high milling performance and surface quality. This is achieved with a flute-angle of 30° on the shorter tools with cutting length 2 X D, whereas the longer versions with cutting lengths 3.5 to 4.5 X D have a progressive flute-angle increase from 30° to 40°. For both versions, the transition of 30° from the radius to the cylindrical section creates an optimal cutting-edge corner stability and smooth milling without vibrations.

Two versions of the CrazyMill Cool Ball Z4 are available with especially long cutting edges. These have progressive spiral flutes (from 30° to 40°) that guarantee vibration free milling. The angle of 30° at the tip avoids an accentuated interface between



the cutting edges and the cylindrical section, reducing the risk of cutting edge break-out. These versions are especially suitable for side milling because the entire depth can be machined with minimal passes or even just a single pass.

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MACH • Stand: H20-620

New tools for gear cutting

HORN's product portfolio comprises a wide range of tools for the production of various gear tooth geometries of module 0.5 to 30. Whether this involves gear cutting for spur gears, shaft/hub connections, worm shafts, bevel gears, pinions or customised profiles, all these tooth profiles can be manufactured extremely cost-effectively with milling or broaching tools. Now, the new skiving tool range is yet more testament to the company's gear cutting expertise. It is a process that has been in use for over a century, but has only been incorporated into a wider range of applications since machining centres and universal machines with fully synchronised spindles and process-optimised software have been able to accommodate its highly complex technology.

The new range consists of tools for high-yield manufacturing of internal gear teeth, splines and other internal profiles as well as external gear teeth with interference. In these applications, the key advantages that skiving offers are significantly shorter process times in comparison to broaching,

the ability to use the technique on optimised turning and milling centres, turning and gear cutting takes place in one set-up, the absence of undercuts at the end of the teeth, a manufacturing process that is generally more productive and cost-effective compared with gear shaping and broaching, and cycle times that are four to five times shorter than those found in broaching processes.

Skiving tools are designed for gear cutting in medium to large batches. Each tool is individually adapted to the application and to the material being machined, with the various tool interfaces based on the number of teeth and the module size.

The range comprises tools in cylindrical or conical form for modules from 0.5 mm (0.0197") to 2 mm (0.0787"). The solid carbide tools are available with diameters of ≤20 mm (0.7874") and in a compact design. These are used for small modules as well as small components, primarily in applications that require a narrow shank due to the risk of collision. Cutting materials and coatings



matched to the application achieve excellent surface qualities on the workpiece. Gear skiving tools with an exchangeable head system are used for diameters of ≥20 mm (0.7874"). The highly precise interface enables the cutting head to be replaced easily in the machine without the need to remove the holder. The solid carbide holder ensures a high level of rigidity, wear resistance and precision.

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MACH • Stand: H6-890

CGTech celebrates 30-year milestone

CGTech, the developer of VERICUT® software, is proud to celebrate three decades of innovation and consistent growth. Headquartered in Irvine, California, with 10 wholly-owned subsidiaries and an extensive network of resellers to support customers worldwide, the company is releasing new CNC simulation and optimisation technologies faster than ever before.

Tony Shrewsbury, managing director of CGTech, says: "CGTech may have started 30 years ago, but we continue to come out with new products while enhancing our core capabilities," VERICUT development is driven by our customers' needs, and we always encourage input from users and partners. We host nearly 50 free VERICUT user group meetings worldwide each year to gather valuable customer feedback."



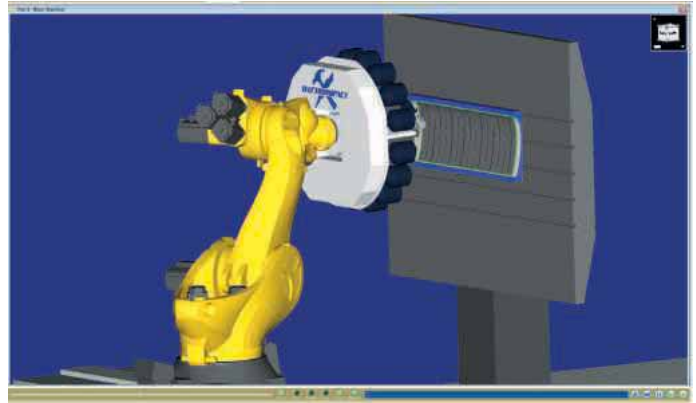
CGTech began when CGTech president, Jon Prun, recognised a need to verify NC tool path programs without wasting valuable CNC machining time on a prove-out part. VERICUT software was the world's first widely available, productive method to test NC machine tool paths in an offline virtual reality environment. VERICUT revolutionised NC program verification by simulating material removal using a three-dimensional solid model.

VERICUT products are developed in-house by a large team of CGTech software engineers who have many years of experience in the mechanical CAD/CAM industry. Over the years enhancements have been added to support complex multi-axis kinematics, reduce machine tool cycle times, increase tool life, and simulate the additive capabilities of hybrid CNC machines. CGTech also develops several software products for companies utilising automated composite machinery, along with drilling and fastening machines used for airframe assembly.

The company has been on a hiring spree in recent years to keep up with the demands of its customers, which consists of thousands of companies in virtually every manufacturing industry and every major aerospace and automotive company. Direct offices are located in the United Kingdom, France, Germany, Italy, Japan, China, Singapore, India, Brazil, and Korea.

CGTech to showcase VERICUT composites applications software

At the 2018 JEC Composites show, from the 6th-8th March in Paris, CGTech will demonstrate how advanced programming strategies and simulation can lead to better composites parts. Throughout the show, on stand N80, CGTech will also demonstrate Composites 2018, the latest version of VERICUT Composite Programming (VCP)



& VERICUT Composite Simulation (VCS). CGTech's Composite 2018 release of VCP and VCS features a completely redefined Graphical User Interface (GUI), enhanced suite of programming and analysis tools, and redefined methodology through the use of the powerful new Laminate Manager.

The Laminate Manager helps users easily manage files, processes, and batch actions for the entire composite laminate. Internal refinements ensure that large projects are now able to be programmed and simulated in a fraction of the previous time.

Tony Shrewsbury says: "Due to the extensive time, energy, and labour invested in composite workpieces prior to machining, they can often be more expensive than even some exotic metal alloy parts. Repairing composite workpieces after a machining error is problematic and many times not advisable. Thus, validating the part program prior to trimming is exceedingly critical. Simulation also decreases machine downtime by eliminating the need for wasteful dry runs."

Visitors to CGTech's stand will also have the opportunity to receive a thorough overview of the steps needed to get from a CAD designed composite part to CNC programs that drive an Automated Fibre Placement (AFP) or Automated Tape Laying (ATL) machine. There will be information on new projects that highlight the implementation and use of machine independent offline NC programming software for AFP and ATL machines, such as the work being done at NASA's Langley Research Centre using a 16-tow Electroimpact automated fibre placement machine. Current customer projects to be highlighted include extensive use of robots, lasers, probing, and ultrasonic knives.

CGTech will also exhibit its latest version of VERICUT 8.1 software. VERICUT is an industry leading CNC machine simulation, verification and optimisation software that enables users to eliminate the process of manually proving-out NC programs. VERICUT simulates all types of CNC machining, including drilling and trimming of composite parts, waterjet, riveting, robotics, mill/turn and parallel kinematics. VERICUT runs standalone, but can also be integrated with leading CAM systems.

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MACH • Stand: H17-626

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OPEN MIND drills out benefits for offshore manufacturer

The economic situation surrounding the UK offshore industry has been well documented for its difficulties in recent years. To rise above the uncertainty, and build success where others have failed, Sub-drill has invested heavily in modern Mazak machine tools, OPEN MIND CAM software and a new factory. The results are truly amazing.

In 2011, the Westhill manufacturer of subsea tools and drilling equipment for the global energy industry moved to a purpose-built factory that was then extended to 24,000 sq/ft in 2014. Sub-drill succeeded where others failed for a number of reasons. Firstly, the company manufactured its own brand of products and support services for the offshore sector that it continually extends. Secondly, the company faced the adverse market conditions by investing in the very latest machine tools.

Mark Paton, operations director at Sub-drill, says: "With difficult market conditions, we knew we had to invest in new technology to streamline the business, improve productivity, reduce costs and generate efficiency savings to improve our competitiveness. Firstly, we bought a Mazak E500H turning centre with a 3 m bed and 5-axis capability. This enabled us to reduce setups, conduct one-hit machining, decrease lead-times and increase productivity. This machine was followed in

2015 by a Mazak Nexus 450 II M. The latest machine that has just been installed is a Mazak Integrex e-670 turning centre with a 4 m bed and large through spindle enabling machining of larger more complex parts. The machine also has a 70 Bar high pressure coolant system that has enabled us to conduct gun-drilling on complex parts for the oil & gas industry. It is the first machine of its type in Scotland with the new Smooth control system.

"The flexibility of the new machines, the ability to reduce setups and conduct one-hit machining has taken the production of large high strength carbon steel, stainless steel, P550 non-magnetic stainless, super duplex Inconel components and projects from 20-30 weeks down to 8-10 weeks. The arrival of OPEN MIND Technologies hyperMILL CAM software has been instrumental in reducing lead-times and improving our machining capabilities."

Each machine tool has given the Aberdeenshire company added capacity and the ability to extend its product portfolio and subcontract services. However, when the manufacturer of drill tools, valves, rig floor and well-head equipment set about manufacturing down-hole drilling tools, it was OPEN MIND's hyperMILL software that 'drilled' to the bottom of the issue.

Sub-drill identifies the problem

Prior to the arrival of hyperMILL, all components were programmed on the shop floor utilising the Mazak Mazatrol and Smooth control systems. On the older machines, the Mazatrol CNC control units were the control of choice. However, the new development and prototype tools and equipment at Sub-drill required much more complex geometries to be machined to achieve the desired performance from the new product range. The company was witnessing excessive programming times and significant challenges with tool paths and production times. Added to this, Sub-drill manufactures its own brand of 'Handle Style Lift Caps' for the off-shore industry. The programming was too complex to undertake at the machine and the only feasible solution was to look into CAM software.



hyperMILL solves the problem

Recalling how the issue was resolved, Mark Paton says: "We spoke with Mazak and our shop floor staff that had previously used CAM software, they all categorically recommended hyperMILL. We discussed the project with OPEN MIND and they happily delivered a solution with hyperMILL last year."

The hyperMILL CAM package was supplied with the latest MAXX Machining module, and hyperCAD-S. The results were almost immediate for the 20 employee Scottish company.

With Sub-drill's new downhole tool and equipment designs, new geometries and tool dimensions are continually being reviewed.

Mark Paton continues: "The introduction

of hyperMILL was a product driven decision. We realised the market potential for our new development tools and equipment and recognised that hyperMILL was a necessity for efficiently generating the complex tool paths and strategies. With scope for the development of a range of new tools; manually programming at the CNC control was a time consuming, complex and tedious task that made machining times particularly slow."

The benefits of hyperMILL

The arrival of hyperMILL instantly made an impact. The programming times have been reduced from four to five days to around eight hours. Complex tool forms that couldn't be programmed with the latest CNC control are now programmed on hyperMILL in four to six hours using cycles such as Shape Offset Roughing/Finishing and OPEN MIND's trochoidal milling cycles to deliver efficient programming times.

Previously, Sub-drill was using the SolidWorks modelling package and manually programming the CNC control from the SolidWorks and AutoCAD drawings. Now, the ultra efficient hyperCAD-S with its direct SolidWorks

interface enables Sub-drill to receive SolidWorks CAD files, transfer the native file format in to hyperCAD-S and prepare the files for downstream programming with hyperMILL. This eliminates errors and streamlines the process with significant savings. Machine operators are no longer spending long periods conducting CNC programming, machine downtime is reduced and the potential for error or scrapped work is removed.

With regard to the 'Handle Style Lift Caps' that were subbed out to an external company to create programs, Sub-drill now has the CAM software capable of programming the 'kettle bell shaped' caps in-house. Manufactured from a solid billet with extensive 5-axis machining cycles, the complexity was beyond feasible for the company's previous programming methods. By subcontracting this work out, Sub-drill was at the mercy of the supply chain. However, the application of hyperMILL and in particular the 5-axis helical drilling feature and the barrel cutting strategies, Sub-drill can now produce the complex components in-house in a matter of hours. This has slashed lead times and costs whilst improving component quality, consistency



and also giving the company complete control over the process.

Demonstrating the remarkable performance of the MAXX Machining Package, Sub-drill is now manufacturing a number of its downhole tools in less than 10 hours. The machining time prior to the arrival of hyperMILL was over 40 hours, a 75 percent productivity gain.

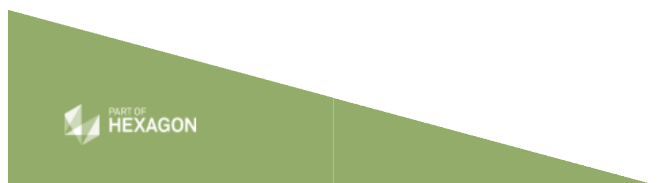
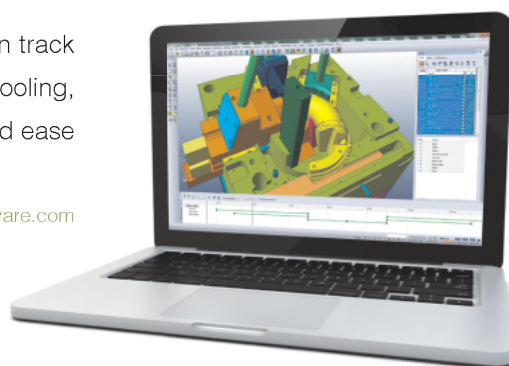
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High-end all the way for Alpha Precision

An injection mould manufacturer has seen a recent resurgence of toolmaking in its native Irish Republic and says state-of-the-art software helped it through the recession by giving it a competitive edge to work in high-end markets.

