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Standard and bespoke workholding

1st Machine Tool Accessories offers an enormous range of workholding products to enable accurate, efficient rotational and prismatic machining of components. Standard equipment from world-renowned sources like Kitagawa, Chick, OK-Vise, Abbott, BEST and V-Tech Zero Point offer clamping solutions to suit most manufacturers' needs. However, there are times when a standard workholding configuration cannot meet the requirements for a particular job.



One problem-solving project for a customer carried out by 1st MTA involved clamping an irregularly shaped automotive pump housing in a Kitagawa jaw chuck. The component has two through-holes in a flange that are specified to extremely close tolerances in relation to the central bore. In addition, the taper of the cast body called for a chuck capable of providing substantial pull back.

Following a detailed evaluation, 1st MTA recommended a purpose-designed back stop and two jaws with a custom profile mounted in a Kitagawa power wing chuck with draw-down action. The solution was subsequently confirmed successful through a series of tests and the component is now in volume production at a leading component supplier to the motor industry.



Another tailored workholding solution, delivered to a subcontractor for prismatic machining, involved finding a way to present enough components to the

spindle of a vertical machining centre to make a particular contract financially viable. Instead of Chick Qwik-Loks holding components directly, an aluminium faceplate was supplied with two machined recesses on the underside that snap in seconds onto the Qwik-Lok slide assembly in its base, after removal of the jaws, to a repeatability measured in microns. The faceplate was then used in conjunction with Mitee Bite machinable clamps to secure dozens of components quickly.

1st MTA operates a consultancy service to identify the optimum workholding solution for any given application and offers what it claims is the largest variety of clamping products under one roof for securing round and prismatically shaped components.

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DMG MORI creates value in all of its production phases

as John Barber discovered in Pfronten, Germany

With 70 high-tech machines, two world premieres and the future-orientated focus topics of digitalisation, automation and additive manufacturing, DMG MORI's annual Open House in Germany was focused on integrated manufacturing solutions for integral processes

At this year's event, DMG MORI once again presented a tantalising glimpse into the future with its innovative range of customer orientated solutions. The company has an enviable reputation as a leader in technological advancement and digitisation developments.

Addressing a range of media representatives at the technical press conference, Christian Thones, chairman of the executive board at DMG MORI, said: "Dynamic excellence is our claim for the year. We have two new machines at the Open House and many innovations in the areas of automation, digitisation and additive manufacturing. We have invested a lot in automation and digitisation and we are once again defining standards."

Year on year the company continues to grow and just as impressive as the constantly evolving, pioneering technology, are its year on year results. Christian Thones enthused: "The biggest asset for DMG MORI is our employees and our technology. We can announce that we have achieved record figures in 2018, in terms of turnover and profitability. Our employees and customers are always number one and, as a result, so are our numbers."

From a UK perspective, DMG MORI also enjoyed an impressive 2018. Steve Finn,



managing director of DMG MORI UK, said: "We grew 38 percent last year with new customers. The quality of our product range, together with the stability and quality of our staff, has allowed us to achieve this growth. My suggestion is that Brexit has been good for UK manufacturing and the confidence is back in the UK manufacturing supply chain. The biggest part of the UK market is subcontractors. They are our bread and butter business, companies of 50 employees or less."

Dr Masahiko Mori, president of DMG MORI, added: "70 percent of our customers around the world are small to medium-sized enterprises."

Additive manufacturing

Additive manufacturing was a key area of focus for the company at the Open House. Its portfolio comprises of four complete process chains for additive processes with the powder nozzle and in the powder bed. DMG MORI combines its additive machines from the LASERTEC 3D and LASERTEC SLM series with the machining centres of the wide-ranging machine portfolio. The continuous further development of additive manufacturing is demonstrated with the most recently introduced LASERTEC 12 SLM and the innovative software solution OPTOMET. The DMG MORI Academy complements the service range in additive manufacturing with a consultancy approach that is specially tailored for this sector.

The steady growth of additive manufacturing technologies is alerting designers to the potential of this method in the construction of components and tools. The quality of workpieces produced with additive methods is also increasing as is machining speed. Additive manufacturing, as a complement to conventional production methods powder nozzle and powder bed processes, offers expedient and extremely promising possibilities" explained Patrick Diederich, responsible for AM at DMG MORI.



With its broadly diversified machine portfolio in both machining and additive manufacturing, DMG MORI's approach is clear. Patrick Diederich continued: "If additive manufacturing is to become established on the shop floor, it is essential to integrate this method into existing production systems and process chains, especially where successfully progressing from prototype and small series production to serial production is concerned."

Regarding the Lasertec 12, Christian Thones said: "We are now making a huge step forwards, in additive manufacturing, with this 2nd generation machine. We want to succeed in selling 3-digit numbers of our AM machines very quickly and I am convinced that we will be able to achieve this."

LASERTEC

The Open House saw the debut of the impressive LASERTEC 125 Shape. The machine has been designed especially for the texturing of large moulds and dies of up to $\varnothing 1,250 \times 1,000$ mm and workpiece weights of maximal 2,600 kg, with the optional tandem drive. The optional high-speed Z-Shifter increases travel speed in the Z direction from the current 1.5 m/s to 5 m/s, whilst the laser achieves a pulse frequency of up to 1,000 kHz. Texture quality has once again been optimised whilst retaining the high processing speed. This has resulted in up to 69 percent shorter processing times and, therefore, far lower costs per part.

Like the smaller LASERTEC 75 Shape, the LASERTEC 125 Shape also combines all the stability benefits offered by the tried and tested monoBLOCK design, along with the advantages of challenging 5-axis machining. With a footprint of just 19 m², it is the most compact machine in its class. Travel paths of

1,335 x 1,250 x 900 mm (X/Y/Z) allow this machine to be used for a multitude of different applications. It can handle maximum workpiece dimensions of $\varnothing 1,250 \times 1,000$ mm thus also enabling the efficient texturing of large formats. The NC swivel/rotary table is designed for a workpiece weight of up to 2,000 kg. The load capacity goes up to 2,600 kg with the optional tandem drive. The work area offers users optimum accessibility and guarantees a reduced risk of collision thanks to its large dimensions.

LASERTEC Shape technology allows users, from all sectors of tool and mould making, absolute freedom of design with maximum repeat accuracy and reproducibility. Shape technology has already become established especially in the sector of automotive mould making for exactly this reason.

Automation

Automated machines are crucial components of a digital factory and are therefore an integral part of Industry 4.0. DMG MORI is a pioneer of digitalisation in machine tool construction and considers automation to be a strategic, future-orientated field. The joint venture DMG MORI HEITEC supports the company in the development and realisation of flexible automation solutions, such as workpiece handling. The automation expertise for pallet handling is directly integrated into the production plants. The interplay between engineering from the DMG MORI production plants and automation expertise on the part of DMG MORI HEITEC provides the user with a customised, integrated and reliable solution with everything from a single source.

Highlighting the increasing importance of automation, Steve Finn said: "The main

themes of the Open House event this year are automation, additive and digitisation. Automation is really being gripped by the UK, in fact 80 percent of the machines at our UK Open House last year were equipped with automation and every single one was sold. People in the UK now understand that automation is not that complex and the desire for any company is to become more efficient. The younger generation are not frightened by automation at all, it does not phase them."

Dr Mashiko Mori added: "There are more and more demands coming from the customer in terms of automation. About 20 years ago, a customer was asking about the weight of his machine and weight of parts. Now the customer is asking us what is the cutting speed and time? So, over time, process reliability has become more and more important.

Christian Thones stated: "Automation is key."

Quality service

The importance of providing a quality service are the heartbeat and driving factor behind the ongoing success of DMG MORI. Steve Finn emphasised: "The priority, from our point of view, comes in the delivery of spares. This is what keeps the country going. We have agreements in places with local suppliers to source components.

"Our spares delivery teams hit targets almost every single time. Spares is our critical, number one priority when it comes to supporting our customers. We can offer our customers a complete service."

Christian Thones added: "Our spare parts and service business is very important. We will invest more in spindles and aim to have more than 98 percent available within 24 hours. Spare parts and service is key for our business in order to support our customers."

Of equal importance to the company are its people, with staff retention key. Steve Finn explained: "We are still continuing with apprenticeships in the UK which is really important. It is all about people, all about staff. We want people to be working for DMG MORI for 30 - 40 years."

Christian Thones concluded: "I have one clear instruction from Dr Mori and that is quality, quality, quality. He is a believer in selling machines in order to make the world better."



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Sodick wire EDM producing turbine blade root holders at Promach 3D

Derby-based Promach 3D, a leading subcontractor for high-end markets, has recently installed its second Sodick wire-erosion machine from Sodi-Tech EDM to boost capacity and keep up with customer demand. The new Sodick ALC 400G has been set to work producing fir-tree profiles on special tooling for a critical aerospace application.

Established in 2004 by Matt Fazekas, with little more than a 3-axis vertical machining centre and a laptop for CAD/CAM software, Promach 3D has grown into a 12-employee business turning over in excess of £1 million per annum. The company has created a strong niche by focusing on bespoke projects for high-end markets, the principal one being aerospace. Typically, the parts, tooling and assemblies manufactured by Promach 3D are complex in design, with high tolerance and surface finish demands.

Offering 3- and 5-axis CNC milling, CNC turning and general toolroom manual machining, the company recently sought to increase its wire EDM capacity. Promach 3D had installed a Sodick AG600L in 2012, but in order to meet the demands of an increasing order book, wanted to add another machine.

Owner, Matt Fazekas explains: "We recently introduced an additional facility in

Derby and decided to invest in a second wire EDM, not just to increase capacity, but to take advantage of the latest technology. Our existing wire EDM is six years old and technology has moved on. Although we looked at the whole market, due to the reliability and functionality of our AG600L, we returned to Sodi-Tech EDM. The ALC 400G was the right machine for our requirements, largely thanks to its versatility and high specification. As a subcontract business, we never know what will come through the door tomorrow, so we have to be prepared and continue to offer high-end solutions."

Based on the latest digital innovations in generator technologies and the use of advanced electrode materials, Sodick's ALC range demonstrates considerable advances in cutting speed, accuracy and surface finish. Having made the decision to purchase the machine at MACH 2018, the subsequent months since installation have seen the ALC 400G hard at work.