Alpha Precision, based at Tubbercurry in County Sligo, operates an almost full suite of VISI modules, which director Brendan Feely describes as a seamless communication tool. "Several years ago, Ireland experienced an exodus of toolmaking contracts as work went overseas, particularly to China. At the same time, the specialist VISI CAD/CAM software for the mould and die industry was rapidly developing and adding new features. Even companies which weren't computer literate were investing in the technology to survive. The software had a huge effect on the toolmaking industry, giving us a competitive advantage to weather the storm."

He says it's now "high-end all the way" for Alpha Precision: high-end staff building, high-end mould tools with high-end software.

Brendan Feely says: "The technology promotes a more automated process, and means our staff need a different skillset nowadays, to use VISI to its full potential."

To explain fully how he feels VISI is the seamless communication tool that acts as the glue in the complete toolmaking environment, he likens his toolroom to a football team.

Brendan Feely continues: "We need our goalkeeper, defenders, midfielders and strikers. We have a variety of different machines doing different jobs, so our operators have different skills. The software's applied on the back of the machining, and because there are several disciplines, such as design, milling, wire and spark eroding, the software fits naturally into its given area. The operator in that area is



just trained on the one particular VISI module."

Continuing the "team" analogy, he says the toolroom is like a group of people from different countries with none of them speaking a language other than their own.

Brendan Feely says: "One language is design, with others including flow analysis, milling, wire eroding, spark erosion. VISI is the common language that unites all processes, ensuring everything moves fluently through the toolroom from one discipline to another."

Operating with 12 employees, the company produces an average of around 40 tools a year, ranging in size from 100 mm x 100 mm x 100 mm, up to 600 mm x 1 m, mainly for the automotive, medical, packaging and electronics industry sectors.

Two of its current projects are: producing a number of high cavitation tools for one of their many medical customers; a contract for two-shot plastic injection tools, which involves an overmould.

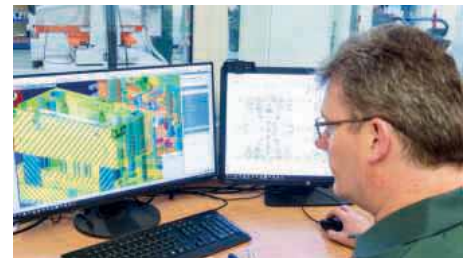
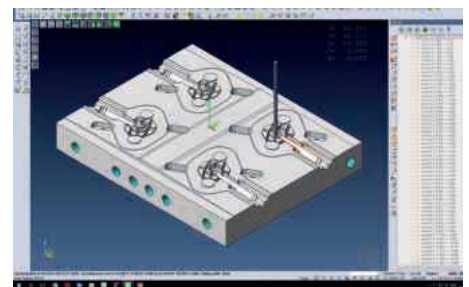
With VISI programs running high-speed milling on Röder, and F3 and F5 Makino machining centres, the challenges posed by the medical industry requiring very fine micro levels, are readily overcome. VISI also powers Alpha Precision's EDM Charmilles machines for spark eroding, and Mitsubishi wire eroders.

Having invested in many VISI modules including Modelling, Analysis, Flow, Mould, Progress, the wire cutting and electrode systems, along with 2D Milling, 3D Milling and High-Speed Milling, the software is

used at every stage of the process, beginning with providing an accurate quotation for the customer.

Brendan Feely says: "We use VISI's analytical tools to check the drafts and all the different features we'll need to build into the mould, such as the core and side pieces.

Combining VISI's Compass technology with its 2D and 3D milling capability, all milling for hard prepping and high-speed finishing is handled quickly and accurately,



which Brendan Feely says is vital to the operation. "We make a lot of one-off custom components for each mould, meaning we only run a program once. As pattern cutters we need to be very good at generating CNC code time after time, and VISI is exceptional at doing that job for us."

Although injection mould tools form Alpha Precision's core business, it also provides a blow moulding and forming tool service and has experience in specialised press tooling. Brendan Feely concludes by saying it is currently embarking on an exciting new journey, working closely with one of their major customers on injection rubber.



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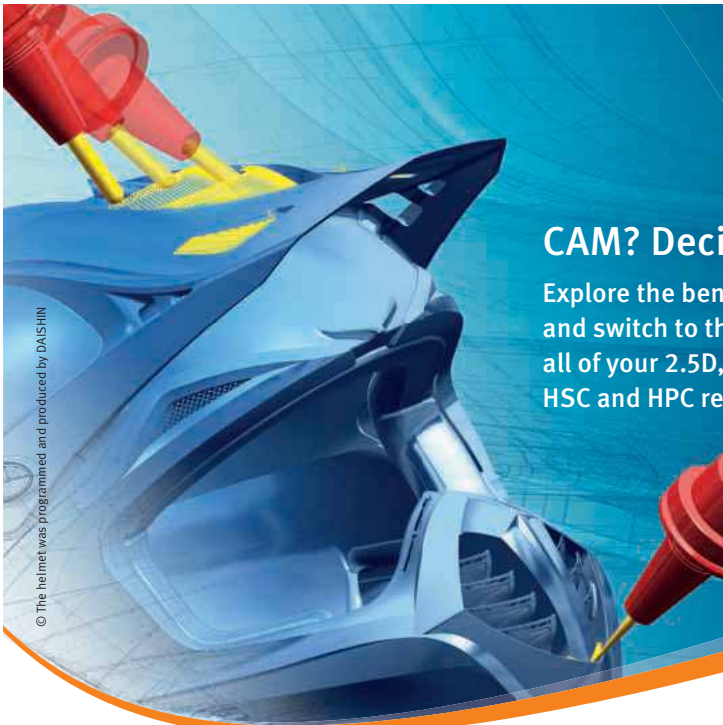
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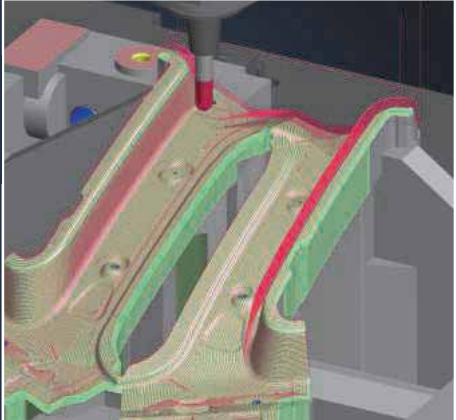


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THE CAD/CAM EXPERTS

Mastercam's 35th anniversary

CNC Software, Inc. celebrates 35 years of CAD/CAM Innovation



The year 2018 marks the 35th anniversary of CNC Software, Inc., developers of Mastercam CAD/CAM software. In 1983, two brothers, Mark and Jack Summers, came up with a new concept for programming CNC machine tools. A third brother, Brian Summers, soon joined and together they developed a PC-based CAD/CAM software package that laid the foundation for what would be Mastercam, the world's most widely used CAD/CAM software.

Chairman Mark Summers says: "It started out as a simple idea. I was a machinist, my brother was a mathematician. We combined our experience to put what was out of reach for most shops, NC programming software, right onto their desktops. In the 35 years that followed, they have advanced dozens of important new technologies for those shops, including "smart" toolpaths, hybrid machining, mill-turn, multi-axis, their proprietary Dynamic Motion technology, as well as basic packages for milling, turning, and wire EDM. All of this couldn't be possible without the valuable feedback from the industry and from what's most important to CNC Software, the user base. In addition to manufacturers, the company has focused on selling and supporting Mastercam in the education sector since its inception.

They first called the software program "Meghan," named after Mark Summers' eldest daughter, and then changed to "Mastercam" as a clearer descriptive of the software's primary function. Today, Meghan is the CEO and Mastercam is the most widely used CAD/CAM software in the world, closing in on almost a quarter million installations at the end of 2017.

CEO Meghan West says: "Mastercam users help drive our innovation. We're in constant contact with shops, machine tool builders, educators, tooling suppliers, and they all help us focus on what shops need the most now and, in the future, so we can deliver.

"One of the biggest reasons for our success is our global dealer network, probably the largest and most experienced in the CAM industry. They are true partners with our customers, offering advice, training, and applications experience to Mastercam users around the world. We're also extremely proud to be the number one CAD/CAM program being taught by technology teachers in schools, colleges, and universities. Helping to train the next generation of skilled manufacturing personnel is an important mission of ours."

Shortly after CNC Software started in Massachusetts, the company moved its base

milling and turning, 2- and 4-axis wire EDM, 2D and 3D design, surface and solid modeling, and Swiss machining. Privately owned and founded in 1983, CNC Software provides CAD/CAM solutions to more than 224,000 installations in 75 countries in industries including mouldmaking, prototyping, automotive, medical, aerospace, consumer products, and much more.

Mastercam offers solutions for designers and NC programmers in a spectrum of industries, including milling, turning, wire EDM, router programming, plasma cutting, lasers, and 3D design and drafting. CNC



of operations to an office in Vernon, Connecticut. After a brief move to an industrial park, CNC Software built corporate headquarters in Tolland, Connecticut. When it outgrew that space, the Summers established the company's corporate headquarters and training facility in a new, 38,000 sq. ft. building in the same town. The building was thoughtfully designed as a world-class "green" facility and built for expandability and environmental friendliness. In 2007, ground broke for a 12,000 sq ft addition to house a fully functioning Manufacturing Lab with advanced equipment for Mastercam product research and development.

Developed by CNC Software, Inc., Mastercam is Windows®-based CAD/CAM software for 2- through 5-axis routing,

Software's customers range from one-person job shops to Fortune 100 manufacturers. The same software that is utilised by corporations such as Boeing, IBM, and Sikorsky is still affordable enough for the small job shop. To ensure a new generation of trained metal and woodworking personnel, Mastercam is available to educational institutions at sizable discounts.

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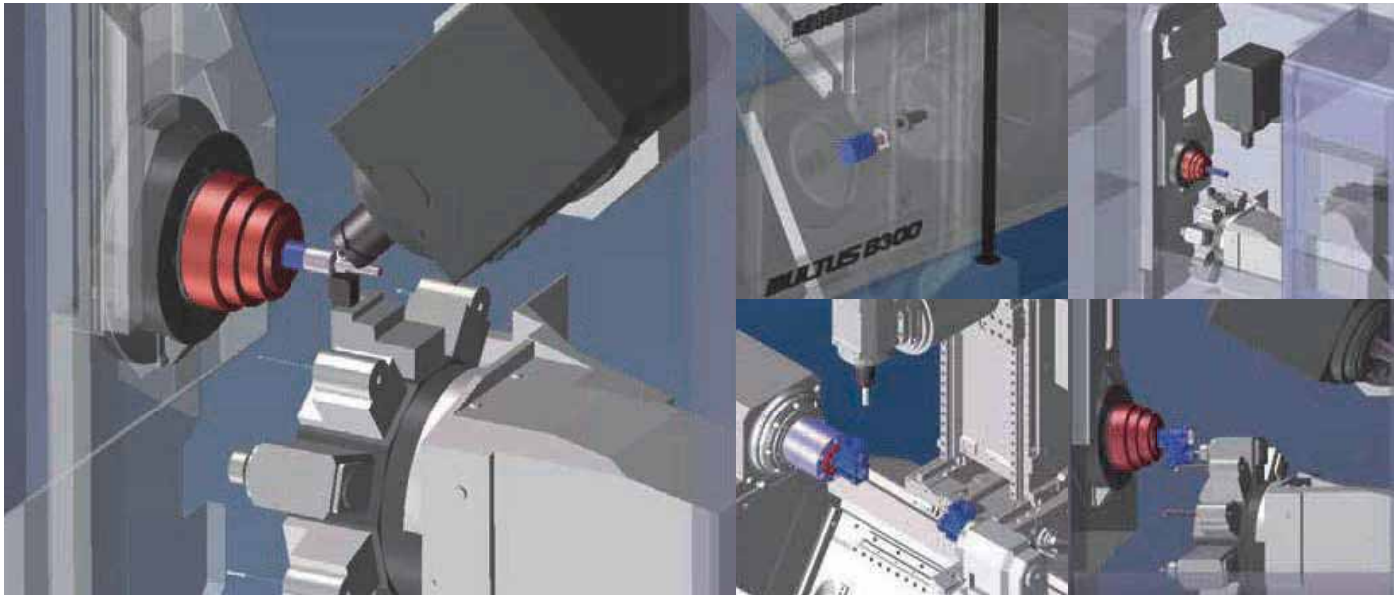


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Consistent development

Tebis AG, the process provider for the development, design and manufacturing of models, moulds and components, has extended its CAD/CAM software with laser hardening and laser weld cladding functions. Because the new applications are frequently operated with Tebis robot technology, the process provider has also optimised this. Manufacturers can now use the software to simultaneously operate eight individually configurable axes, making them more flexible.