Matt Fazekas says: "We won an aerospace contract that in the first instance involved liaising with the customer to assist with the design-for-manufacture of stainless steel tooling that helps automate the coating of turbine blades. From the outset, it was clear that, due to the complexity of a key feature, wire EDM was the only way it could be made effectively and efficiently."

Machining high-precision components and tools has been the mainstay for Promach 3D since the beginning. As the business has expanded so has the complexity of jobs, with the client list following suit. Promach 3D quotes on projects which other engineering companies tend to avoid, typically due to the challenging nature of the parts and materials to be machined.

The turbine blade root holder, as the part is known, is a case in point. An intricate fir-tree profile is the prominent feature of



the tool, which is used to clamp the turbine blade into position at its root end, ready for coating.

As a company, Promach 3D has evolved over the years, from producing one-off jigs and fixtures, to small batch production and anything in between. This trend is predicted to continue, as evidenced by the root holders. The company is currently working its way through batches of 150-off, for three types of root holder, with more variants set to follow.

Matt Fazekas says: "We designed a fixture to EDM 20 root holders at a time on our new Sodick ALC 400G, typically running lights-out over a 12-hour cycle time. The AWT [Automatic Wire Threading] technology of the Sodick machine is excellent, which means we can leave it to run assured of its reliability. If we need to run the machine over a longer unattended period, we can use the Sodick Jumbo wire feeder for a full weekend's worth."

Promach 3D, which is accredited to ISO 9001:2015, employs a one-cut strategy on the root holders, as the quality of the Sodick ALC 400G means a single cut is more than sufficient to meet the tool's requirements for tolerance and form.

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It's all about you



Starrag and JJ Churchill continually probe for world-class turbine blade perfection

JJ Churchill continues to set the bar in gas turbine blade machining by building on its success in machining blades complete from solid in a single setup, rather than machining larger batches of forgings. Working closely with machine supplier Starrag, JJ Churchill is now developing specific production processes that look set to consistently produce world-beating time and manufacturing benefits through the implementation of both in-process probing and adaptive milling routines.

Both techniques are forecast to result in unprecedented savings in overall production times, as well as improved surface finishes, to eclipse the 0.7/0.8 Ra currently being achieved by JJ Churchill when using a 'super finish mode' on the Starrag machines.

Indeed the developments, which are being evolved in close cooperation with the Swiss machine tool builder, are among a number of initiatives being led by JJ Churchill's head of engineering, Will McAleese and his team.

Will McAleese says: "It is some time now since we proved that machining blades from bar has a number of advantages over the traditional route of machining forgings, not least the fact that the process negates the need for relatively large batch sizes. One-offs to 90-off are feasible compared to a minimum batch of say 300 off. When oversize, usually by 3 mm, forgings are used and the resulting time savings can be enormous when it is accepted that lead times for forgings can sometimes be one year.

"In addition, blade integrity from billet compares with that from a forging, while milling from solid means that blade aerofoils can be held to the same tolerances, at least 25 microns radially and axially as well as in alignment."



The route into such a highly flexible method of blade production was mapped out by the Market Bosworth-based company in 2008, when it started its association with Starrag UK for machine supply and with Starrag Switzerland, on the joint development of the process and programming/cutting parameters for the machining of double-ended stators.

Its so-called 'fast-make' strategy has since been applied to a number of contracts among its blue-chip customer base that includes first-tier status with companies such as Rolls-Royce, Siemens and Safran.

Now, however, blade machining continues to be refined, as Will McAleese explains: "A blade is conventionally held by clamping on the machine's tailstock/driven head and rather than machining commencing, on the assumption that the blade is positioned and held accurately every time, which isn't always the case, we're now probing the root, using a probe held in the machine's tool magazine, to accurately locate its position.

"Using Starrag's RCS CAM software, the machining program then automatically adjusts to the blade's true position within the machine and determines the 'best fit' position of the blade in relation to the root. This means we can eliminate the need to measure the blade after machining and, if necessary, adjust and re-write programs then undergo a period of post-programming before we can restart machining.

"The potential time savings are

extraordinary if we can ensure this probing regime is consistently faultless."

Starrag is the preferred supplier to JJ Churchill for aerofoil machining and Starrag is applying the full effect of its 'Engineering precisely what you value' strategy to JJ Churchill's blade manufacturing routines. It developed RCS specifically for 5-axis high-speed blade machining.

With extended selection of machining strategies, RCS provides highly efficient and effective programming due to its parametric input structure. Cycle times are minimised via the software's optimal selection of milling strategies, taking the best and most effective cutter path in relation to blade cusp height and tool radius. The latest version 7.4, of the RCS suite includes improved routines for snubber machining, trochoidal milling and reduced tool wear, while significantly reducing pre-production programming times.

Used by JJ Churchill in conjunction with Unigraphics CAD, RCS enables programmers to, for example, create difficult features such as variable fillet radii. JJ Churchill has also developed an in-process 'polishing' routine for the Starrag machines where blades are rough milled to within 2-3 mm of final form before finish machining. Starrag's 'super finish mode' then sees blades finished to typically 0.7/0.8 Ra and even 0.4 Ra has been achieved.

RCS's capability for adaptive milling is also being put to work by JJ Churchill on creating perfect blends on aerofoils, on both

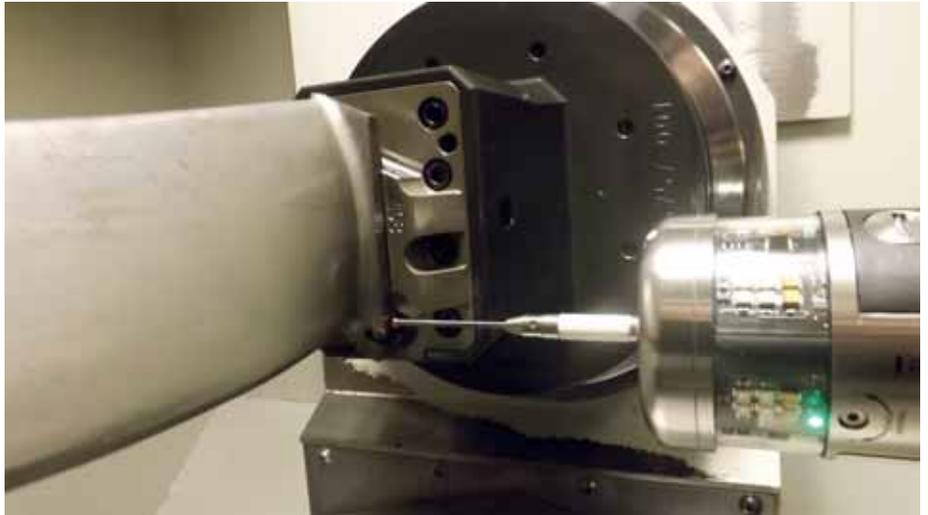
bar and forged blades, a technique where Haimer heat shrink tooling and 2 mm diameter ball nose cutters also play key roles.

Will McAleese says: "Better surface finish is the result of improving and decreasing the cutter step-over, as well as creating far less stress on the material and improved process capability as well as extended tool life.

"The new processes are working well and we are looking to standardise probing across all our Starrags, three LX051s, one SX 051B, the LX 051's predecessor, as well as a LX151, plus the additional LX 051 that is currently on order."

JJ Churchill has a long history of machining, with compressor blades being supplied since 1947 to Rolls-Royce, turbine blade production was added subsequently. Company founder Walter Churchill worked with Air Commodore Sir Frank Whittle, who is accredited with the invention of the turbojet engine.

Today, the company not only specialises in the prototype development and spares supply on a variety of aircraft programmes but is also playing a key role in OEM production programmes for both compressor and turbine blade work, which



currently accounts for 35 and 65 percent of business, respectively, including a recently-signed £70 million contract with Rolls-Royce for the supply of turbine blades on a rolling ten-year programme.

Coupled with a host of quality standards and accreditations, JJ Churchill's continual process developments also include 3D printing of fixturing and work into blade machining from solid of titanium aluminide.

Will McAleese concludes: "We've jointly investigated the machining strategies, in

terms of tool speeds and feeds, required for such a brittle material and the use of trochoidal milling that generates less continuous/overall contact with the workpiece and therefore less stress on the tool."

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Big machines for big aerospace aspirations

Large-capacity Doosan vertical turning lathes occupy centre stage at Hanwha Aerospace's new aero-engine parts production facility in Vietnam

South Korean-based Hanwha Aerospace, part of the Hanwha Group, a FORTUNE Global 500 company, has announced that its plans to significantly ramp up production and supply of civil aircraft aero-engine parts, fans and compressors, to the global aerospace market through the creation of a new manufacturing facility in Vietnam, are nearing completion.

The new factory, located near Hanoi, is substantial and at 60,000 m², is approximately eight times the size of a football pitch. Building work, which began in 2017, is expected to be completed by the end of 2018.

Once fully operational, it is anticipated that Hanwha Aerospace will be able to increase sales turnover to 1 trillion won (USD 879 million), in order to lead the aero engine production industry by 2025.

To help the company achieve its ambitions, it has invested heavily in a number of large-capacity Doosan vertical ram-type lathes (VTRs). By the end of January 2019, it is expected that 30 Doosan VTRs will have been installed at the new Vietnam factory, rising to 120 machines by 2024.

The Doosan machines supplied to Hanwha Techwin comprise the VTR 1012F and VTR 1216F models.

Doosan's F-designated VTR machines have a fixed cross beam design as opposed to a travelling cross beam design and, as such, are particularly suited to the machining of smaller, shorter components such as aero-engine rings.



In addition, both VTR models also have a wide column and box guideway design and are equipped with powerful ram-type spindles, up to 45 kW/400 rpm and large diameter cross taper roller bearings for heavy-duty machining operations.

The machines also feature servo-driven tool changers for fast and accurate tool change, high-efficiency swarf evacuation and management systems for increased productivity and trouble-free machining as well as a maximum turning diameter up to 1,600 mm (VTR 1216F).