Laser hardening enables locally limited hardening of complex steel parts and steel castings to a defined depth of up to 1.5 mm. These parts then do not have to be reworked to compensate for any resulting distortion. This enables die and mould manufacturers to increase the strength of trim and coining steels, cutting edges and mould plates and thus the service life of the manufactured dies and moulds.

Laser weld cladding can be used to repair areas of workpieces, for example, in die and mould manufacturing. In this process, a laser beam fuses the weld metal and the material to be processed in layers, yielding a strong bond. These areas can then be machined.

Both add-ons include a CAD preparation function and collision checking that support the programmers and their work. 3D beam geometry and integrated tool and technology data management combine to produce NC programs with which robots can perform smoother pivoting movements even for highly complex parts.

Tebis has also overhauled its robot technology and extended it to include eight individually configurable axes with simultaneously integrated traversing and rotary table axes. This enables more flexible use of robot cells. The process provider has also provided additional functions that affect robot poses so that users can prevent

undesirable singularities and pivoting movements in the limit switch area.

Completely tailored for manufacturing

Tebis, has extended the design technology of its CAD/CAM software. This will be available as of Tebis Version 4.1 and forms the basis for many CAD/CAM applications. The entire data processing procedure is faster, simpler and more flexible for the user.

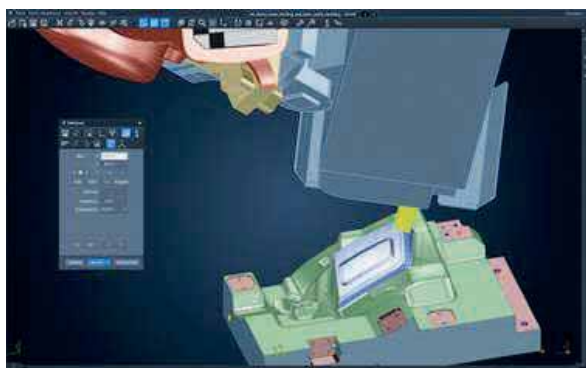
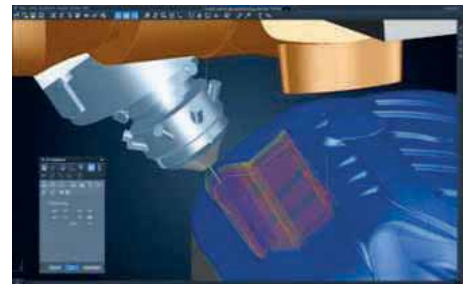
Parametric design technology is used in applications such as electrode design and the manufacturing-oriented design of models, gauges and fixtures as well as for geometry analysis and overall manufacturing preparation. The Job Manager, templates and process libraries also benefit tremendously from this. When working parametrically, the complete part is automatically updated when changes are made. This approach is therefore suitable for variants and subsequent adaptations.

Tebis has exactly tailored its parametric design technology to the requirements of manufacturing-oriented companies. The familiar design and editor functions can be used to parametrically design both wire-frame models as well as surfaces and solids. In contrast to many other volume-based systems, Tebis does not distinguish between surfaces and solids. This enables the user to work with the software very easily.

Users also benefit from the fact that all design steps can be automatically saved. For example, a part without holes and pockets can be handed over for roughing already at an early stage.

Users can edit the elements parametrically either on the graphical 3D object or via the structure tree. All information on the history of a specific geometry element can be directly called up and changed. For complex parts, object-oriented work in the tree with a clearly implemented structure is recommended: The entire process remains clearly structured and easy to follow. The Tebis Job Manager is also integrated in the object tree.

Stephan Galozy, product manager at Tebis AG, concludes: "We know from



surveys that nearly 95 percent of our customers use the design functions for manufacturing preparation. We have closed an important gap with parametric surface and solid technology. And because users can work in a single environment, they don't have to be trained in two systems."

Tebis will be showcasing its capabilities at MACH 2018 and the UK team will be on hand to present the latest developments of its software and discuss business requirements. There will be live demos of the software at the show including Tebis Milling and Trim/Laser solutions.

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At the forefront of technology

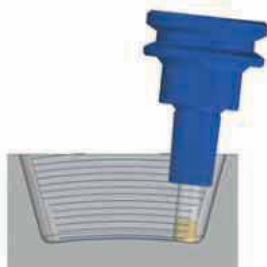
ModuleWorks, a leading supplier of CAD/CAM components for toolpath generation and simulation, has announced the latest release of its CAM components, ModuleWorks 2017.12, the third major update of 2017.

ModuleWorks is at the forefront of 5-axis machining and simulation technology, providing the toolpath and simulation technology that powers many of the leading CAM systems around the world today.

In this latest release, multi-axis collision avoidance has become even safer by taking the shape of the holder and arbor into consideration, and it is now possible to create deburred edges with a user-defined constant depth or width. These and further highlights of the 2017.12 release are described below.

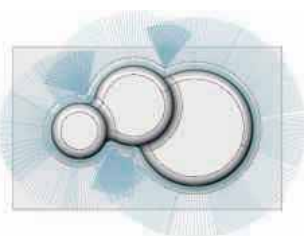
5-axis machining: dynamic collision avoidance between the tool, arbor, holder and machining surfaces

This new feature considers the shape of the holder and arbor during the toolpath calculation to avoid collisions between the entire tool and the machining surfaces.



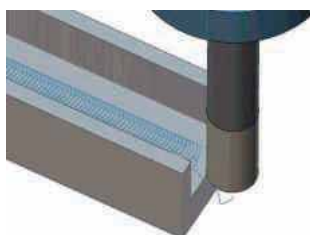
Tool axis smoothing for surface based and geodesic machining

Tool axis smoothing allows users to smooth the tool axis when machining to eliminate jerky movements. Rotary smoothing as well as linear axis smoothing optimisations are possible.



3-axis machining: breakthrough overlap for adaptive roughing

This new option enables users to specify an additional area that requires machining after the tool has broken through the thin wall of stock material. This usually happens at the end of slots machining. This feature makes the exit safer without instantly going through the thin walls.



Expand the rest finishing area

This new parameter can be used to expand the rest finishing area boundaries to process more material and clean-up the remaining regions more efficiently.

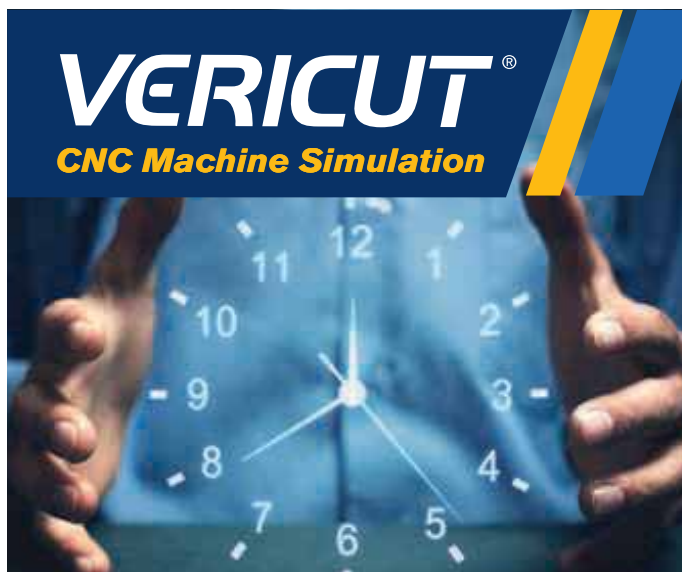
2-axis machining: start points for engraving and chamfering

This new option enables users to define unique start points for each contour to be machined. The toolpath start position is located at the shortest distance from the user defined start point.

Lead-in and lead-out for engraving

Vertical profile lead-in and lead-out moves can now be used for engrave roughing and finishing operations.

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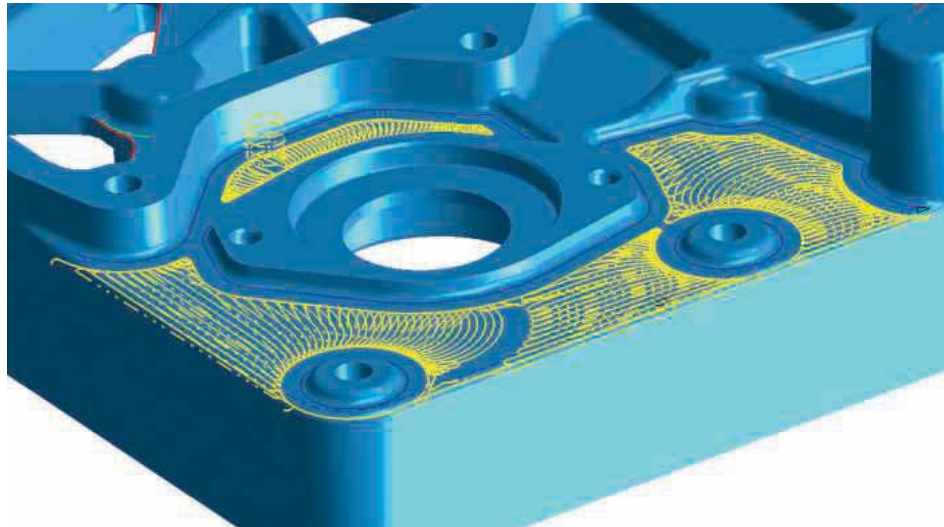
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SmartCAM v2018 released

SmartCAMcnc has announced the release of SmartCAM® v2018. The SmartCAM software family consists of applications for CNC milling, turning, fabrication and wire EDM. SmartCAM v2018 delivers new adaptive rough milling technology in the Advanced Milling™, SmartCAM FreeForm Machining™ and SmartCAM Advanced Turning™ applications; new Verification modules in SmartCAM Advanced Fabrication™ and SmartCAM Advanced Wire EDM™; improved feed rate control and numerous other useful core additions found in all products.



New adaptive rough milling

The SmartCAM Adaptive Roughing toolpath results in consistent cutting condition, elimination of full-width slotting cuts and automatically-created adaptive feedrates, which provide end-user benefits of increased tool life, reduced cycle time and reduced shock on their machine.

Doug Oliver, senior product manager at SmartCAMcnc, says: "Traditional offset toolpaths present several problems such as sharp corners, sudden changes in cutting tool load and shock on the machine tool, all of which can lead to shortened tool and machine life, even breakage.

"With the new SmartCAM Adaptive Roughing toolpath processes, the engagement volume of the cutter with stock is constantly monitored and maintained using in-process-stock algorithms. These algorithms handle the changing volume conditions encountered when creating toolpath for the infinite geometric possibilities."

Features of the SmartCAM Adaptive Roughing processes include: near-constant cutting conditions throughout the toolpath; sharp corners are never generated; independent, user-controlled width of cut and feed rates for climb- and conventional-cut toolpath; auto-start position with smooth entry allows entry from open boundaries at full cut depth where possible; cuts can be linked with smooth connections that lift the tool off the floor while returning to the start of the next cut at fast-feed rate; user controls for unidirectional with fast-feed returns or bi-directional adaptive passes; Plunge, Ramp or Helical entry types can be specified under user control; options for Rest-Mill Uncut Regions creation

SmartCAM Verification Module now in all applications

In May 2017, the new SmartCAM Verify Module was delivered in SmartCAM milling and turning applications; it is now included in the SmartCAM Advanced Fabrication and SmartCAM Advanced Wire EDM applications. The module uses the industry-leading ModuleWorks simulation technology, providing accurate material-removal verification and collision-checking capabilities.

Additional verification improvements include: Creation of revolved stock in all applications using open- or closed-wireframe profiles. With this change, the stock profile will be revolved around the X-axis of the workplane assigned to the profile geometry; Verification can now automatically remove separated stock pieces, or "chunks", such as when there is material remaining from inside a closed profile. This verification option allows the user to remove waste material during the simulation to better see the final results of the toolpath; Two new 'Pause At' Conditions for tool changes and/or collisions can be used to pause the simulation to allow closer examination of toolpath process Verification.

Doug Oliver says: "In our previous release, we began a new and productive relationship with ModuleWorks. By adding adaptive roughing in SmartCAM v2018, we extend that partnership, and remain excited by the various technology now available to us to implement going forward. Our customers have been uniformly pleased with

the significant improvements resulting in their SmartCAM products."

SmartCAM core improvements include: feed rate capability and flexibility has been expanded with several changes that provide better and more complete control of toolpath feed rates; new CAD/Process Plan List View visually separates the CAD geometry from the CAM toolpath geometry; SmartCAM v2018 includes the most-current ACIS® 2018 Solid Modelling kernel; updated data translators, SmartCAM v2018 includes updated CAD data translators for Pro-E/Creo® 4.0 and ACIS SAT/SAB R2018 data files.

Customers who have purchased any of these optional modules have been notified to the availability to download the new updates. Customers wishing for a free, no-obligation trial are encouraged to contact the company by phone or through the website.

For over 30 years, the SmartCAM family of computer-aided manufacturing software provides toolpath modelling and CNC programming for prismatic production work to complex moulds, dies, and prototypes. SmartCAMcnc provides affordable maintenance contracts, updates, upgrades and technical support for all SmartCAM users. All SmartCAM applications include standard CAD translators, and optional native CAD translators.