Tony Dale, technical director at Mills CNC, the exclusive distributor of Doosan machine tools in the UK and Ireland says: "Across the world, Doosan machine tools are used extensively and are specified by global aerospace OEMs and by leading manufacturers in the aerospace supply chain.

"Hanwha Aerospace supplies aero-engine parts to GE, Pratt & Whitney and Rolls-Royce, to name but a few and the sheer scale of this investment, 120 machines in five years, is truly remarkable and demonstrates Doosan's prowess in the aerospace sector."

Mills CNC is an independently-owned company and its focus is only on serving customers in the UK and Ireland, as opposed to Europe and/or the rest of the world.

Its independence means the company can make decisions and respond quickly to changing market trends and conditions.

As Mills CNC only serves the UK and Irish markets, it has developed a good understanding of customer requirements and puts all of its resources into making sure customers expectations are exceeded.

As the exclusive distributor of Doosan machine tools in the UK and Ireland, its product range, while being one of the most extensive in the market, is entirely Doosan. As a consequence, everything it does is geared around ensuring the sale, service and support of Doosan machines and providing excellent customer service to customers that invest in them.

It believes that great CNC machines demand equally great service and regularly improves and upgrades its services, as well as introducing new service initiatives.

The company is highly-regarded and respected in the machine tool market and across all the manufacturing sectors that it serves: aerospace and defence; power generation; motorsport; oil and gas; medical; and automotive to name a few.

Its reputation is built on the quality, reliability and performance of the Doosan machine tools it sells, machines that include the iconic Puma and Lynx lathe brands as well as the equally popular, successful DNM and Mynx vertical machining centres and DBC horizontal borers.



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Aerospace manufacturer fuels further growth through seven-figure machinery investment

Middlesex Aerospace has committed to a seven figure investment with long-term machine tool partner Yamazaki Mazak, to support the continued expansion of the company following an extended period of success.

Middlesex Aerospace is one of Britain's leading Tier-1 suppliers of critical components and assemblies to major OEMs throughout the global aerospace market. The Basingstoke-based business currently employs 150 staff, including five apprentices and the new investment will lead to the creation of further roles within Middlesex Aerospace's machining and assembly department.

The company has worked with Mazak for over twenty years and its latest investment comprises two state-of-the-art 5-axis multi-tasking machines and one horizontal machining centre, complete with an expanded tool storage system.

The new equipment will not only reinforce Middlesex Aerospace's existing in-house precision machining capabilities, but the

increased capacity of the new machines will allow the company to further develop its offering to customers. What's more, the new machinery will enable Middlesex Aerospace to operate lights-out unmanned manufacturing, 24-hours a day throughout the entire week, dramatically improving production volumes.

Laurence Foulds, managing director at Middlesex Aerospace, comments: "Our latest investment in machinery is one of the company's most significant to date and will allow us to support a number of new customers and programmes, as we continue to grow the business.

"Mazak has been our long-term machining partner for two decades. The work we undertake for our customers places a great demand on our equipment and we know that Mazak machine tools, as well as the company's applications engineering team, ensure we are able to deliver the incredibly high levels of accuracy and repeatability mandated by the aerospace sector."

Alan Mucklow, managing director UK and Ireland sales division at Yamazaki Mazak, concludes: "Middlesex Aerospace is a fantastic example of a British business taking the lead in the global supply chain and delivering exceptional results. After many years of working together, we are delighted to be able to help the company take a step closer towards realising its long-term strategic goals, through the purchase of three new state-of-the-art machining centres.

"The aerospace supply chain is faced with a unique array of application engineering challenges, given the stringent accreditations that govern the industry and our latest 5-axis and horizontal machining centres are more than capable of working to the tight tolerances required."



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Rhodes Interform develops revolutionary new process for aerospace industry

Group Rhodes, through its Rhodes Interform business, has developed a revolutionary new process that enables large monocoque components, particularly those produced by super plastic forming (SPF) from very thin material, to more accurately retain their shape on cooling.

This innovation, for which the company has a patent pending, opens up opportunities for use in the aerospace and automotive industries.

The manufacturing process for monocoque components involves diffusion bonding multiple layers of titanium sheet at selected points and then superplastically forming them using argon gas to inflate the sheets into the shape of a hollow die. This process is extremely temperature and pressure sensitive. At the point the ambient temperature argon forming gas is admitted into the heated component, the gas expands, increasing its volume and hence its pressure if not adequately controlled.

One of the most critical phases during the press cycle is when the component has been

formed by gas inflation and then needs to be cooled, prior to extraction from the press. At this stage, very low-pressure argon gas is passed through the component (purging) to ensure no oxidisation of the internal faces takes place whilst it is at elevated temperatures.

If the purge gas pressure is too high, the component will over inflate and lose its shape as soon as the dies are opened. If the purge gas pressure is too low, the ambient air pressure will implode the component. Achieving the correct balance is further complicated by the cooling component reducing the gas temperature/volume and therefore the internal gas pressure.

Certain external factors have however traditionally been more difficult to control. One significant external variable is ambient atmospheric air pressure, which can significantly affect the final shape of the component and take it out of tolerance. In the case of larger components with relatively thin membrane sheets, this can become a major problem.



Rhodes Interform's innovative solution uses a gas manometer principle in the form of a vertical, open to atmosphere vent pipe, for controlling the gas pressure. This ensures a constant low-pressure gas supply, which self-compensates to changing ambient air pressures and keeps the material in a constant shape once formed in the mould.

This novel method of gas pressure control allows for the more accurate production of complex shapes and greater control when diffusion bonding multiple layers of titanium sheet.

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Irish subcontractor progresses to 5-axis machining

Craigavon-based subcontractor Boyce Precision Engineering primarily serves the commercial aerospace sector, which accounts for 70 percent of turnover. A majority of throughput involves producing aluminium parts for first-class and business-class seating, plus various aluminium structural components. Aerospace recognitions include AS9100 accreditation, the global quality management system for the aerospace industry, as well as supply chain recognition.

The contract machinist started operations in 2006 and in little more than a decade has made significant strides, the company now employing 34 staff. Earlier this year, Democratic Unionist Party MLA, Member of the Legislative Assembly, for the local Upper Bann constituency, Carla Lockhart, hosted a visit to the firm by party leader Arlene Foster and the chief executive of Invest Northern Ireland, Alistair Hamilton.

In recent years, there has been an increase in the complexity of the prismatic aerospace parts that Boyce Precision manufactures, making a progression from 3-axis to 5-axis machining necessary. For the new machining capacity, joint owners and brothers George and Brian Boyce decided to move away from the supplier of two-thirds of their 3-axis machines. Instead, they opted for a 600 x 550 x 450 mm capacity, German-built Hermle C 250, which was supplied in July 2017 by sole UK and Ireland agent, Kingsbury.

The 5-axis machine's suitability was immediately apparent and a second, identical model was installed three months later. The configuration of Hermle vertical machining centres places the three linear axes within a modified gantry above the working area, whilst the integrated trunnion



provides a rigid, stable platform for the two rotary axes, which includes a ± 115 -degree swivel for considerable production flexibility. The machines in Craigavon have integral Blum tool breakage detection to allow long periods of unattended running across the two shifts that Boyce Precision operates.

A further trend within the aircraft seating sector is towards larger components, which are even more complex, to avoid the labour costs and delays associated with assembly. Once orders for such parts were promised, George Boyce had no hesitation in placing an order for a larger Hermle C 400 with a working volume of 850 x 700 x 500 mm.

It was due to be delivered in November 2018 directly to a new, 18,000 sq ft factory unit currently being built for the subcontractor in Portadown. Treble the size of the current premises, the building represents a £3 million investment, taking into account the capital cost of the third

Hermle 5-axis machine and the imminent purchase of two further 3-axis machining centres.

The benefits of 5-axis machining to Boyce Precision are far-reaching. One-third of the time, the two Hermle C 250s are executing programs requiring interpolation of all five CNC axes simultaneously, work which formerly could not have been carried out.

To fulfil other contracts

requiring only 3-axis cycles, automatic positioning and clamping of the rotary axes reduces the number of separate operations needed to complete a job, in some cases dramatically. Aerospace parts that used to require two or three separate operations are now completed in one hit.

One pharmaceutical component that used to require eight separate setups now requires only two. This sector together with medical contracts accounts for 20 percent of the subcontractor's turnover, with the remaining 10 percent spread across the automotive industry, motorsport, TT racing and general engineering. The latter work focuses on contracts for the construction industry, particularly bespoke jigs and fixtures, but also includes the manufacture of items for film sets, such as aluminium-bladed swords, daggers, shield parts and catapults used by actors in the television series, Game of Thrones.

The reduction in the number of setups also means that tight tolerances can be held more easily. On some aerospace parts and even those for the pharmaceutical industry, such as blister pack tooling, accuracy specified on the drawings is down to ± 20 microns.

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Aircraft Philipp upgrades machine park for additive manufacturing with 3DMP

Aerospace supplier Aircraft Philipp Übersee GmbH & CO. KG, based in Germany with subsidiaries in Austria, Israel and India, has further extended its technology spectrum in additive manufacturing with 3DMP® (3D Metal Print). To this end, the company has expanded its initial investment by purchasing an arc 605, GEFERTEC's top model. This machine is capable of producing workparts of up to two tons in mass using additive manufacturing, thereby responding to user needs for considerably larger components in the future, based on the new industry standard 3DMP.

Rolf Philipp, founder and owner of Aircraft Philipp Übersee, says: "Developing new aircrafts nowadays requires a radical change in thinking with regards to meeting climate targets and resource-optimised production. Applying this method will lead to radically improved buy-to-fly ratios and will, thus, contribute a great deal to economic and ecologic efficiency in the future."

Tobias Röhrich, CEO of GEFERTEC, says:

"We are delighted that Aircraft Philipp Übersee has set its goal towards manufacturing ever greater structural components in the additive fashion. Exactly here lies the special strength and efficiency of 3DMP, which is why it has developed into the new industry standard."