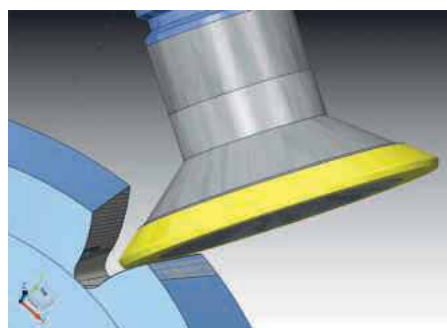
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Latest InvoMilling CAD/CAM software changes gear cutting with new advanced features

Gear manufacturing software from Sandvik Coromant boosts the capability of universal 5-axis machining centres

Cutting tool and tooling system specialist Sandvik Coromant has extended the functionality of its InvoMilling™ software. The latest version of this user-friendly CAD/CAM solution for fast and simple NC programming offers even more possibilities when manufacturing gears on universal 5-axis machining centres. As of late 2017, the software will also enable customers to produce straight bevel gears and herringbone gears.

InvoMilling exploits machine tool kinetics for the effective and flexible manufacturing of high-quality gears and splines in quality six or better, according to DIN 3962. After entering the required gear data, the



intuitive CAD/CAM software defines the optimum machining strategies and generates a CNC program that allows the production of different gear profiles using just a few standard precision tools. The software also offers excellent graphics as well as features to create and simulate milling paths.



As well as forthcoming options for herringbone, double helical, with and without gap, and straight bevel gears, as of the end of 2017, a further new function available in the latest version of InvoMilling is flank correction. This applies to tip relief and crowning in both the flank and profile directions, as well as helix and pressure angle corrections. Numerous improvements have also been made to the tools. For instance, adapted tools have been introduced to the tool library.

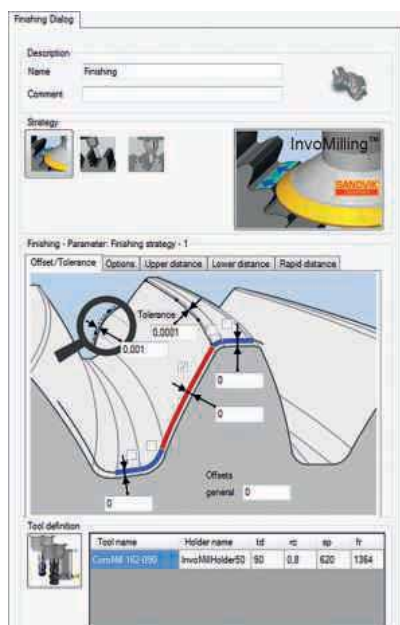
Jochen Sapparth, product manager InvoMilling CAD/CAM at Sandvik Coromant, says: "With the new software functionalities and tool optimisations, we are offering our customers additional options for gear

cutting in small and medium batch sizes, making the process even more flexible, fast and efficient. At the same time, we are expanding the range of applications that can be performed using 5-axis machining centres."

Sandvik Coromant's latest InvoMilling CAD/CAM software offers even more possibilities to manufacture gears on universal 5-axis machining centres. InvoMilling from Sandvik Coromant allows the production of different gear profiles using just a few standard precision tools.

In addition to the latest extension of the InvoMilling software, Sandvik Coromant has also made numerous tool improvements.

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Tips for choosing a 3D vision system

The future of vision systems in manufacturing

With four times as many colour receptors as humans, the Mantis shrimp has the most impressive eyes in nature. Manufacturers have long relied on human vision for complex picking and assembly processes, but 3D vision systems are beginning to replicate the capability of human vision in robotics. Nigel Smith, managing director of Toshiba Machine partner, TM Robotics, gives three rules to live by when choosing a 3D vision system for manufacturing:

Rule one: Abandon CAD

Advanced 3D vision systems are a stark contrast to the vision software of manufacturing's past. Many existing systems still require professional CAD programming to ensure the robot can recognise shapes. However, even after programming, this software can have difficulties recognising multiple items at once.

A common application for vision systems is removing and sorting items from a bin. While CAD-based systems can identify items in a bin, the challenge is recognising the position of each item when presented in a random order, let alone determining the best method for the robot to pick them in.

Advanced vision systems eliminate this problem by using passive imaging to enable the robot to automatically identify items, regardless of their shape or order.

Toshiba Machine's vision system, TSVision3D, for example, uses two high-speed cameras to continuously capture 3D images. Using intelligent software, the system can process these images and identify the exact position of an item. This determines the most logical order to pick them up and does so with sub millimetre accuracy, with the same ease as a human worker.

Rule two: Mimic human perception

Deploying a robot for bin-picking isn't advantageous if the robot cannot identify the edges of the bin. Considering the speed and strength of most 6-axis robots, hitting the box sides could easily halt production or damage the product.

Some manufacturers believe that motion stereo systems can effectively imitate a human's perception of an item. Motion stereo systems use one camera, usually



Distributor of Toshiba Machine's TSVision3D software, TM Robotics, explains the things to look for when choosing a 3D vision system, with no need for CAD software or mimicking human perception and simple installation

mounted on a robotic arm, to enable the system to move and take two or more photographs of an object. However, these systems require absolute precision as even the slightest movement can cause disparities in data and skew the measurement.

For manufacturers hoping to automate their box-picking processes, they should identify whether the system has a collision avoidance function. Advanced systems, including TSVision3D, enable the system to be programmed according to the size of the bin, ensuring the robot can dive into the box without a hitch.

Rule three: Simplify installation

Automation for jobs like bin-picking are designed to free manual operators from repetitive and menial tasks and speed up operations. However, some traditional vision systems involved multiple hurdles to implement, including longwinded installation methods and high levels of technical know-how.

Using 3D vision systems for bin-picking, cycle times can be as fast as 0.7 seconds. But, these productivity gains are useless if implementation of the software has high costs for time and staff resources.

When choosing a system, manufacturers must strike a balance between potential productivity gains and the resources required for installation. Today,

manufacturers should opt for software that anyone, even with minimal training, can understand.

Eyes are a testament to evolution's creativity. While they all have the same basic duty, the more advanced the vision system, the more information it can acquire. When choosing a vision system for manufacturing applications, manufacturers should consider how the system will improve their process, how it will manage complex requirements and how easy it is to understand and implement it.

TM Robotics has installed thousands of robots in factories throughout the world, including North and South America, India, Russia, Europe, the Middle East, Africa and Australia. Many of the top manufacturing companies depend on TM Robotics' product offerings for their reliability, performance, and overall value.

In partnership with Toshiba Machine, TM Robotics is the only company that offers a comprehensive range of all three categories of robots: 6-axis, SCARA, and Cartesian. These are designed and built in-house.

For more information on Toshiba Machine's TSVision3D, visit www.tmrobotics.co.uk or contact:

TM Robotics
Tel: 01707 290370
Email: sales@tmrobotics.co.uk

New FARO Design ScanArm 2.0 improves product design workflow

FARO, a world trusted source for 3D measurement and imaging solutions for factory metrology, product design, construction BIM/CIM, public safety forensics and 3D machine vision applications, has introduced the next generation FARO Design ScanArm® 2.0, specifically designed to address the most demanding challenges and requirements faced by product design and product engineering professionals. It offers an exceptional combination of flexibility, reliability, value and performance through best in class accuracy, resolution and ergonomics.

Live web demonstrations can be scheduled at www.faro.com/about-faro/contact/request-a-demo

The new Design ScanArm 2.0 delivers up to 25 percent improved system accuracy compared to the previous generation. Design and product engineering professionals can now have increased confidence that the real-world design output conforms even more tightly to the look, feel and complex geometry of the source object. Furthermore, productivity is

enhanced with the addition of FAROBlu™ Laser Line Probe HD that incorporates advanced blue laser technology and rapid scanning of up to 600,000 points per second.

The FARO Design ScanArm 2.0 is now available in three highly manoeuvrable arm lengths of 2.5 m, 3.5 m and 4 m, to ensure that end users can select the option that optimally fits with the specific design objectives for their projects. Furthermore, it includes the option of dual, hot swappable batteries that enable continuous operation wherever needed, without the requirement for external power. Users can now bring the scan to the project rather than needing to bring the project to the scan.

Enhanced ergonomics and a 25 percent overall weight reduction enables less operator fatigue. This leap forward in comfort, combined with improved manoeuvrability, significantly increases productivity by facilitating continuous use over extended periods during the workday.

The Design ScanArm 2.0 enables a new level of efficiency with integration of a kinematic intelligent probe system for



projects that require contact measurement. This system includes a tool-less quick release for fast connect/disconnect and allows operators to quickly transition from contact to non-contact projects without needing to spend any significant additional time and effort to switch out or recalibrate probes.

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Quality that lasts

Inspection equipment ensures quality for handmade shoe manufacturer

The Cheaney Shoe brand represents the finest British craftsmanship, producing premium footwear handcrafted from start to finish in their original 1886 Northampton factory. From cutting the leather to stitching and final polishing, the entire process is conducted using the same methods developed by Cheaney from the very beginning. The company has a highly skilled and experienced workforce and retains a strong reputation as one of the top English shoemakers chosen by discerning buyers across the world.

The first stage of the manufacturing process of the shoes is the cutting out ('clicking') of the quality leather. Cheaney work with the best tanneries in Europe to secure the finest leather for their shoes, but as a natural material even the finest leather can have wire and vein marks that need to be picked up early in the manufacturing process to avoid having rejects later in the process. In the past this was performed with the human eye, but it has now invested in equipment to enhance the human eye inspection with a Mantis Compact microscope, to ensure that these faults can be picked up as soon as the leather has been cut out.

Clicking Room examiner, Lesley Tartaglia, inspects thousands of sections per week to ensure that they are of the highest quality as they continue the eight-week process and 200 hand or hand tooled operations involved in making a pair of Cheaney shoes.

The Mantis Compact is bench-mounted and allows Lesley to inspect the individual pieces of leather with a comfortable viewing position. The ergonomic design allows the



user to wear glasses and have freedom of head movement, reduced eye fatigue, a long working distance and most importantly allows better hand to eye coordination which is crucial when inspecting large volumes of sections each week.

Cheaney Shoes purchased the Mantis Compact from Optimax Imaging Inspection and Measurement and found it invaluable to be able to bring samples of the leather to their showroom in the Midlands. This allowed it to try a number of different solutions to see which would work best for the particular application. Optimax always takes the time to understand each customer's application so that it can offer the best solution available to them and UKAS accreditation ensures the highest possible quality and accuracy.

Alex Bateman, factory manager at Cheaney Shoes comments: "We have already seen a return on our investment. We were hoping that the Mantis Compact would pay for itself by reducing the number of rejects within a year when we first purchased the equipment, but we are currently seeing a vast improvement of

25 percent of rejects now being picked up at this crucial first stage. This key piece of kit in the clicking room ensures that we continue to manufacture shoes to the highest quality standards that people expect when they purchase a Cheaney shoe."

For more information on Cheaney Shoes visit www.cheaney.co.uk

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Powerful aircraft surface inspection software

New surface damage analysis software combined with the HandySCAN 3D™ helps aerospace companies cut downtime and slash aircraft maintenance costs.

Creaform, a world leader in portable and highly accurate 3D measurement solutions, has launched aircraft surface inspection software for non-destructive testing (NDT), designed especially for aerospace applications. The damage assessment software paired with the HandySCAN 3D scanner represents a safe, cost-effective and time-saving solution for airlines and maintenance, repair and overhaul (MRO) service companies.

"Following our operator-friendly design thinking and with deep consideration of user requests, we have developed a software that streamlines data processing from a 3D scanner for easy and reliable assessment and characterisation of surface defects on aircraft," says Steeves Roy, NDT product manager at Creaform. "As predictive maintenance becomes more prominent, aviation maintenance professionals and MRO providers are increasingly on the

lookout for innovative methods that allow quicker and safer decisions to be made on part defects outcome."

Used with the HandySCAN 3D metrology-grade scanner, Creaform's inspection solution offers the following benefits:

- User-independent (repeatable results regardless of the user)
- 80 times faster than the pit gauge technique
- Reliable, repeatable, and accurate results
- Short learning curve and easy-to-use software
- Real-time, 3D visualisation and on-site instant reporting available in different formats.

Unlike generic MRO software, SmartDENT 3D provides a guided workflow with an intuitive graphic interface to bridge the gap between data acquisition and report production. The software is designed to simplify measurement extraction of 3D scanning data to get exactly the dimensions required for in-service aircraft assessment. SmartDENT 3D eliminates the need for



Creaform Launches SmartDENT 3D™, a Powerful Aircraft Surface Inspection Software

advanced knowledge in metrology software or otherwise complex 3D data handling. Users can feel confident about their results while saving time and money with no compromise on safety to return aircraft in service as fast as possible.

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Optimised cutting of sensitive surfaces

The new AMADA ALPHA V laser machine cuts materials with sensitive surfaces even faster, more reliably and more efficiently than before. Its burr-free and almost scratchless cutting quality sets new standards in laser cutting technology.

One of the greatest advantages of the new ALPHA V is its high cutting speed which has been considerably increased compared to the predecessor model. The machine now features an AF3500i-C resonator. It provides the performance required for an efficient cutting process, while the new "HyperFine Mode" ensures even greater productivity and maximum cutting quality. A key factor is that the new AMADA ALPHA V doesn't just permit the high-speed and high-quality cutting of conventional materials. In addition, the system delivers outstanding results when cutting material with sensitive surfaces. It processes stainless steel or aluminum components with highly polished or brushed surfaces to absolute perfection, with no back spattering and minimized scratching.