The decision to invest in 3DMP is all the more remarkable, as the company has so far reached a long-standing leadership role in chipping methods for its application to the aerospace industry. Aircraft Philipp has worked for over three years with this welding technology and enjoys its coordinator role in the joint research project "REGULUS" as part of the fifth aerospace research programme of the German Federal Ministry of Economics and Energy. The company can also build on its additive manufacturing experience using powder beds at its Salzburg, Austria facilities. The GEFERTEC arc605 will be installed at its Übersee premises in Bavaria.

GEFERTEC invented the innovative 3DMP



method for additive manufacturing of metal parts, which offers completely new possibilities. The company is the first to offer modern machining centres based on this technology. GEFERTEC is part of the Berlin headquartered Scanconic Group, which has around 328 employees and a turnover of approximately €45 million.

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GF Machining Solutions wins large orders for aero engine components

GF Machining Solutions, a division of GF, has won, in North America, a large number of new orders in the aerospace sector for a total value of approximately \$100 million. These orders are to be delivered in the next four years.

Aerospace is one of the key sectors in the 2020 strategy of GF Machining Solutions. With the recently opened Centre of Competence in Huntersville, North Carolina (USA), which focuses on the North American aerospace and energy markets, the division has underscored its commitment to actively support its customers, in particular in the manufacturing process of future engine programs. This new Centre of Competence will allow it to significantly strengthen the division's presence in this promising market segment in the NAFTA region.

The new orders include the whole range of EDM, milling and laser machines as well as automation solutions and services. The customers, well-known aircraft engine manufacturers and their suppliers, will use the new machines for the highly demanding production of blades, blisks and other

complex components to be used in the latest generation of aero engines.

GF Machining Solutions is one of the world's leading providers of complete solutions to the tool and mould making industry and to manufacturers of precision components. Its portfolio includes milling, wire cutting and EDM machines as well as spindle systems, laser texturing, additive manufacturing, automation and digitalisation solutions. Its key customer segments are the aerospace, ICT, medical, and automotive industries.

The company is present in more than 50 countries with its own sales companies. In addition, the division operates production facilities and research and development centres in Switzerland, the US, Sweden and China.

GF Machining Solutions' competences extend far beyond its machines to include peerless customer support, deep application expertise, innovation driven by the market and standard-setting excellence as measured by its customers' success.

Wherever its customers operate in the



world, they benefit from GF Machining Solutions' customer-centric support, its well-trained staff and reliability as well as the high-quality, precision and innovation rooted in its Swiss origin.

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Standfast lives up to its name as oil and gas sector recovers

The well documented downturn in the oil & gas market hit many subcontract companies hard and while many chose to make cutbacks, Craigellachie, Banffshire-based Standfast Precision Engineering decided to stand firm and resisted the temptation to downsize. This meant when the work started to return, it was fully manned with all the skills it needed to meet demand.

Malcolm Fraser, director at Standfast Precision engineering, says: "Most of our work is in the oil & gas sector, mainly providing parts for instrumentation and logging systems. When we bought the business in 2000, we started without any work whatsoever, then one customer appeared with a wad of drawings and told us to 'crack on', which we did and we have not looked back since. That customer has stayed loyal to us throughout and it was relationships like this that gave us the confidence to work through the latest downturn. This is the third oil and gas sector slump we have experienced, meaning we knew that things pick up eventually, so it was a case of take it as it comes while maintaining the skills that we had."

Prior to the cooling off of the market, Standfast had looked at further machine investment, but delayed that until this year, replacing its existing XYZ TC 250 turning centres with the latest TC 400 models.

Malcolm Fraser explains: "Working with materials such as Super Duplex and Inconel we needed a substantial machine and while the TC 250 machines coped well, the TC 400 has improved things considerably. The machines may look similar, but the construction of the TC 400 is more substantial and its added rigidity means it



can handle bigger cuts in these materials, whilst holding tolerances for longer. Our tooling consumption has also reduced."

Behind this performance is the XYZ TC 400 turning centre's solid-ribbed Meehanite cast base, with hardened and ground Turcite coated box slideways. This is combined with a 43 hp, 32 kW, spindle motor with up to 3,300 revs/min available and a spindle bore of 91 mm giving a bar capacity of 78 mm. The maximum swing and turned length are both 600 mm and with a maximum turned diameter capability of 400 mm, the TC 400 can handle a wide range of workpieces. This capacity is enhanced by the standard 12-station Sauter VDI 40 turret, which provides the ability to load a variety of turning and boring tools. The choice of control, the Siemens 828D

ShopTurn system, was also important to Standfast Precision as its previous machines had used the earlier 810D control, so the functionality of the control was very familiar. Other standard features include a 300 mm hydraulic chuck, through tool coolant, automatic tool setting arm, remote electronic handwheel, hydraulic tailstock and swarf conveyor.

When Standfast Precision initially looked at turning centres from XYZ, it only ordered one TC 250, but within three months a second machine was being installed.

Malcolm Fraser concludes: "We work on some tight deadlines with extremely short lead-times and having a second machine was important to have capacity available at short notice. Therefore, when it came time to upgrade to the XYZ TC 400 machines it made perfect sense to bring two in at the same time, with XYZ taking the old machines away in part exchange. We have had a number of XYZ machines in the past and have always benefited from the cost-effectiveness of the machines. All of the XYZ machines we have bought have played a part in moving the company forward and enhanced our ability to continue to invest."

XYZ has been developing, testing and refining its range of machine tools for over 35 years. Its winning principles of combining outstanding build quality with the worlds best control systems, namely ProtoTRAK® and Siemens, has seen the product range become the nation's first choice for prototype and low volume production.

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Burnett & Hillman calls on Citizen Machinery's expertise

Burnett & Hillman has become a 'brand name' in its role as a major manufacturer of hydraulic adaptors and associated fittings that supplies into around 90 percent of the world's countries, with a known customer base that exceeds 1,000 names. In addition, parts are also sold through significant numbers of distributors and stockists. Its operation is mind-boggling having a standard range of over 4,500 different machined parts, of which 99 percent are held in stock for next day delivery. While its machine shop processes some 40,000 components a day, consuming 200 tonnes of mild steel a month, these contribute to a massive year-on-year tally of over 10 million individual machined parts of which a quarter are directly exported.

Nestling in the small Somerset village of Wrington, south of Bristol, this family-owned business still uses multi-autos to meet its greater volumes. However, for smaller demands and batch sizes, typically from one to 250 plus samples, a progressive addition to its production capability has been the highly successful installation of turn-mill centres, including five Miyano multi-axis machines from Citizen Machinery UK.

Following the performance capability obtained from the first 12-axis Miyano ABX-51TH3 fixed-head turn-mill centre, with two spindles and three all-driven 12-station tool turrets installed in 2008, three further smaller capacity Miyano BNA-42GTY's were laid down in 2015 and 2017. In October 2018, the fourth BNA-42GTY was commissioned. The company has now invested some £500,000 over the last two years in the business.

Dan Burnett, general manager of Burnett & Hickman, says: "We face ever increasing demands for non-standard parts, smaller batches plus in-house store top-ups and due to the specification requirements of customers into our production, quality is the prime requisite followed by delivery. Here, the first installation of the Miyano ABX-51TH3 gave us improved capability to achieve and still maintain these changing needs, introducing far greater levels of flexibility and most important, consistency of production to meet the standards required."



As a result, the family firm made the decision to standardise on Miyano fixed-head turn-mill centres for smaller bar capacity up to 42 mm, which lead to the multiple installations.

The 10-axis, plus three auxiliary axes, BNA-42GTY is the top of the Miyano BNA range with 42 mm bar capacity. It is configured around two spindles, having 7.5 kW, 6,000 revs/min on the main and 3.7 kW, 5,000 revs/min for the secondary-spindle. It has a single 3-axis, eight-station turret which is carried with the two spindles on a single platform-like surface table structure.

The turret features half-indexing that provides 16 driven-tool positions plus a 13-tool gang vertical toolpost, having three driven tool positions. This brings the total machine capacity with multiple toolholders up to 45 tools. The machine is able to accommodate 3-axis overlap machining with three tool simultaneous cutting involving either or both spindles.

Most of the material passing through the Miyano machines are hexagon based. Here, the rigidity gains from the heavy cast iron bed, hardened and ground slides on the common platform-like surface table structure enables maximum advantage from speeds and feeds to be maintained without

effects of vibration. This means general tolerances are 0.05 mm and surface finish 63 micrometres on sealing faces is also easy to maintain.

The Miyano installations create the ability to achieve enquiry-to-quote within 12 to 24 hours. A new turned adaptor or fitting can often be supplied within two weeks and an out-and-out special within four weeks.

This is aided by the number of tool positions enabling a standard suite of tooling to be held on each Miyano machine. The largely 'self-taught' setters, with Citizen Machinery support when required, programme directly at the control. Here, most setting up is achieved between 20 minutes and two hours.

Dan Burnett concludes: "It has even been known for a customer, with an extremely urgent need, to be supported. Following a call in the morning, we are able to set up the Miyano and machine parts in the afternoon and ship out that same evening."

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T R U S T E D I N T H E I N D U S T R Y F O R O V E R 1 0 0 Y E A R S

High precision five-sided manufacturing of large workpieces

Okuma presents new double column machining centre

Okuma, represented in the UK by NCMT, has set the standard with its new MCR-S (Super). In terms of accuracy, productivity and flexibility, the new double column machining centre opens up new possibilities for manufacturers. Combining several high-end features, the machine tool is perfectly suitable for machining press dies to the highest standards. The machine also unites subtractive and additive manufacturing methods, allowing for process-intensive production.

With its newest double column machining centre MCR-S, Okuma offers a machine tool that fulfils the demanding requirements of the automotive industry. When producing car bodies, manufacturers require press dies that are as precise as possible to achieve not only an extraordinary dimensional accuracy but also surfaces of the highest quality. As labour costs are on the rise, perfect surface quality needs to be achieved without manual polishing.

High dimensional accuracy

For great rigidity and close tolerances, MCR-S possesses a solid cast iron double column structure. Equipped with Okuma's Thermo-Friendly Concept, unnecessary heating-up can be prevented and thermal deformations are compensated. When manufacturing press dies, this is especially important because the machining process can take days or even weeks, making it vulnerable to changes in temperature. By using a Swivel Image Sensor that rotates relative to the indexing angle of the tool, highly accurate measurements of its cutting-edge position can be provided, improving accuracy even further. The sensor also helps to ensure traceability by recording the captured images.