At the same time, the AMADA ALPHA V also excels through a range of additional new practical features. For example, the once common problem of welding the finished part to the material support has been eliminated. A variable cutting gap adjustment permits the individual regulation of the cutting gap at all times. All this is complemented by a generously-sized, end-to-end brush table and user-selectable roller support for the absolutely reliable positioning of all workpieces in accordance with process requirements. Optional rollers at the table edges protect the brushes during loading. Parts removal is now also even easier at the AMADA ALPHA V because of the larger opening angle of the work chute.

The new AMADA ALPHA V also offers exceptional cost-effectiveness. The maintenance intervals of the beam guidance components have been considerably extended. Further cost reductions are achieved by the system's reduced power consumption which may require up to twenty percent less energy than conventional CO₂ lasers. In addition, the laser cutting system is now even easier and more convenient to operate than before because of the use of the AMNC-3i control unit. The new AMADA ALPHA V is the

perfect solution for high-performance, reliable, economically efficient laser cutting, even when processing materials with sensitive surfaces.



The new ALPHA V combines maximum cutting quality with outstanding productivity, even when working with easily damaged materials

Perfect for even more applications

The new AMADA ENSIS-3015AJ RI laser cutting system, with its innovative rotary index (RI) unit and integrated material measurement, now also permits the laser cutting of pipes and profiles.

AMADA's latest laser cutting system is based on the proven ENSIS laser beam source. As a logical further development of the AMADA FO-3015M2 RI CO₂ laser system, it offers maximized production

metals such as aluminum, copper, brass or titanium without difficulty. What is more, the rotary index unit redesigned and optimised for ENSIS, features a new generation of tubular axes. This improves speed and precision again, while the optimised pipe guide ensures practically scratch-free processing.

The new, integrated material measurement unit for the fast, precise measurement of pipe reference surfaces enables the processing of pipes and profiles at the AMADA ENSIS-3015AJ RI in an easy and efficient way. There is also no longer any need to change lenses and nozzle changes are performed fully automatically. That's why the AMADA ENSIS-3015AJ RI permits a nearly interruption-free production that combines high speeds with optimised cutting quality.

The system's other highlights include a carbon collecting tray for the cut pipes and profiles as well as the practical sliding doors. These features ensure optimum access to the machine, while also proving reliable protection against reflections and slag projections.

With the AMNC 3i control unit, the new AMADA ENSIS-3015AJ RI also offers



efficiency, accelerated speed and extraordinary cutting quality. A completely new feature is the profile and pipe processing unit in the form of the innovative rotary index (RI). This unit permits the fast, simple, precise processing of pipes and other profiles. The 3 kW fibre laser based on AMADA's variable beam control automatically adapts to the specific type and thickness of the material and cuts normal steel, stainless steel and nonferrous

exceptional ease-of-use. It ensures simple, intuitive operation, helps minimising setup times and reliably evaluates the machine data.

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Prima Power – the 'Elite' choice laser cutter

Elite Office Furniture UK Ltd has expanded rapidly since the company was established in 1986. Having outgrown its original Howden-based premises after just two years of trading, the business moved to a much larger production site in Goole, East Yorkshire. To help satisfy ever rising demand for the company's range of office furniture over the past three decades, the Goole site has undergone several major expansions.

Now a multi-million pound business employing 150 people, Elite Office Furniture has recently relocated to a £15 million, 225,000 sq.ft Goole based HQ. In addition to housing the company's admin functions and showroom facilities, the impressive building provides a generous 152,000 sq ft of manufacturing space.

Elite Office Furniture's impressive new production facility is part of a multi-million pound investment program that includes the procurement of a range of highly efficient production systems. These purchases will allow the company to streamline its manufacturing methods, reduce production flows, substantially increase its output and also assist in achieving its ambitious growth targets.

Central to Elite Office Furniture's manufacturing investments was the purchase of a highly efficient 2D Platino Fiber Evo, laser cutting machine from Prima Power UK. Elite Office Furniture production



director, Rob Clarke explains: "Our policy of making continuous investments in state of the art production machinery has resulted in Elite now being able to produce 90 percent of all of our required components in-house. This high level of autonomy allows great flexibility and helps us to provide the best possible standards of product quality and service.

"Our move to new premises with a much larger custom designed production facility, and the purchase of further advanced plant, will allow us to complete even faster order to delivery times and to achieve further major manufacturing efficiencies. Vital to succeeding in our aims was the purchase of a fast laser cutting machine that was able to produce high volumes of the kind of premium quality, accurate cut parts required for many of our products.

"Having considered laser cutting machines from several leading manufacturers, we decided that the Prima Power 2D Platino Fiber Evo was the ideal machine for our needs. A demonstration proved that the machine was easy to program, simple to operate and straightforward to integrate in to our production system. Also, we were satisfied that the Prima Power 2D Platino Fiber Evo was capable of producing high volumes of premium quality laser cut parts. In addition to having confidence that the machine could meet our demanding production volumes and product quality requirements, we were also aware of the excellent reputation of

Prima Power machines and the levels of service provided by the company."

The 2D Platino Fiber Evo laser machine was developed by Prima Power to maximise customers' competitiveness. The flexible machine is provided with a series of optional suites, each dedicated to different production needs. SMART Cut, allows the rapid cutting of thin sheets of up to 5 mm and delivers reductions in cycle times of up to 30 percent. For the fast laser cutting of medium to high thickness sheets, MAX Cut, enables reductions in processing times up to 40 percent, while NIGHT Cut, intended for use in intensive production situations, provides higher piercing and cutting process safety. These suites add further value to a flexible, reliable and high performing fibre laser system that is based on a tried and tested platform with over 2,000 installations across the globe.

The Platino Fiber Evo is equipped with an advanced new cutting head with an adaptive collimator, single focus lens and is suitable for all production needs. In addition to high brilliance, the energy efficient fibre laser provides over 30 percent wall-plug efficiency. The system has low maintenance and reduced consumables needs and is supplied with two, three, four, or as specified by Elite Office Furniture, 6 kW of power.

The Prima Power Fiber laser cutting head has adaptive optics for automatic focus position and diameter control. Thanks to a quick, reactive and precise stand-off

measurement, the advanced new head ensures excellent quality and provides dynamic cutting of all materials, it can also be used with maximum cutting pressures in the most challenging of environments. SIPS (Safe Impact Protection System) protects the fibre laser head in the event of a crash and a wide range of nozzles suitable for all applications, together with an automatic nozzle changing system, are available on request.

The 2D Platino Fiber Evo features easy-to-use and highly efficient CNC software, while MAESTRO-Libellula® and NC Express e3 CAD/CAM systems allow simple and fast off-line programming.

The machines' new cabins are available in two versions: the LEAN option is compact, quicker to install and more economical, while the OPEN cabin version has greater accessibility and visibility of the work area, which allows front, lateral and roof opening.

A wide range of modules for the automation of raw and processed sheets flow means that Platino Fiber Evo machines are able to be delivered that exactly match the processing needs of each individual customer. Available systems cover automatic loading and unloading, to



automatic storage, and from the automatic selection and stacking of finished parts, to the seamless integration into flexible manufacturing systems (FMSs). Also, as users' production needs may vary over time, modules can be retrofitted that allow the machines to adapt to all new situations.

Rob Clarke concludes: "Our new building has impressive environmental friendly features, including energy efficient glazing, a biomass heating system and motion activated LED lighting throughout. In

addition to meeting our challenging production volume and product quality criteria, it helped that the Prima Power 2D Platino Fiber Evo also met our environmental standards as it has very low power consumption needs and minimal consumable requirements."

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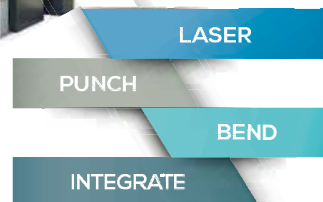
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Size really does matter

Salvagnini expands its product range with the L3-6020, the new laser cutting system for large formats

The L3-6020 is able to process sheet metal of a maximum length of 6,096 mm and maximum width of 2,032 mm, while retaining the features of the smaller L3 models, i.e. high speed and great flexibility over an extremely wide range of materials and thicknesses.

Salvagnini's patented load-bearing beam principle with lightened airplane manipulator has been revised and implemented in this new model as well, guaranteeing an extremely rigid structure with even greater stability, without compromising speed and precise, easy positioning.

Key factors in the management of such a large machine, such as operator ergonomics and ease of accessibility, are also guaranteed: the six sliding doors on the long side provide easy access to the working area, while the large windows, approved for safe use with solid-state lasers, along with the position of the new control console, offer maximum visibility of the cutting area.

Salvagnini has also paid particular attention to the new electrical pallet changeover (CPE) system. A fast, high-performance system, regardless of the size and weight of the sheet, it has been designed to minimise the risk of issues while transferring the machined material below the raw one.

The result of Salvagnini's extensive experience in the fibre laser field, the L3-6020 is equipped with a single optics head that provides high-quality cutting across the whole range of workable thicknesses, assuring rapid production changes, thus eliminating adjustment times. The patented DRY COOLING technology involves cooling the optics without the use of gas or liquids, as well as offering real-time control of the lens temperature.

The L3 is also equipped with two native



cutting functions: Standard and PowerCut, that allow you to choose the operating mode best suited to the different production requirements. Standard mode guarantees greater safety in unmanned manufacturing, while PowerCut offers reactivity and greater operational speed. Both can be easily activated using a toggle switch.

The L3-6020 is a productive and versatile solution, with reduced power consumption and competitive operating costs and is able to process the largest parts while offering significant design advantages.

The Salvagnini Group designs, builds and sells flexible systems and machines for processing sheet metal: punching machines, panel benders, press brakes, fibre laser cutting machines, FMS lines, automatic store-towers and software. Thanks to its

global presence, the Group offers direct customer service in more than 30 countries around the world.

Innovation, competency, service: three words that describe Salvagnini's activity in the field of flexible automation and industrial machinery for processing sheet metal. The Salvagnini Group has designed, manufactured, sold and serviced up-to-the-minute modular and flexible high-performance machinery and systems from as far back as 1963. As a result, Salvagnini is in a position to offer the customers of today highly optimised and customised solutions.

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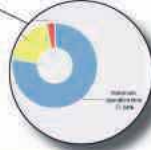
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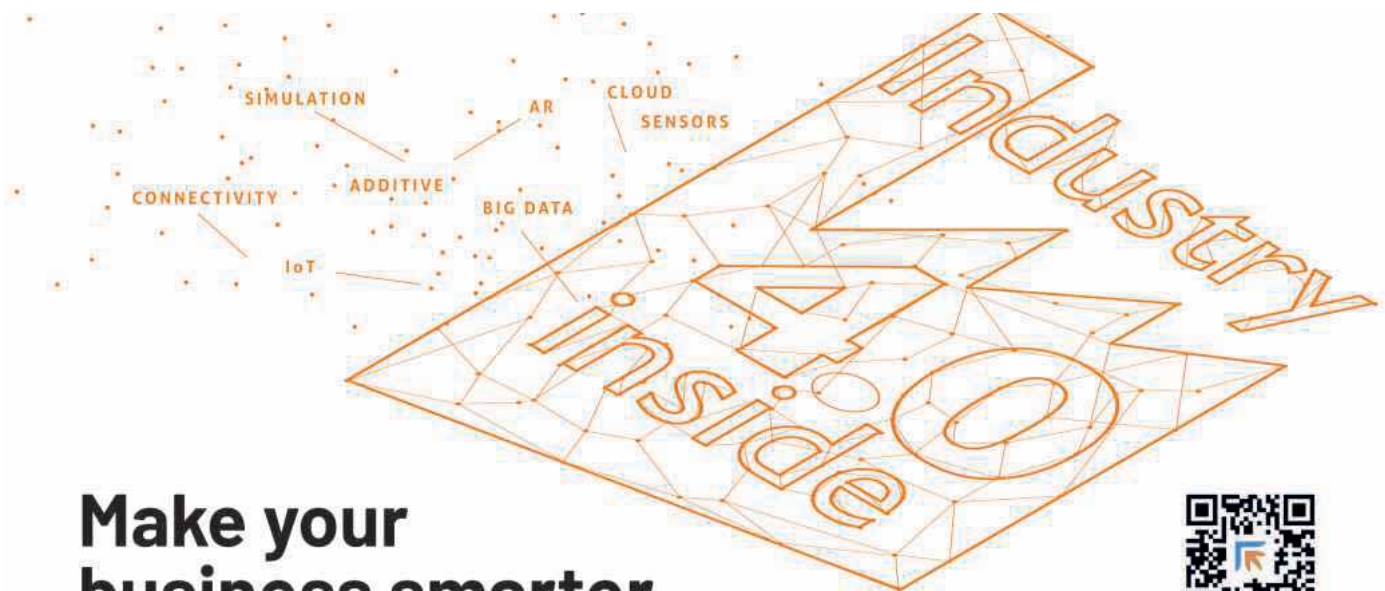
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Lasers - cutting through the choices

There is little doubt that lasers have become a firmly established production tool for cutting within many industries and applications. Choosing the correct laser cutter however can seem like a daunting task, especially for those planning to use the technology for the first time. In addition, even although lasers have been mainstream for many years, there are still issues with incorrect perceptions and assumptions surrounding the technology.