Creating perfect surfaces economically

Okuma's Hyper-Surface solution eliminates the costly need for hand-finishing by creating die surfaces that are instantly ready for use. It achieves superior surface qualities by automatically detecting disturbances in the CAM-output machining data and correcting them on the CNC whilst



maintaining the required shape accuracy. In this way, Hyper-Surface also increases throughput since raw material is processed in shorter time frames.

To allow for cost-efficient manufacturing, Okuma increased the productivity of MCR-S by shortening cycle times. The machine possesses a heavy-duty cutting capacity, reaching a chip removal rate of 710 cm³/min when face milling. Average continuous feed rates of 20 m/min for the X- and Y-axis and 10 m/min for the Z-axis contribute to the machine's productivity. In addition, the Intelligent Technology application SERVONAVI autonomously maximises table acceleration according to the workpiece's weight. As these features contribute to the machine's productivity, the total cost of ownership (TCO) can be reduced to a minimum.

Additive and subtractive combined

For super process-intensive manufacturing, the machining centre is equipped with a laser. It allows for additive manufacturing via laser metal deposition (LMD). This way, subtractive and additive manufacturing methods are combined in one machine enabling manufactures not only to produce highly complex parts, but also to repair defective pieces. The laser can also be used for surface treatments such as laser hardening. This also increases productivity as multiple setups on different machines become obsolete.

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

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

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Rapid machine installation keeps NEMA flying high

A specialist North West aerospace supplier is targeting further growth after securing £2.3m sales and investing in a new CNC horizontal turning centre.

NEMA Ltd, which manufactures motors, actuators and electromechanical assemblies for UTC Aerospace, BAE Systems and Airbus, has installed a Hardinge GS200 at its factory in Chichester Street in Rochdale.

The company acted quickly after a previous machine had failed causing significant downtime and turned to Engineering Technology Group (ETG) for support in quickly identifying a replacement.

Working together, the two firms took just ten days from an initial enquiry to specify the machine, deliver and fully commission it, including full training for operators.

Andrew Wilding, managing director of NEMA, explains: "The last twelve months have seen us deliver a number of complex and demanding projects for the aerospace sector and that has placed a lot of pressure on our machining capabilities.



"This resulted in a spindle bearing failure on an existing machine. It wasn't practical for us to try to repair it, so we instead took the longer-term approach of replacing it with a new machine.

"ETG was quickly briefed and its response time was excellent, coming back to me with an option that we were happy to invest in. This was quickly specified, delivery agreed and a training plan put place so that we didn't lose any production time on our motor housings and end plates.

"Our ability to get involved in early stage design is helping us secure a lot of new orders, boosting our turnover to £2.3m and necessitating the need for five more people, taking our workforce to 40."

Engineering Technology Group (ETG) is the exclusive distributor of Hardinge Bridgeport CNC machines in the UK and, thanks to its extensive stockholding at its Wellesbourne facility and technical academies across the UK, was able to immediately engage with NEMA to secure the right solution to its production issues.

John Brimblecombe, regional sales manager at ETG, concludes: "Aerospace suppliers simply can't have downtime in their factories and we are delighted that we were able to support Andrew and his team in ensuring a smooth installation and switchover of machines.

"The Hardinge GS200 is the ideal machine to produce components that need to operate in demanding and safety critical environments."

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Precision and passion for complete customer satisfaction

Teixidó has been specialising in the mass production of precision parts since it was founded in 1952. Based in Catalonia, the bar turning company is the largest of its kind in Spain.

The company operates in the automotive, pneumatic, equipment and aeronautics industries. The bulk of its production covers diameters from 0.5 to 20 mm. As Spanish group sales director Xavier Teixidó Pont explains: "Many bar turners are capable of producing these diameters, but what distinguishes us from our competitors is our ability to adapt to the tightest tolerances. Our 13,500 m² production facilities and the diverse technologies we use in our company enable us to respond rapidly to varying demand from our customers."

Teixidó is, first and foremost, a company offering very high performance and it is led by a team of highly-qualified specialists. With a workforce of 470 staff, the company has ISO: 9001 and ISO: 14001:2004 certification. Able to meet the strictest cleanliness requirements, Teixidó has its own plating and heat treatment department. In addition to bar turning, Teixidó has a classic centreless large-scale grinding machine and its services also include polishing and honing. It produces over 300 million parts every year with an average PPM of 3. The company machines

all kinds of material and offers hard turning operations. In addition to tempered steel, the offering covers an unparalleled range of materials such as bronze, aluminium, steel, brass, inconel, stainless steel, copper and titanium.

Xavier Teixidó Pont says: "Machining is our core activity.

However, we also have a centre of competence for additive manufacture. This centre will soon be equipped with our first 3D printer and we can perform cold forming operations."

To realise this rationale, Teixidó has relied on Tornos and its machines since its earliest days. Teixidó still has around sixty cam-type machines, including R10s. It was one of the first customers to adopt the DECO and the first DECO 10, dating back to 1997, is still running. The company now has several dozen Tornos CNC machines, including two EvoDECO 20 machines that replaced two old DECO 20s.

Production manager Josep Colina Vidal states: "We have given Tornos a variety of challenges over the years. It must be said that we have always enjoyed assistance from high quality contacts, both in Spain and Switzerland. The after-sales service from Tornos Spain is very fast, which we really appreciate.

"However, it's really Tornos's machines which, when adapted for our production, make all the difference. We have a number of multi-spindle machines as well as our DECO, Delta and EvoDECO fleets. We have SAS 16, SAS 16.6 and BS 20.8 cam-type multi-spindles, MultiAlpha, MultiSigma and MultiDECO CNC machines and several recently acquired MultiSwiss 6 x 16 machines, including two machines with Y-axis.

"These machines can exceed the specifications required of single-spindle models, offering stable, highly precise machining. Their six spindles make them



extremely productive and we can produce far more parts per square metre. This means a MultiSwiss can easily replace three single-spindle turning machines.

"It's a very high-performance machine and it's fair to say we have been seduced by its performance. It also enables us to save time on setups, partly because we can avoid performing several identical setups on single-spindle turning machines, but primarily because the machine is highly ergonomic and changes can be performed very quickly. The MultiSwiss is an excellent partner for Teixidó and the machine sits perfectly with our commitment to quality."

Josep Colina Vidal concludes: "To guarantee perfect results, we have invested heavily in monitoring equipment. For example, we now have 23 measuring stations for automatically inspecting parts and a 3D measuring machine. Our philosophy is simple: customer satisfaction is our watchword and to achieve it we rely on technology, quality and service. This has been our vision since the very beginning. It also guides Teixidó's management in its relationships with employees and the environment. Training is a central pillar in Teixidó's strategy for maintaining a high level of quality. The company has its own waste water purification station, as well as almost 600 m² of solar panels installed on the roof of the factory."

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Ramsgate engineers choose Haas

Running a business their own way had always been the dream for brothers Ben and Matt Wesley and, in 2018, they founded ProSpeed Precision. The subcontract machining company specialises in reverse engineering, taking on the complex jobs that other engineers typically shy away from.

Ben Wesley started his career as a toolmaker, before training on CNC machines. Matt Wesley had just returned from working at BAE in the Middle East. After registering the name ProSpeed Precision, they organised funding, looked for suitable premises and finalised their CNC needs by visiting the Haas stand at the MACH 2018 exhibition in Birmingham.

Six weeks after buying a brand-new factory in Ramsgate, Kent, the brothers invested in a Haas VF-4SS Super-Speed vertical machining centre. The VF-4SS has a 12,000 rpm spindle and is equipped with 30+1 high-speed side mount tool changer. The brothers opted to add through spindle coolant and high-speed machining software option for greater versatility.

Ben Wesley explains: "We wanted the

very latest machine on the market, something state-of-the-art, with a full set of features. We needed to future proof our business as much as possible and the Haas mill fitted the bill."

ProSpeed now has over a dozen customers on its books from its first three months of trading, ranging from motorsport to manufacturing and fabrications. All work, from design to completion, is carried out in-house, with the CAD/CAM software of choice being Fusion 360.

With both brothers still holding down full-time jobs elsewhere, time is of a premium. Ben Wesley concludes: "We're focusing on making the parts that other companies find too difficult. We recently did a job for some machines that recycle copper cables. We did the plate work and blade holders; there were some very complex compound angles involved.

"I've worked on Haas machines for over ten years; they were the only brand I wanted in our workshop. I thought I knew them



inside out, but even I was surprised by how far they've developed in that time. The rigidity and accuracy keep us well within tolerances and the tool change speed on our new machine is fantastic. The Next Generation control is user-friendly and has some brilliant time-saving features.

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Vertical machining centre washes away any worries over drilling

Pipeline & Drainage Systems of Sheffield is maintaining a lead in the production of its Envirokerb kerb drainage system, by using a Hyundai-Wia vertical machining centre to produce the numerous holes/slots required in, what is described as, "the lightest, strongest and greenest" kerb drainage solution available.

Manufactured from recycled materials, the composite kerb has the appearance of concrete and its wide appeal is also helped by the fact that it is a one-part kerb system as opposed to conventional two-part concrete alternatives, which means no breakages and faster installation.

Part of the USL Group, a leader in the provision of specialist civil engineering and construction solutions, Pipeline & Drainage Systems needed to replace an ageing vertical machining centre for producing the required holes/slots in each section of drain. These range from six to 20 mm diameter/width, vary in height/length, depending on product variety and are machined in a straightforward sequence along the length of each kerb section.

The company turned to local machine supplier, T W Ward CNC Machinery (Ward CNC), knowing that a suitable machine would be in stock. Ward CNC is the UK and Ireland exclusive supplier of a wide range of machines, with many representative models being held in stock.

Glyn Jones, operations manager for Pipeline & Drainage Systems, says: "The Hyundai-Wia F600D was selected due to a number of reasons. First, it had the capacity to accommodate all kerb lengths and, secondly, it had the capability to reliably produce the holes and slots day in, day out."

With a 900 mm x 650 mm twin table configuration, which is able to accommodate loads of 400 kgs per table, plus X-, Y- and Z-axis travels of 800 mm x 600 mm x 600 mm, the F600D has the ability to have a continuously running (in-cut) spindle due to the twin-table arrangement, enabling a load/unload procedure while the machine is in-cycle. This feature, when coupled with a powerful 15 kW 8,000 revs/min spindle and 24-tool automatic toolchanger, offered a machine



with all the features that Glyn Jones required.

Glyn Jones concludes: "The Hyundai-Wia is proving to be much quicker and a lot better at consistently producing the holes which are, after all, key to the success of the drainage system."

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Boosting the production of inclined oil holes in crankshafts

Among many current areas of automotive focus at cutting tool and tooling systems specialist Sandvik Coromant is the production of inclined oil holes in crankshafts, a notoriously challenging operation that has been hampered by inconsistent results and frequent drill breakage, due to the high depth-to-diameter ratios and steep drilling angles involved. However, a new breakthrough in this area is providing extremely encouraging results, with the potential to make large gains in both tool life and productivity.

The predominant materials for crankshaft manufacture are cast iron, ISO K, plus steel, ISO P, with workpieces typically starting off as forged, cast or solid billets. Cast-iron grades are usually those containing nodular graphite, such as GGG60, GGG70 and GGG80, while forged steel blanks from 42CrMo4, 240-285 Hb plus C38, 900-1400 N/mm², are also commonplace. Strength, weight and cost are among the factors that determine the selection of cast iron or steel, with the current market split standing at approximately 50:50.

The challenge

Inclined oil holes, commonly four per crankshaft, are required to lubricate the big-end journals. Each hole, which is angled at 27° to 29°, measures 5-8 mm in diameter, depending on the size of the crankshaft and around 90 mm in depth, typically passing through two adjoining journals and a counterweight section. In many cases, the inclined oil hole will also intersect a straight hole. Due to depths of up to 25 times the diameter, inclined oil holes and pilot holes



are normally produced on specialised crankshaft production lines using machines dedicated to deep-hole drilling operations.

Until now, there have been many problems associated with the drilling of inclined oil holes, namely the angle, depth and intermittent break-out into other holes, all of which ensure tool life is a constant challenge. Elevating the difficulty levels even further is the automotive industry's drive towards MQL (Minimum Quantity Lubrication), rather than conventional through-spindle emulsion coolant.

The solution

There is clear demand for a drill that can offer high penetration rates, repeatability and process security. With these ambitions in mind, Sandvik Coromant set about developing CoroDrill® 865 especially for producing inclined oil holes.

The principal innovation here is brand new geometry with a new flute profile to improve chip formation and increase strength. Each flute has an excellent surface finish to aid chip evacuation and reduce thrust forces, while further edge preparation refinement ensures consistency and form, ultimately delivering a green-light machining process. Moreover, strong geometry and optimised point features support accelerated feed rates.

As a point of note, subtle differences in the geometry design of CoroDrill 865 are

offered to suit either ISO K or ISO P crankshafts. Indeed, each CoroDrill 865 is tailored to precise requirements, allowing dimensional adjustments of flute and overall lengths for optimum hole-making performance.

The result

To highlight the potential gains on offer, a recent customer case study saw 5 mm diameter inclined oil holes produced in a GGG80 crankshaft. At a cutting speed of 50 m/min, 0.164 ft/min, feed of 0.28 mm/rev, 0.011 in/rev and MQL at 17-19 bar pressure and 19 ml/hr flow rate, the customer witnessed a 140 percent increase in tool life and a productivity gain of 108 percent. Moreover, the robust CoroDrill 865 demonstrated predictable wear patterns, enabling full reconditioning of the tool to as-new performance levels.

With some major crankshaft manufacturers producing around half a million crankshafts a year, tool life and productivity gains of this magnitude can have a significant impact on bottom-line profitability.

Secrets of the success

Along with tool innovation, a carefully considered machining strategy contributes enormously to the successful drilling of inclined oil holes. For instance, manufacturers should always start by using the dedicated pilot drill with CoroDrill 865 to ensure precise and reliable cutting action and hole position. The pilot drill has a manufacturing body tolerance of p7 and 150°-point angle and CoroDrill 865 has an m7 manufacturing tolerance and 135°-point angle.





Once the pilot hole has been produced and the CoroDrill 865 has been engaged in the pilot hole, full recommended spindle speeds and feed rates can be applied. When approaching a cross hole or breakout of the angled face, drill until 1 mm from this point and reduce the feed to 0.1 of its recommended value. The entire drilling operation takes place in a continuous motion, no pecking cycles should be applied. Once the outer corners of the drill have fully cleared the angled face, retraction should take place at 500 rpm and 600 mm/min.

Speeds and feeds

In terms of the recommended cutting data for say a 5 mm diameter inclined oil hole, a cutting speed of 50 m/min, 0.164 ft/min and

a feed of 0.28 mm/rev, 0.011 in/rev, should be applied for ISO K materials. For ISO P, dependent on the application, a feed range of between 0.20 mm, 0.007 in/rev and 0.28 mm, 0.011 in/rev, is recommended, although the cutting speed should be increased to 80 m/min, 262 ft/min.

Machine setup and toolholding are also critical for drilling inclined oil holes. With a maximum recommended tool run-out of 30 µm, 0.00118 inch, always use a high-quality tool holder such as CoroChuck™ or shrink-fit variants.

The MQL factor

For optimised performance, it is vital that the MQL flow and pressure is well controlled. CoroDrill 865 comes with an MQL-compatible shank as standard, although MQL system selection needs to be carefully considered.

Single-channel systems mix the MQL oil and air at the back of the machine, before a coolant pipe delivers the mix through the spindle to the tool. Standard toolholders can be used, but oil drips out due to gravity accumulating in the spindle and can cause a surge of MQL delivery. In contrast, double-channel systems mix the MQL oil



and air in the spindle or at the spindle nose. This gives greater air pressure, uniform droplet size and is best used when drilling deep holes or any other application where chip evacuation is crucial.

Ultimately, the correct application of CoroDrill 865 allows crankshaft production lines to run at full capacity, producing precise inclined oil holes up to 25 times the cutting diameter with high reliability and excellent chip control.

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Remote controlled vibration damper for flexible deployment with deep drilling machinery

by Benjamin Röcker, sales director TIBO Tiefbohrtechnik GmbH

Vibrations generated during machining processes frequently have a major effect on process safety and can, in the worst-case scenario, result in the total failure of the tool. Notoriously, deep drilling processes are by no means immune to this effect. The greater the drill diameter, the more potentially extreme the associated vibrations, which can even be transferred to adjacent plant under certain conditions, where they can also affect the production process. In such cases it is advisable to decouple the machine tool foundations from the rest of the environment as is commonly practised in similar situations in relation to heavy duty pressing plant and other vibration generating machinery.

In deep drilling operations based on the BTA process, the required boring tube is also considered to be part of the tool. The boring tube is clamped in the drill spindle of the deep drilling machine and the actual tool, the drill head, is screwed onto the end of the tube with the usually single or quadruple start thread (or sometimes a flange connection). To create a deep drilling, the length of boring tube must be at least the nominal bore depth plus the machine-related length reduction. Accordingly, the greater the bore depth, the longer the boring tube required and, as function of the increasing longitudinal



elasticity of the tube, the greater the potential torsional and flexural vibrations. These vibrations need to be minimised as far as possible, as they have a direct effect on the drilling quality and on the operational life of the tool.

The objective

As a leading German manufacturer of deep drilling plant, TIBO Tiefbohrtechnik GmbH from Pfullingen in Baden-Württemberg

decided to tackle this issue. TIBO set itself the objective of analysing existing damping systems and using these findings in terms of improvement potential to develop a high-quality product of its own. TIBO's well-known modular construction method for deep drilling rigs represents another fundamental design principle adopted for their new vibration damping system for BTA deep drilling plant, which will also benefit from the development of modular and universally deployable components.

The purpose of the vibration damper

The vibration damper is designed to support the boring tube, to absorb the torsional and flexural vibrations arising during the drilling process and to dissipate them into the subsoil via the machine base. As a rule of thumb, the number of vibration dampers required, and their positioning, can be calculated using the formula $40 \times D$ (where D = diameter). This is the maximum distance at which a vibration damper must be positioned to support the boring tube in order to have a positive effect on the drilling process.

Construction types

In most modern deep drilling machinery, both the drilling tool with the boring tube



and the workpiece rotate in a counter motional manner. To this end, vibration dampers used in conjunction with a rotating tool need to be equipped with a roller bearing supported base frame. Within this base housing, a slotted damping cone is clamped to the boring tube by bracing it with bilaterally applied locking rings, which redirect the vibrations directly into the damping housing. Prior to starting the drilling process, the damping cone's defined pretension force is applied to the tube. In some cases, it may be necessary to adjust the tension force during the deep drilling operations due to a range of influences.

Generally speaking, there are two damping system types. In one, the damping cones are adjusted manually while the other type relies on a hydraulic or pneumatic control circuit. In manually operated dampers, the tension force is adjusted by hand using c-wrenches or hook spanners, which, under current safety regulations, is no longer permitted during operations in the case of new machines. Moreover, many of the damping systems currently available with hydraulic or pneumatic controls are extremely large and can only be deployed in a limited set of situations unless the

operator chooses to acquire them in a range of different sizes in order to be able to cover the desired spectrum of drill diameters.

Compact construction, easy to operate TIBO's newly developed vibration damper can be used to effectively pretension all commonly used boring tube diameters, which range from 11 to 382 mm. Special features of the system are a space-saving housing construction whilst covering an extensive range of drill diameters within a single frame size. The installed dimensions are oriented on those already established within the market, which are, to some extent, manufacturer independent. This enables the use of TIBO vibration dampers with third-party manufactured deep drilling machines with existing compressed air supplies. Additional oscillating weight can be easily affixed to the housing as required, and depending on the use case, to achieve even better damping properties. The pre-tensioning force is applied effortlessly via a proportional directional valve in conjunction with an ultra-sensitive precision controller, which also allows for precisely metered adjustments during the deep drilling operation. A touch panel display is also available for the new TIBO damping

machines, which provides graphic visualisation and regulation of the tension pressures of each individual damper.