In this article, TLM Laser's Andy Toms discusses the different laser types, applications and materials, reinforcing the fact that there is no "one size fits all" approach to laser cutting:

Even in our technologically enlightened age, it is still possible to hear the phrase "a laser is just a laser – right?" Whilst the term laser does apply to all variants, the differences between types of lasers, their capabilities and how and where they are applied are vast, requiring careful consideration by prospective purchasers.

Laser cutting systems can be found in areas as diverse as school technology laboratories and high volume, state-of-the-art manufacturing sites. The lasers used at these extremes of the application range are very different, as are the materials that they are likely to be expected to process. For those who have been cutting wood, fabrics or plastic on a small desktop flatbed laser system, it is more than just a leap of faith to decide to move

into metal cutting, there is a subsequent leap in technology and cost.

Today, the two main technology choices for cutting metal are CO₂ or fibre lasers. The decision on which to select will be based upon a number of factors, including the types of metal to be cut and material thickness. A further consideration however, is the type of work to be undertaken by the laser. For example, subcontractors and job shops need high levels of flexibility, due to

the potentially wide range of products, and material thicknesses they are likely to encounter, whereas an OEM may have a well-defined range of regular products of similar material and section, at higher volumes, therefore requiring a more focused approach.

Material types and section will influence the choice of laser for metal cutting

The differences here mean that in certain instances, the subcontractor may decide that a CO₂ laser, with its capability to cut thicker material, might be better overall. The advantages of the CO₂ laser, when compared with the fibre alternative, mainly relate to the cutting speed when processing thicker materials, typically above 8 mm. In these instances, the CO₂ machine is faster in a straight line cut and also has the advantage of a smoother surface finish when cutting thicker materials. So, if a subcontractor is to have just a single laser and is being asked to cover a wide range of medium to thick material sections, perhaps a CO₂ laser might be the preferred choice. In practice however, a number of subcontract companies employ both technologies, allowing them to select and take advantage of, the most appropriate laser for each application.

The OEM on the other hand may choose a



fibre laser system, which will deliver higher cutting speeds, especially on thinner materials. Typical estimates show a fibre laser cutting 1 mm thick steel will be approximately 3.5 times faster than an equivalently powered CO₂ system. Fibre lasers are also able to process reflective materials without fear of damaging the system, meaning that brass, aluminium and copper, as well as traditional steels and alloys, can be safely cut by the laser. Fibre lasers do not have any moving parts or mirrors etc. therefore they require much less maintenance. They also have significantly higher levels of electrical efficiency, making them much less expensive to run. The IPG fibre lasers, distributed in the UK and Ireland by TLM Laser, typically use 70 percent less electrical energy than traditional CO₂ alternatives in metal cutting applications.

A small footprint does not necessarily mean a small price

There are some perceptions that there is a correlation between the physical size of the laser system and the cost. Of course, the small desktop laser cutters found in school technology laboratories are relatively inexpensive, but these systems do have their limitations. The concept of footprint and cost however does not apply for the systems used within true manufacturing environments, where it is the technology that drives cost. For OEM's or subcontractors that generally work in thinner sections and / or with multiple alloys and higher-value metals, many of which are only available in smaller sheet sizes, the LaserCube system offers significant benefits. Manufactured by the world's leading developer and manufacturer of high-performance fibre lasers IPG, LaserCube is a compact flat-bed cutter and is the ideal cutting tool for metals, including mild steel, stainless steel, aluminium, copper, brass and exotic alloys. Ideally suited to smaller part sizes, prototypes and smaller production runs, the LaserCube provides the most cost-effective capacity addition and lowest cost of ownership of any professional laser cutter.

IPG's LaserCube uses fibre technology to process a wide range of metals cost effectively within a small footprint

On thin sheet sections, LaserCube's fibre laser source performs much more efficiently than high power CO₂ lasers that can become unstable when operating at the lower power settings needed to process these thinner sections. Here the fibre laser will provide the optimum solution, and for materials that are only available in smaller sheet sizes, IPG's LaserCube definitely comes into its own. The 1,250 mm cutting bed of the LaserCube is the perfect size for cost-effective material processing. The system is also available in a wide range of different power configurations, allowing

users to select the power they need, from 500 W to 4,000 W. By offering such a broad range of options, users can to select the exact cutting solution required.

As we can see, there are many factors which will influence the choice of laser and system for metal cutting and, as the brief summary within this article demonstrates, there is no "one size fits all" solution and costs are definitely influenced by laser technology and power, and not by the size of the system.

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New solid-state lasers optimised for digitalised and connected manufacturing

The latest generation TruDisk lasers from TRUMPF are claimed to be the most advanced, high-power solid-state lasers on the market. With built-in intelligence, they include optimum hardware features for a digitalised future and Industry 4.0. Naturally, they perform condition monitoring, predictive maintenance and trend analysis which is a prerequisite for successfully implementing lasers in digitalised and connected manufacturing environments.

"The new TruDisk is not just the smartest, most advanced generation of disk lasers we've ever developed, it's also the most compact and energy efficient," says Klaus Löffler, managing director and head of Sales at TRUMPF Lasertechnik GmbH.

"Combined with our Condition Based Services, the new TruDisk lasers are the perfect production tool for superior Industry 4.0 production lines."

Condition Based Services are modular components of TruConnect, the TRUMPF technology for connected manufacturing. They increase the availability and productivity of connected laser systems while identifying potential cost savings.

All-new control systems, diodes and cooling technology

The critical hub of the smart TruDisk beam source is the built-in control system known as CPX. This is the laser's brain, where all the condition data and process parameters are collected. During processing, a broad array of sensors measures multiple parameters, including the actual laser output at microsecond intervals, all internal and external signal characteristics, the utilisation rate of the beam source and the condition of additional components.

The new generation TruDisk lasers also incorporate a clever new feature that significantly enhances the quality of the data obtained from the readings. Known as Precision Time Protocol, it synchronises all the sensors and provides them with an identical time stamp. But perhaps the most impressive development of all is how TRUMPF is planning to use Condition Based Services in the future.

With the customer's prior approval, the services will be used to analyse data



parameters, carry out algorithm-based trend analysis and take targeted measures to determine the risk of potential laser failure in advance to prevent unscheduled downtime.

The second major improvement inside the new-generation TruDisk laser can be found in the new laser diodes which TRUMPF develops and produces at its US plant in Princeton, New Jersey. The new laser diodes are both compact and energy efficient. These characteristics keep running costs down while also reducing the laser's footprint which, at just 0.85 square metres, is currently the benchmark for multi-kilowatt high-power lasers.

There is even room in this small space for the laser's smart cooling system which enables the use of cooling water at feed temperatures of up to 26 degrees Celsius. This eliminates the need for an external cooling unit in most cases.

Now even better

To boost the energy efficiency of the new TruDisk lasers, TRUMPF has equipped them with a new pulse function. This makes it possible to ramp the current of the pump diodes down to zero Amps even during very short laser-off times between two processing steps.

The lasers also come with a smart energy management system that switches the laser between different power-saving modes for each operation, reducing energy consumption to a minimum. Additionally,

the laser's optics have been redesigned to ensure optimum use of the diode pump light.

The TRUMPF TruDisk laser has proven its worth thousands of times over in practical applications. Real-time power regulation ensures the power applied to the workpiece remains stable from one operation to the next and throughout the system's entire service life. TruDisk technology is also built to withstand laser radiation reflected from the workpiece making it an extremely robust disk laser that is ideally suited to tough industrial environments.

Modular design makes it easy to upgrade the machines with individual components and functions at a later point of time allowing them to be optimised for a remarkable range of applications. From vehicle making, aerospace engineering, medical devices and electronics through to the supply sector and heavy industry, the high beam quality of a TruDisk laser make it a reliable tool for joining, coating, additive manufacturing, hardening and cutting, with high quality and reproducibility.



The new generation of TruDisk laser is available for laser output of between three and five kilowatts with fibre core diameters between 100 and 600 micrometres. Further models are also being developed.

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LVD introduces new 8 kW electric fibre laser

LVD Company nv has announced the launch of its Electra FL 3015 8 kW fibre laser cutting machine. The ultra-high-speed Electra cuts a wide range of ferrous and non-ferrous materials as fast as the thermal process allows without dynamic compromise. The Electra 8 kW can maintain 2 G acceleration speed while cutting, producing high quality, high accuracy cuts in simple to complex configurations. The Electra FL also features a new cutting head, new "smooth lead-in" feature, advanced drive system and the latest generation of LVD's intuitive Touch-L control.

The Electra is equipped with an advanced cutting head featuring automated adjustment of focus position and focus diameter (zoom focus). Zoom focus control can dramatically improve piercing times, cutting speeds and cut performance in all material types and thicknesses, increase throughput and reduce the need for operator intervention. The ability to change the focal point allows Electra to pierce 20 mm material in just two seconds for significant productivity gain on fully nested

sheets. This also means that less heat is generated in the material, making it more efficient to cut small holes.

Electra's new "smooth lead-in" feature guarantees a much faster but stable lead-in after fast piercing when cutting thicker material greater than 6 mm with Nitrogen, resulting in an average gain of up to 15 percent on part cutting times. A linear drive system to harness the full benefits of the higher power cutting capability of the 8 kW fibre laser. Electra's high cutting dynamics and rapid acceleration achieve high part output. The machine's rigid frame design ensures that cutting performance is reliable at top cutting speeds. The rigidity of the mono-frame construction also means no foundation is required.

The machine's laser source has a high wall plug efficiency of up to 40 percent, offering savings in electrical operating costs.

The Electra features the latest generation of LVD's 19" Touch screen graphical interface, making the system easy to operate for virtually any level of user. An icon-driven user interface guides the user



through all necessary man-machine interactions, making machine setup fast and uncomplicated.

Two levels of automation are offered: an automated load/unload system designed to keep pace with Electra's high cutting speed (FA-L), or a Compact Tower (CT-L), offering full capabilities for loading, unloading and storage of raw materials and finished parts.

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Choosing the right solution in a diversified market

CO₂ lasers have often been the product of choice for subcontractors, but a new generation of fibre lasers is increasingly taking market share and segmenting the laser market. Andrew Armstrong, sales and marketing manager at FANUC UK, discusses the merits of CO₂ versus fibre lasers and advises subcontractors on how to choose the right laser for their applications. CO₂ lasers have long been the default choice for subcontractors. For many, they represent a reliable and precise method of cutting sheetmetal.

In recent years, however, the laser cutting market has diversified, leading many subcontractors to consider alternative laser technologies, specifically fibre lasers.

The question for many is: which is better? Like most things, the answer isn't simple, and very much depends upon the specific application.

The key issue is the thickness of the sheetmetal that the laser is being asked to cut. A broad rule of thumb is that CO₂ is a good solution to cut mild steel of up to 32 mm thickness, or stainless steel of up to 20 mm thickness.

Where quality of finish is key, CO₂ also comes into its own, offering a good fit for



contractors requiring contours or smooth edges. For example, the FANUC CO₂ lasers offer a precise and cost-effective way to cut sheetmetal, producing a smoother cutting-edge surface than their fibre

equivalent, which can, in turn, deliver a superior parts fitting.

The other great advantage of the CO₂ laser is its ability to cut different thicknesses, alternating from relatively thin sheets, up to very thick. For subcontractors manufacturing tube or pipe shapes, the best and most efficient option for them remains the CO₂ laser.

What then is the role for fibre lasers? The key issue is that fibre laser technology is ideally suited for fast cutting of ultra-thin metal sheet up to 6 mm. At the same time, fibre technology is capable of cutting extremely fine contours, which means that this is an ideal choice for subcontractors needing speed plus precision with a variety of materials, including non-ferrous metals.

The FANUC fibre laser shares the same cutting machine technology as FANUC's existing CO₂ lasers, but has no complex mirror technology, transferring the beam to the cutting head via a fibre optic cable.

Another issue to consider is machine footprint. Both the FANUC CO₂ and fibre lasers do offer a very compact footprint, making them an optimal solution for subcontractors with limited floor space.

A further consideration is machine



tending. With the FANUC lasers, integration of a tending robot to enable lights out or unmanned running is extremely straightforward thanks to the FANUC CNC's Robot Connection Function, which completely dispenses with the need for an additional interface.



The diversification of the laser market means that it is now much easier for subcontractors to choose the cutting solution that is suitable for them.

My advice to subcontractors looking to specify a new laser is to take an application-first approach. Ask yourself what you want to cut and then specify your machine on that basis.

FANUC UK has a range of fibre and CO₂ laser systems available and has installed over 20,000 worldwide. For more information, please visit: www.fanuc.eu/uk/en/cnc/laser-systems

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.

FANUC UK works in partnership with FANUC Europe Corporation to provide a range of customer support services, including sales, product support, parts, repairs, and training, as well as development of bespoke engineering systems. FANUC UK is a subsidiary of FANUC Europe Corporation and employs approximately 107 staff.