Bi-directional deployment capability

Another benefit of these dampers is their bi-directional deployment capability. They can be used for both ramming operations, for example solid drilling, core drilling, reaming, decortication or skiving and roller burnishing and traction operations (extraction drilling), without having to go to the considerable effort of rotating the damper housing through 180° as is the case with other makes.

True to TIBO's corporate motto, "modular", our vibrational dampers are universally usable and their wide deployment range is a reflection of our flexible approach to the manufacture of deep drilling plant.

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Plug and play

Cut out the chatter

Walk into almost any machine shop and there's a good chance that you will hear the high pitch whine of a deep boring operation, the chatter loud enough to have even the hardest of hearing among us scrambling for a pair of ear plugs. It's a problem that has plagued machinists since the day lathe inventor Henry Maudslay first chucked up a piece of steel and tried to bore a hole through it. The issue has only gotten worse as metals have grown tougher and more challenging to machine.

Kennametal's latest weapon in the war on chatter is one that will have machinists everywhere saying, "I need that." The new boring system boasts the most effective anti-chatter mechanism ever developed by the company and also offers an extensive range of indexable heads and shank sizes.

Kennametal's new vibration-free boring system boasts a number of technological improvements that allows a plug and play operation. An array of interchangeable heads, that includes screw-on and lever-style clamping mechanisms in positive and negative rake configurations, provide the required efficiency.

Someone who knows all about it is Sam Eichelberger, product engineer for lathe systems engineering and part of the team that developed the internal dampening mechanism.

He says: "Perhaps the most important thing to know about the new bar is that it's plug and play. There's no need whatsoever

for tuning or adjustments, you simply pull it out of the package, mount it in the turret, and get boring."

There's more to the story than making the shop a quieter place to work, however. Eliminating vibration and therefore chatter greatly extends tool life, never mind its positive effect on part surface finish. When tools last longer, they can be pushed harder, with feed rates, cutting speeds, and depths of cut many industry experts once thought unachievable.

The vibration-free boring system boasts a number of features that make it not only the most easy-to-apply bar you'll ever bore with, but also the most productive. These include a serrated, bolt-on connection at the bar's business end that securely clamps a variety of styles and sizes of indexable heads.

Better still, the heads themselves have been put on a diet, with a shorter length and lighter weight that provides greater stability, contributing to the bar's improved performance. They're also coolant-fed, to precisely direct a stream of high-pressure coolant where it's needed most. The result is hassle-free chip control together with maximum cooling in the cutting zone.

Most important of all is the internal dampener. Sam Eichelberger explains: "The bars are both vibration and maintenance free. Within the bar there sits a mass that's supported by a pair of elastic



supports, inside of which sits a dampening fluid. This mass vibrates at a predetermined frequency during machining, attenuating the natural frequency of the bar around it to suppress vibration."

Setting the head exactly on centreline is as easy as bringing the angle finder display to zero and locking the bar in place

The vibration-free system offers superior performance in boring applications up to 10 x diameter deep, much deeper than solid carbide or heavy metal boring bars are capable of. Internal and customer test results show surface finishes as good or in most cases better than competitive "quiet bars," with significantly more aggressive cutting parameters possible across the board.

Of course, boring bars are only as good as the method by which they're clamped in the machine. Kennametal has addressed this critical consideration by supplying machine specific turret adapters, along with a special split sleeve bushing for maximum rigidity.

Anyone who's ever struggled to get a boring bar exactly on centre will appreciate the fact that setup is extremely easy. Considering the higher cost of a such a boring system, they'll also appreciate the fact that the heads are replaceable in the event of a crash, avoiding damage to the bar itself. Users of Kennametal's older boring system will also find that their new heads fit perfectly with the use of an adaptor.



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Mollart expands BTA drilling technology operations

Mollart Engineering recently invested over £600,000 to expand its BTA heavy duty deep hole drilling operation with the development of a new generation BTA deep hole drilling machine. The BTA tooling and process operation is coordinated through the newly formed BTA application centre team drawing in Mollart's machine tool design and development plus the coolant and filtration and build facility in Resolven, South Wales.

The HD1-BTA-3M is a modular constructed BTA machining system able to produce precision drilled holes up to 150 mm diameter from solid in packaged lengths of 3 m over a wide range of materials including exotic steels widely used in the oil and gas and sub-sea sectors. These drilling depth-based bed lengths can be extended to 6 m, 9 m and 12 m capacities. Also, within the specification is the capability to counterbore existing bored holes to 200 mm diameter over the full depth capacity of each 3 m length module.



BTA or STS (single tube drilling system) demands higher power than conventional drilling or gundrilling for deep hole applications and uses a highly rigid drill head system that is secured to a support and feed tube with either brazed carbide or indexable inserts. Filtered coolant is pumped in high volume, under pressure, to the cutting edge of the tool between the outside of the tube, the cutting head and the newly created bore of the workpiece.

The highly stable and rigid cutting tool system uses the coolant flow to effectively flush chips back through the drill head, tube and machine spindle for collection. As a result, penetration rates are high and several times faster than more conventional drill types with good geometry and surface finish being maintained.

The first Mollart HD1-BTA-3M machine is being installed at the Chessington headquarters to expand its subcontract drilling capability. With Botek engineers working with the Mollart team, this will further expand its capability to produce larger deep holes in a wide range of materials including Inconel and Super Duplex stainless steel.

Indeed, the capacity of the new drilling platform module will be capable of accepting billets of material up to 400 mm diameter by 3,000 mm long and weighing up to three tonne. These are typically required by sectors such as oil and gas and sub-sea, which are already regular sources of business for Mollart.

Such is the match of BTA tooling to the processing capability of the HD1-BTA-3M machine, that to maximise rigidity and stability, a heavy cast frame carries twin rack-and-pinion drives. These can be

extended when additional modules are linked together to satisfy increased demands for depth of hole. The precision racks have servo backlash elimination and a four-speed automatic selection gearbox that develops a massive thrust of 70 Nm at just 50 revs/min.

Power to the drilling head is 37 kW and the workhead can also be counter-rotated between 50 and 2,500 revs/min.

The new generation machine is able to perform push-boring and pull-boring tasks for hole enlargement applications as well as skive burnishing to create higher orders of size and surface finish.



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High-end drilling taken to the next level

Dragonskin upgrade enhances the performance of WTX Speed and WTX Feed drills

WNT, the flagship brand for high-quality cutting tools from the CERATIZIT Group, has upgraded two of its high-performance tools: the WTX Speed and WTX Feed drills, resulting in significantly enhanced performance. Already seen as premium class high-performance drilling tools, the upgrades will further enhance productivity and performance.

The WTX Speed range of solid carbide drills is synonymous with extremely high cutting speeds and long service life. Now an innovative change to the cutting geometry has significantly improved the performance to maximise productivity. This new, highly robust, cutting edge is combined with the recently developed universal Dragonskin coating DPX14S, featuring an extremely low coefficient of friction, which guarantees an extended service life: double that of similar competitor products. This combination also means that achievable cutting speeds can be doubled, catapulting the WTX Speed to the top of the rankings for high-speed drilling tools. In addition to the optimised cutting-edge shape and design, WTX Speed also benefits from a unique, precision-ground, flute profile to generate faster chip removal, a further aid to productivity.

The second development is to the WTX Feed range of solid carbide drills, which are



ideal for those companies looking to maximise high feed rates for drilling operations. These three-fluted drills from WNT feature a powerful, self-centring, chisel edge to guarantee extremely accurate positioning, even in difficult drilling applications, with the drill design allowing feed rates of two to three times faster than conventional drills to be achieved. The performance of the WTX Feed has undergone further development with the addition of WNT's legendary Dragonskin coating DPX74S which, along with an evolution in the geometry, has resulted in major improvements to the service life along with an extension to the application range of the WTX Feed drills. Process security is also enhanced by the polished, ultra-smooth, flutes that generate maximum swarf evacuation.

Tony Pennington, managing director of CERATIZIT UK & IRELAND, comments: "The development of the WTX Speed and Feed ranges of solid carbide drills is a further example of WNT's philosophy of continuous improvement to deliver productivity gain benefits to customers. The significant performance gains from tools, such as these, make a big impact on the profitability of customers, who can rely on not only the high quality of WNT cutting tools, but also the customer service that the combined power of the CERATIZIT Group provides."

For over 95 years, CERATIZIT has been a pioneer developing exceptional hard material products for cutting tools and wear protection. The privately-owned company, based in Mamer, Luxembourg, develops

and manufactures highly specialised carbide cutting tools, inserts and rods made of hard materials as well as wear parts. It is a market leader in several wear part application areas, and successfully develop new types of carbide, cermet and ceramic grades which are used, for instance, in the wood and stone working industry.

With over 9,000 employees at 34 production sites and a sales network of over 70 branch offices, the Group is a global player in the carbide industry. Its international network also includes the subsidiaries KOMET, WNT, and Becker Diamantwerkzeuge, as well as the joint venture CB-CERATIZIT. As a leader in materials technology, it continuously invests in research and development and holds over 1,000 patents. Its innovative carbide solutions are used in mechanical engineering and tool construction as well as many other industries including the automotive, aerospace, oil and medical sectors.

It is active on the market through its seven competence brands: Hard Material Solutions by CERATIZIT, Toolmaker Solutions by CERATIZIT, Tool Solutions by CERATIZIT as well as Cutting Solutions by CERATIZIT, KOMET, WNT and KLENK.

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Tungaloy forces feed rates up with new HFM Series

High-speed and high feed milling is increasingly prominent with the ever-improving performance of the modern machine tool. Adding to its already extensive milling product portfolio, Tungaloy UK has now introduced its new TungForceFeed small diameter high-feed milling cutter.

With a tool diameter range from 8 mm to 16 mm, the new TungForceFeed caters for a diameter range smaller than the existing DoFeed Series. Perfect for the mould and die industry and general machining applications, the new TungForceFeed is available with both a high-feed insert and an R2 insert line. It can be applied to machining a diverse range of materials from alloy steel, stainless and hardened steels through to cast iron, titanium alloys and heat resistant alloys such as Inconel and Hastelloy.