FANUC is a leading global manufacturer of factory automation solutions using Computer Numerical Control (CNC) systems. From its international headquarters at the base of Mount Fuji in Japan, FANUC specialises in the development and manufacture of factory robots and automation machinery, including wire EDM machinery (ROBOCUT), high-speed milling machinery (ROBODRILL) and

injection moulding machinery (ROBOSHOT). More than 400,000 FANUC robots are currently operating worldwide.

FANUC develops and manufactures all of its components in-house, and provides lifetime parts, repairs and support to its customers.

Based on more than 60 years of research, FANUC's CNC systems allow manufacturers to maximise their productivity, while minimising downtime. All FANUC systems offer high reliability, strength, control and precision. They are also equipped with intelligent energy management systems, which provide optimum performance using the least energy possible. FANUC is a global leader in CNC systems, currently holding 65 percent of the market share in the global CNC sector.

FANUC was founded in 1956 by Dr Seiueemon Inaba. The corporation now has more than 2000 robots working on its own lines, with more than 250 offices and 5,200 employees worldwide.

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MACH • Stand: H19-610

An advertisement for Accurate Laser Cutting. The top part features the word 'Accurate' in a blue box, followed by 'Laser Cutting' in a white box. Below this, the text 'RAPID RESPONSE LASER CUTTING SERVICE' is written in large, bold, white letters. The background of the advertisement shows a laser cutting machine in operation, with a bright blue laser beam cutting through a piece of metal. The bottom part of the advertisement contains a list of services: 'SHEET METAL PROFILING EXPERTS', '4M X 2M CUTTING CAPACITY', '4M 320 TONNE PRESSBRAKE CAPACITY', and 'FREE UK DELIVERY'. Below this list, it says '10KW FIBER LASER NOW IN FULL PRODUCTION' in yellow text. At the bottom, the website 'www.accurate-laser.co.uk' and the email 'sales@accurate-laser.co.uk' are listed, along with the phone number 'Tel: 0121 520 2444'.

Malton Laser brews up innovative sheet metal solutions for local coffee shop

Full-service sheet metalwork manufacturer, Malton Laser has utilised its state-of-the-art laser cutting technology to create a series of sheet metal products for local coffee shop, Leoni's.

Leoni's called upon Malton Laser's services to create a series of items that are not only functional but also aesthetically pleasing. These include bespoke shelving and sheet metal components for a coffee dispensing area, which have enhanced services for Leoni's customers.

Simon Robertson, owner of Leoni's, produced prototypes of the items he required before working closely with the Malton Laser design team to create CAD drawings of his pieces. Malton Laser's engineers then utilised its Bystronic Bystar 3015 6 kW fibre laser machine to precision cut all components required for each item out of stainless steel. These parts were then welded into shape in Malton Laser's fabrication department by the company's team of expert welders.

Commenting on the projects undertaken by Malton Laser, Simon Robertson says: "After identifying the need for a number of products for the coffee shop that enhanced the look and feel of the shop while serving a purpose, I called upon Malton Laser to manufacture items unique to me.

"I'm quite a creative person and



produced a series of mock-ups of the items I wanted creating, before taking these to the Malton Laser team. I had specific ideas, especially for the coffee dispensing area, and Malton Laser worked closely with me to bring my ideas to life.

"Nothing is a problem for the Malton Laser team. The engineers have gone above and beyond to manufacture stainless steel items that are practical yet visually appealing, all the while being unique to my coffee shop."

Malton Laser specialises in providing a full sheet metalwork service, from laser cutting and pressing to fabricating, powder coating and assembly.

Charles Corner, managing director of Malton Laser, says: "Simon is a good friend of mine and when he came to Malton Laser for assistance in manufacturing the items he required for his coffee shop, we knew we could provide a viable solution for a fellow local business.

"Utilising our cutting-edge laser cutting and welding technology, our engineers have fashioned a series of products for Leoni's from quality stainless steel. Working closely with Simon and using his prototypes, our engineers were able to produce products to an exact specification, making them unique

to Leoni's and meeting Simon's needs perfectly."

Established by engineering expert Charles Corner in 2000, the Malton Laser team offers clients unrivalled levels of quality, precision and service.

Malton Laser uses some of the most technologically advanced equipment available, including a 6 kW Bystronic Bystar Fibre Laser, to offer customers the most efficient and cost-effective laser cutting processes in the industry.

Its full-service offering has led to Malton Laser servicing clients in a number of sectors across the UK, including food and drink, automotive and transport, architectural and construction, retail, energy and engineering.

For more information on Malton Laser and its services, contact:

Malton Laser
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www.maltonlaser.com

Fabricator invests further in state-of-the-art laser technology

Gratnells Engineering has recently invested in a new state-of-the-art BLM LT Fiber machine, allowing the Harlow-based company to expand its capabilities in 2018 and ensure clients benefit from even faster turnaround times.

This brand-new machine sits next to the existing LT5, a laser tube cutting machine designed to cut from small to medium diameters and thicknesses of metal tubular sections. The LT Fiber allows tubes of any shape to be cut, process of special sections and even open shapes without any additional special equipment required.

The laser cutting range boasts an automated unloading and support system for pre-cut lengths up to 6,100 mm, automatic weld seam detection and a module that maintains the cleanliness of the internal tube surface whilst machining.

Anti-crush technology makes the machine capable of processing even the lightest of tubes without deforming the walls. This high-tech equipment is also great for scrap reduction by setting the sequence of parts to be cut and minimising end of bar scrap; meaning less overall waste, which is good for the company and for the environment too.

The additional BLM LT Fiber machine is already helping to increase factory efficiency by allowing unloading to various positions, with finished parts from one machine being unloaded whilst production continues uninterrupted on the other. The need to manually separate parts from different orders has also now been eliminated.

Tube laser cutting continues to grow in popularity as it offers a quick route to a precise finish, eliminating conventional,



time-consuming stages such as marking out, sawing and finishing whilst delivering significant cost savings.

Operations director, Loic Jones says: "Gratnells Engineering decided to invest in state-of-the-art laser technology to enable us to offer fast production runs with the best quality finish, to our customer base. This substantial investment will allow us to continually support the ever-demanding needs of modern manufacturing clients."

The Gratnells Engineering factory can turn around tube laser cutting jobs within 3-5 days from receipt of order and, using sophisticated software, process parts from a variety of media, including 3D models, xt files and solid works. This is particularly beneficial for bespoke automotive and point-of-sale components where the minimum quantities can start at one. The company carries out rapid production of high quality tubular and box section components. Not only does it provide a

high-volume laser cutting service, but also specialises in short-run, quick turnaround projects. This is particularly suitable for bespoke automotive and point-of-sale components where the minimum quantities start at one. Tube laser cutting offer a quick route to a precise finish, eliminating conventional, time-consuming stages such as marking out, sawing and finishing, while delivering significant cost savings.

Gratnells Engineering has also recently updated www.gratnellslaser cutting.com, a website that outlines some of the key benefits of the technology and streamlines the decision-making process for customers even further.

For over 60 years, BLM has been making state-of-the-art systems for processing tubes, special sections and bars to make production simpler, more innovative and more effective for its customers. The company's strengths are tube processing by means of laser cutting, bending, saw cutting and end forming, with a comprehensive range of solutions for a wide variety of applications.

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Retrofits boost quality and productivity

ESAB, a world leader in welding and cutting technologies, has retrofitted two Suprarex plasma cutting machines with new CNC and plasma cutting systems for a longstanding customer, Eddison & Wanless. One machine was 12 years old and the other was five years younger, but both have been retrofitted with identical m3 Plasma™ systems, so it is benefiting from improved cut quality and higher productivity. The complete retrofit project cost substantially less than buying two all-new plasma cutting machines, yet the company is benefiting from state-of-the-art plasma cutting capability.

Eddison & Wanless manufactures high-quality oil tanks, water tanks and air-tight tanks in mild steel, stainless steel and aluminium. These are used in the petrochemical and process industries, offshore oil platforms, marine and dockside applications, heavy industry and mining and mineral sites. Eddison & Wanless was founded in the late 1950s and has had a relationship with ESAB for more than two decades. Around 15 years ago, Eddison & Wanless purchased an ESAB Suprarex plasma cutting machine and five years later invested in a second similar Suprarex. These two machines proved to be robust and reliable, with Eddison & Wanless ensuring they were regularly serviced by ESAB. However, as the machines aged, maintenance costs started to creep up, so ESAB suggested retrofitting new equipment to bring the machines up to date, improve cut quality, raise productivity and reduce maintenance costs.

ESAB planned the retrofit project so that Eddison & Wanless would always have one machine fully operational. From beginning to end, the work took around one month. Managing director Andy Benson is very pleased with the result, saying: "The cut quality is noticeably better, particularly on holes. And whereas we used to be restricted to cutting holes one-point-five times the material thickness, the improved machines cut holes the same diameter as the thickness, which often eliminates a drilling operation. Furthermore, the machines cut faster without compromising quality. Overall, we have therefore seen a marked improvement in productivity."

Previously the two Suprarex machines were slightly different, but now they both have identical plasma systems. This



simplifies production planning and part programming and will also help maintenance in the long run. Another benefit of the upgrades is that the machines can now cut and mark, with no need to change the torch or nozzle between cutting and marking operations.

ESAB's m3 Plasma system uses micro nozzles for cutting thinner plate at high speed and improved cut quality with Precision Hole Technology, as well as providing marking capability, all using the same torch and nozzle. The m3 system also supports SmartCycle™ technology for increased productivity through full integration of the CNC controller, plasma system and CAD/CAM/nesting software. In addition, the m3 system benefits from Smart Voltage Height Control capability, which automatically adjusts the torch height to maximise consumable life while ensuring consistent cut quality through the life of the consumables.

A vital component of the m3 system is the EPP-362 power supply that provides precise control of the plasma current (up to 360 A) using all-digital control circuitry, while a high-speed data bus connection ensures precise control of the current and gas pressure, as well as enhanced diagnostic capabilities, including advanced status and process monitoring. For maximum reliability, the power supply has an internal coolant circulator to maintain the operating temperature at a constant, controlled level.

To complement the m3 Plasma system,

ESAB retrofitted the Suprarex machines with Vision 51 CNC. These Windows-based controllers feature a solid-state hard drive, large colour display, built-in diagnostics and ruggedised componentry. Each controller also has a process database for easy setups, plus a shape library. True multitasking capability means that new programs can be entered while the machine is cutting.

The Vision 51 controller and m3 Plasma system operate together extremely well, but the full benefits of the two are only achieved by implementing the Columbus III CAD/CAM/nesting software as well, so Eddison & Wanless upgraded its software from Columbus II. This Windows 10 package is network-compatible and provides a level of future-proofing to help Eddison & Wanless with any future upgrades to either its IT systems or the Suprarex plasma cutting machines. Columbus III makes programming easier and more efficient, improves material utilisation, streamlines workflow and increases productivity. Intelligent wizards contribute to intuitive operation for both simple and highly complex cuts, as well as marking, labelling and nesting.

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MACH • Stand: H17-580

Bandsaw boosts additive manufacturing productivity

KASTO has introduced an innovative, automatic bandsaw designed to increase productivity in the additive manufacturing sector. The KASTOwin amc incorporates a 180-degree turning device that allows 3D-printed parts on their build platform to be inverted so that the components fall into a container after they have been sawn.

Gains in efficiency, reliability, precision and safety are claimed for the new machine. Moreover, upside down sawing prolongs the life of the 5,090 x 27 x 0.9 mm blade, as wear on the teeth is significantly reduced because swarf also falls away under gravity, so less is drawn through the cutting channel. Cooling is provided by a minimum-quantity lubrication system. The welded, ribbed, torsionally rigid structure minimises vibration for quiet operation and accuracy.

A build platform with additively manufactured parts is bolted to a fixture by means of a handling unit or crane. Alternatively, it can be fixed in position using an optionally available quick clamping system. The operator loads the 3D-printed parts, closes the doors and enters the

thickness of the build platform via an easy-to-use wizard in the KASTO SmartControl CNC system. The saw unit, which has a precise ballscrew drive, then moves to the exact height required and the parts are automatically separated within the specified tolerance.

A window is provided for visual inspection. The operator can open a flap or press a button to stop the sawing process and then continue it, allowing individual components to be removed from the container when several are being worked on.

The KASTOwin amc, which has a footprint of 2,455 x 2,325 mm and stands 2,075 mm high, has a standard cutting range of 400 x 400 mm, although other capacities are available on request. The electromechanical infeed is infinitely adjustable and band speed is controllable between 12 and 150 m/min. The fully enclosed machine is prepared for the addition of a customer-supplied suction unit so that components can be sawn in automatic mode with minimum dust generation.



A video showing the KASTOwin amc in operation can be accessed at the following: www.youtube.com/watch?v=58QKOUfjCe8

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Stand H7-365



Hypertherm celebrates 50 years of industrial cutting innovation



Hypertherm, manufacturer of industrial cutting systems and software, is celebrating its 50th year of industrial cutting innovation by introducing new programs designed to deliver greater value to our long-time customers. In addition, the company's anniversary year events will include the unearthing of a long-buried time capsule, and celebrations at all its global locations with founder Dick Couch.

From its foundation in 1968, Hypertherm has worked to meet customer needs, through continuous innovation designed to improve productivity and profitability. At the same time, the 100 percent associate-owned company follows a triple bottom line management approach in working to enrich the community and environment while growing its business.

"Hypertherm's focus has always been on helping our customers reduce their operating cost and improve cutting performance so they can enhance their profitability," says Hypertherm president & CEO Evan Smith. "That's what we continue to do today. In partnering with our customers, we are helping them identify the right solution to meet their business goals.

"When we say we're 'Shaping Possibility', we are supporting our customers as they bring their visions to life. At this milestone moment, we're inspired to extend and expand that promise into the next half century.

"I'm so proud of all that we've accomplished over the last five decades. We've grown from a manufacturer of plasma systems to a global provider of cutting solutions. More importantly though, we did this as an independent company following our core values while pursuing the long-term interests of our customers and communities.

"It is gratifying to know that we did this while achieving our goal of becoming a company completely owned by associates who remain committed to providing the world's leading industrial cutting solutions and to building long-term customer relationships founded on technology and service leadership."

Working out of a small two car garage, Evan Couch and Professor Bob Dean discovered that radially injecting water into a plasma cutting nozzle would form a narrower arc, making it possible to cut metal more accurately and quickly while virtually eliminating heavy dross and double-arcing. Today, Hypertherm products are found the world over, with its cutting systems used in the construction of ships, trains, earth-moving equipment, large buildings, stadiums, bridges and so much more.

The company continues to put customer focused innovation at the forefront. Through significant investment in research and development, the company's engineering teams are responsible for bringing



numerous breakthrough technologies to market. These include the introduction of HyDefinition®, HyPerformance®, and most recently, X-Definition™ Plasma processes, to highly efficient air plasma and long life consumable technologies. Waterjet differentiators include technology that eliminates common wear items for a lower overall cost of ownership when compared to other brands, and software advances designed to shorten programming time, simplify use and deliver optimal outcomes.

Hypertherm designs and manufactures industrial cutting products for use in a variety of industries such as shipbuilding, manufacturing, and automotive repair. Its product line includes cutting systems, in addition to CNC motion and height controls, CAM nesting software, robotic software and consumables. Hypertherm systems are trusted for performance and reliability that result in increased productivity and profitability for hundreds of thousands of businesses. The company's reputation for cutting innovation dates to 1968, with Hypertherm's invention of water injection plasma cutting. The 100 percent associate owned company has more than 1,400 associates along with operations and partner representation worldwide.

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The same ideals that fueled our inception in this garage 50 years ago are still what drive us today.



Not out on a limb

It takes a lot of dedication to choose a career in medicine. To become a GP you're looking at five years of further training on top of a medical degree and to become a hospital consultant you can expect that to take between seven and nine years. That's a lot of theoretical and practical training. But how often do any of us think about what that training entails, particularly on the practical side?



The team at Limbs and Things think about little else, as the company specialises in providing anatomically accurate and procedurally correct models used in training the next generation of medical practitioners. To help manufacture such high-quality products, Limbs and Things turned to band saw specialist Starrett for support.

Established in 1990 by Margot Cooper, a medical illustrator, Limbs and

Things creates models specifically designed to support the development of physical examination. She identified a need for a way of training healthcare professionals away from patients, cadavers and animals and therefore developed Limbs and Things' 3D models range to fill the gap. Since developing its first dynamic, anatomical models of the foot and spine, as well as synthetic soft tissue models, the company has gone on to continually expand and improve its product line.

Naturally, designing and producing such high quality, accurate models of the human body that are tailored to demonstrate various conditions requires a lot of research and development (R&D). To this end, Limbs and Things works with various specialist surgeons, advisors and medical educators, as well as scan data from human subjects, to ensure as much anatomical accuracy as possible in the 3-D models.

To truly supply the tools for hands-on training for healthcare professionals, it's important to be able to easily manufacture prototypes that can be examined and tested thoroughly by those in the industry to make sure the final product is truly fit for purpose.

"We work with a variety of different materials, and when it comes to prototype development we need the tools at our fingertips to make models easily and cost effectively," said Piers Bentley, design engineer at Limbs and Things. "We want all of our products to replicate a real-life situation as closely as possible to facilitate effective training. This includes replicating the touch and feel of skin or muscle tissue as well as mimicking any fluids that may be present in a given situation."

Using stainless steel means that the manufacturing of prototype medical simulators often results in the need to cleanly cut small lengths of metal. This is why Limbs and Things was looking for a new, cost-effective machine to incorporate into its workshop, and Starrett's S1101 bench top band saw machine fitted the bill.

"Starrett is well known for its quality products and its S1101 band saw doesn't disappoint," says Piers Bentley. "The bench top machine is the ideal solution for our cutting needs. Not only is it small enough to fit into our workshop with an affordable price tag, the machine is versatile enough to produce a range of cutting angles without lubrication."

As the small band saw weighs just 23 kg, the robust machine is easy to move around the workshop as required.

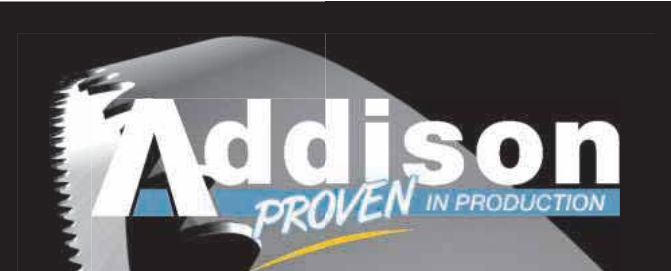


The machine was specifically designed with metalworking and maintenance workshops in mind. As a result, it is ideal for cuts in smaller solids and tubes, up to a maximum tube diameter of 100 mm. Starrett's Bi Metal band saw blades also ensure a smooth finish to any cuts, so prototype models by Limbs and Things are guaranteed to be completed to a high standard.

Product design is a complex and challenging process in any sector, but when you're producing tools to train our future medical professionals, nothing but a perfect result will do.

"Being able to cut as much steel as we need, when we need it, is fantastic," says Piers Bentley. "Starrett has been a great help. Not only has the company provided a well thought out machine, the team of engineers we dealt with invested time in understanding our needs and advising on the best blades for our purposes."


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STM heralds the start of 2018 with innovations

In January 2018, Austrian waterjet specialist STM invited customers and partners to the Innovation Day in Eben im Pongau. The event for networking and information started at the company headquarters with workshops and stations for the subject of waterjet cutting. The visitors could hereby experience the STM waterjet cutting systems as well as the new OneClean abrasive recycling module and the latest STM Jet high-pressure pump 4200.45 up close. The latter were also the subject of lectures rounding off the agenda before the highlight of the day started: the finals of the Four Hills Tournament in Bischofshofen.

For the numerous guests, the event was the perfect opportunity to get information on the latest trends in waterjet cutting and exchange professional tips. STM managing director Jürgen Moser is looking back on not only a very successful event but also a great business year. STM will continue its highly successful route in 2018 and in doing so relies on customised personal consulting, best service and intensive research and development.

With the soon to be completed expansion of the company headquarters by 1,400 m², there will be even more space for research and development work in the future.

"With the new construction, we additionally create the conditions to be able to serve our customers even better in the future and are best prepared for additional growth," explains Jürgen Moser. The grand opening of the annex will take place on 27th April. Interested parties can find additional information on STM waterjet cutting systems at www.stm.at or at the STM booth at the most important trade fairs in 2018, such as, for example, the Intertool in Vienna, from 15th to 18th May.

On the Innovation day, Jürgen Moser presented the OneClean system with the



STM Innovation Day 2018



LTR general manager Franz Trieb, BFT; managing director Ing. Jürgen Moser, STM Stein-Moser GmbH; managing director Grad. Eng. (FH) Sven Anders, STM Waterjet GmbH Germany; Ing. Andreas Lumesberger, NUM AG

abrasive recycling module. The system, which was developed to spare resources, recycles the granite sand (abrasive) used for waterjet cutting so that more than 50 percent of it can be reused. The required energy for the recycling is minimal at 3-6 kW. "In comparison to the new abrasive, the cutting quality stays the same," he explains. "This spares not only the environment but also the budget."

A high-pressure pump as a "Jack of all trades"

The additional subjects of the day were the STM Jet high-pressure pump 4200.45 and the 6-axes module for the STM SmartCut waterjet cutting software. STM Waterjet GmbH Germany managing director Grad. Eng. (FH) Sven Anders explained that what makes this pump the "Jack of all trades" are more performance, less wear, energy efficiency, low pressure fluctuations and better functions. Grad. Math. Konstantinos Markatis, also of STM Waterjet GmbH Germany, presented the new add-on module for the STM SmartCut 3D-6X software. This features an enticing clear integration of the previously separate modules for 2D, 3D or pipe contours, an improved user interface and, especially important with complex 3D outlines, a simulation function with which time- and above all cost-intensive collisions can be prevented.

STM is a leading provider of waterjet



Jürgen Moser speaking at the STM Innovation Day

cutting systems with its head office in Eben, Austria and Schweinfurt, Germany. For more than 25 years, the traditional company has developed future-proof production solutions, mainly for the steel, aluminium, metal, plastic, stone and glass industries, which are most notable for their efficiency, ease of use and resistance to wear. Alongside future-proof technology and quality as standard, STM places great emphasis on innovative full service. In so doing, the brand manufacturer ensures that its individual manufacturing processes are continually matched to the latest requirements of its customers.

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Flexible production cell features bending robots and encoding

transfluid develops an efficient bending system for short and long pipes

When the requirements are complex, a solution is required that provides dynamic and diverse results. This can also lead to several results, as in the case of transfluid Maschinenbau GmbH's current project. Here, the special developed automation system bends 6 m long pipes with small diameters at a consistently high speed. Simultaneously, the transfluid production unit is capable of producing shorter pipelines of 500 mm featuring diverse bending geometry in large quantities. Handling the coated pipes during the process is also demanding. Because of the sensitive surfaces, special care and treatment are required during processing.

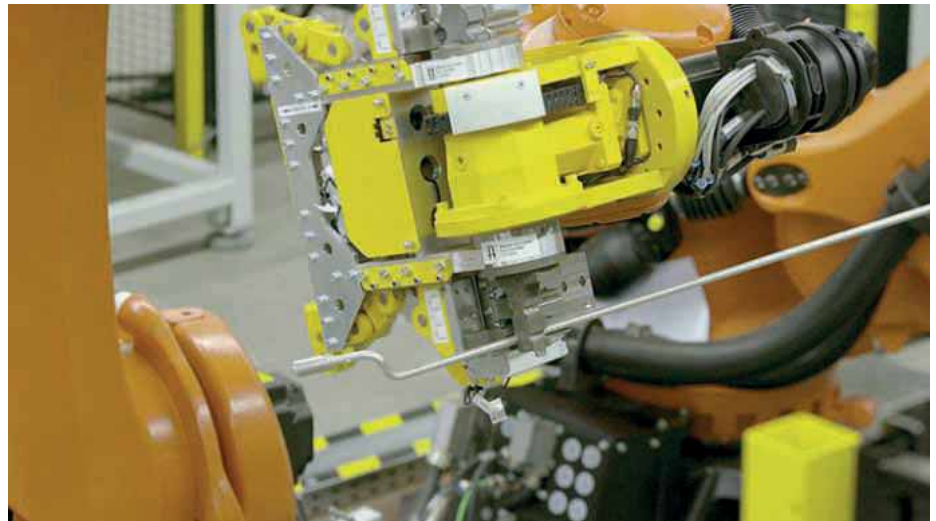
Chain conveyor and clever encoding

To ensure that production can be implemented safely, quickly, and thoroughly, transfluid has equipped two robots that are used as bending machines with different magazines. One magazine is a so-called "chain conveyor". It guides long pipes to the bending robot. According to the markings placed on the pipes by the encoding beforehand, the robots can detect which geometries need to be produced. In this case, they are capable of bending a long pipe from one side to the centre. Following processing, the workpiece is placed on a slide.

The bending cell also possesses a separate step conveyor. This feeds in short pipe lengths, including two different pipes if this is required. Depending on the case at hand, each robot processes a different geometry or pipes with another diameter. This enables a large series of short components to be processed efficiently at the same time. Long components can be processed just as effectively

For high versatility

"An additional challenge for the development of our solution was that all the pipes have previously end formed ends on both sides or they already have cutting rings mounted," explains Stefanie Flaeper, general manager at transfluid. "With robot technology, bending geometry may be



The bending robots are able to bend short and long tubes equally effectively

started at an extremely short distance from the bend on both previously mounted ends. The process, i.e. preparing the ends first and then bending, is then able to be implemented consistently for any pipe with this bending technique."

This makes prior processing of the ends significantly cheaper and faster. With this process, there are no geometric limitations, and the pipe can be sealed beforehand with caps. This makes it immediately available for use after bending.

Data file for bending directly from the CAD system

In addition to flexibility, an additional strength of the automation system offers another advantage that cannot be underestimated: The robots do not need to be programmed. As with any conventional bending machine, the necessary data may be loaded into the bending robots with a data file directly from the CAD system and transformed into a bending geometry. This makes the psychological barrier raised by programming a thing of the past. The systems are also able to be linked online with all relevant measurement systems.

A video is available at:

<https://www.youtube.com/watch?v=48DzHy7B1Us>



As with any conventional bending machine, the necessary data may be loaded into the bending robots with a data file directly from the CAD system and transformed into a bending geometry



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