The high-feed insert is suitable for general high-feed milling applications and subcontract machine shops while the R2 insert designation is ideal for full profiling and semi-roughing to semi-finishing processes. The R2 insert has a free cutting geometry that eliminates chatter and improves surface finishes whilst the built-in wiper reduces burr formation. Applying the latest PremiumTec coatings, the inserts are offered in Tungaloy's AH3225 and AH8015 grades. The AH3225 incorporates a Nano multi-layered coating that optimises cutting edge integrity and increases wear, fracture and oxidation resistance. Similarly, the AH8015 grade has a hard coating layer that improves performance on difficult to machine materials.

Particularly prominent in high-feed machining applications is the design of the toolholder and Tungaloy once again impresses with its innovative new design



that is perfect for shoulder milling, slotting, and ramping, plunging and helical feed drilling.

The toolholder pockets are designed with a positive inclination that works in synergy with the thick corner inserts. Supporting this, the toolholders have a particularly robust M2 screw that reduces screw neck shearing that can be commonplace during high cutting force applications. Furthermore, the screws improve operator handling, clamping and precision when combined with a precise seat location. The positive insert inclination also improves swarf evacuation, which is critical for high-feed machining applications. The inclination reduces chip adhesion and the likelihood of premature insert failure, a systematic symptom of poor chip evacuation and adhesion.

The tool body line-up is available with a short shank, long neck shank, undercut shank and a modular interchangeable head configuration. The EXLS toolholder and the modular screw-on TungFlex are both available from 8 mm to 16 mm diameter with the option of two, three or five insert seats with a tool shank length from 75 to 120 mm.

DoTriple-Mill offers exceptional versatility

The impressive DoTripleMill from Tungaloy can use an octagon insert that offers 16 cutting edges that can take a depth of cut up to 3.4 mm. However, if the depth of cut requirement is greater, then

the same cutter body can accommodate an 8-edged square insert with DOC capability of 6 mm.

The innovative DoTripleMill is also capable of using an eight-edged round insert. There are many advantages to a round insert. Round inserts are the strongest of all cutting tool geometries and can handle several applications. Another feature of round inserts is that with a light depth of cut, round inserts utilise chip-thinning to offer feed rates that rival high-feed cutters.

Versatility and economy are just part of the reason the DoTripleMill is one of the best face mills available today. A big part of the performance advantage is found in the way the insert is secured into the pocket.



The insert has a ground in groove that circumnavigates the periphery of the insert, midway through the insert thickness. This groove acts to lock the insert into a mating protuberance in the pocket.

With conventional face mill cutters, the neck of the screw is the only factor holding the insert down. Where the DoTriple Mill uses the milling cutter pocket to wedge the insert into place, this method of securing the inserts acts as a dove-tail locking mechanism that secures the insert, prevents movement, accurately tracks the insert and reduces the strain on the insert screw, which is common with conventional milling cutters. This permits higher feed rates, improved repeatability, increased dependability and better surface finishes.

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Lightweight face milling cutters for high-speed machining of aluminium

Horn has expanded its DTM lightweight milling system to include two new versions. DTM.CX09 arbor milling cutters are designed as roughing tools for use in machining applications that involve high cutting depths and place fewer demands on surface quality. The DTM.CX09.AL.F face milling cutter for finishing adds an adjustable body to the existing product range. Axial run-out can be adjusted easily to the exact micron using a presetter.

The aluminium body of the toolholders has low mass, resulting in reduced energy consumption during acceleration and deceleration. Its weight is less than that of a steel milling cutter, ensuring faster spindle speed changes and consequently highly dynamic machining as well as less wear on the spindle at high speeds. Additionally, the cutter body features a protective hard coating to prevent wear caused by chip impact.

The arbor milling cutter bodies have diameters between 40 mm and 125 mm and have from four to eight effective cutting edges. All body versions feature an internal coolant supply. The system is used for high-speed milling up to a maximum cutting speed of $V_c = 5,000$ m/min.

Inserts are available from stock in several diamond materials and a variety of geometries, making it possible to obtain a cost-effective alternative to brazed face milling systems. Chip breaker geometries reduce chip volume and increase process reliability.

Inserts are available with a PCD or CVD-D coating. PCD grade PD75 is a useful all-rounder for aluminium machining applications. Horn recommends substrate PD70 for alloys with a high silicon content. The substrate HD08 (CVD-D) is used for highly abrasive



materials. CVD-D consists of 99.9 percent diamond and offers maximum wear resistance. All material versions are available in a range of different geometries to suit the application.

Horn Cutting Tools Ltd, based in Ringwood, is the wholly owned UK subsidiary of Horn S.A. Luxemburg, a leading European supplier of grooving tools and a leader in precision grooving technology. The company was incorporated in the UK in 2008, having previously traded as Horn UK since 1995.

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Seco Jabro-Mini JM500 delivers noticeable improvements for micro-machining operations

Seco's Jabro®-Mini JM500 range comprises over 180 different end mills. All have been specifically designed for machining small and nano-sized parts, typically found in the aerospace, medical, computers, consumer electronics and communication sectors.

Machining very small components with often intricate micro-features are difficult to see and check and, as a consequence, require cutting tools that deliver process reliability, predictable cutting performance and tool life.

Jabro-Mini JM500 cutting tools meet these criteria and feature optimised grades, geometries and coatings that produce exceptional surface finishes on components made from steel, stainless steel, heat-resistant super alloys and titanium.

The geometries incorporate 30° helixes and 3° rakes and are available in torical and ball-nose cutters with two, three and four flutes.



The tools' carbide grade and polished SIRA coating means the tools deliver improved and cost-effective performance.

Jabro-Mini JM500 end mills are available with DMM 4 mm and DMM 6 mm shank

diameters. They come with seven different overhang lengths from 2 to 20* DC, and with 0.2 mm to 3 mm flute diameters.

With such a wide selection, customers can separate their machining operations into distinct stages and use the shortest-possible tool overhangs, at each stage, to minimise tool deflection.

By adopting this strategy, Seco estimates that customers can save machining time by as much as 50 percent and increase feed rates, thereby reducing cycle times and improving productivity.

Bigger is better

Seco Tools has announced that it is introducing a new range of larger LP09 inserts for use with its High Feed 2™ cutter bodies, enabling manufacturers to improve their productivity and process reliability.

The new inserts, featuring higher insert-corner strength and dual cutting edges, are designed for a range of high-feed milling operations, i.e. face milling, helical interpolation, slotting, side milling, pocketing and plunging and are particularly suited for machining difficult materials used in the mould and die, aerospace and oil and gas industries.

High Feed 2 cutter bodies feature stronger reinforced cores and more teeth per diameter enabling higher feed rates to be employed, resulting in faster material removal rates. Furthermore, during high-feed milling operations, the optimised flutes of the cutter bodies evacuate chips quickly and more efficiently.

The rectangular shape of the LP09 inserts, combined with the closer-pitched cutter bodies, help extend tool life beyond that



achieved with square inserts. Cutter-body pockets ensure consistent and precise insert positioning/seating during indexing, whilst high-strength screw clamps hold inserts securely in place.

LP09 positive inserts will be available in a full range of grades, including D12, MD15, M13, ME08 and E08. Seco Tools' High Feed 2 cutter bodies range in size from 25 mm to 100 mm.

Seco is one of the world's largest providers of comprehensive metal cutting solutions for milling, stationary tools, holemaking and tooling systems. For over 80 years, it has been more than just a cutting tool provider. It develops and supplies the technologies, processes and support that manufacturers depend on to maximise productivity and profitability.

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ITC publishes its latest product catalogue

Industrial Tooling Corporation (ITC) Ltd has now released its 2019 product catalogue. Packed with innovative solutions, the Tamworth cutting tools expert has introduced a host of new and extended product lines that are destined to impress the industry throughout the year.

The UK manufacturer of high-quality technically advanced cutting tools has published Issue 14 of its catalogue to update new and existing customers of the ingenious milling, drilling, threading and specialist milling lines that are now on offer. The latest edition of the catalogue incorporates ITC's updated pricing structure for 2019, as well as having a fresh-look trochoidal milling section.

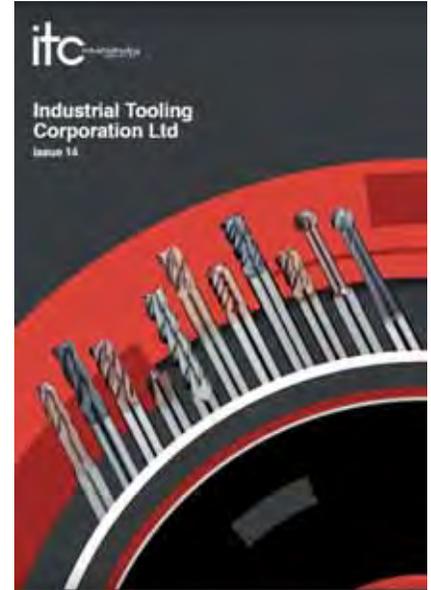
Commenting upon the latest edition of the catalogue, ITC's marketing manager, Georgia Graves says: "We are always attentive to the demands of the marketplace and in particular specific customer feedback. Whilst we have an already market leading line of trochoidal milling product lines, we have extended the trochoidal milling section of this latest catalogue. ITC

has added even more extended reach and stub-length tools to enhance the already exceptional performance parameters our range provides."

"In addition to this, our investment in high-end grinding centres for ultra precision grinding of micro-tools has given us the facility to manufacture milling tools down to diameters in the 1 mm range, with a variety of corner radii to suit the specific needs of engineers in the 'micro-machining' industry."

To view and download a copy of the latest ITC Issue 14 product catalogue, visit www.itc-ltd.co.uk/products.

ITC is a specialist tooling supplier. Its objective is to supply its customers with the best possible products, at the same time making them more efficient by introducing productivity and method improvements. To achieve this, the company continues to invest in its team of capable and enthusiastic engineers and technical sales people, backed up by an in-house team. From solid carbide and PCD tooling, through to indexable milling, turning and boring, plus



top quality toolholders, ITC has an outstanding product range.

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Sumitomo product launch successes

Major product launches at international machine tool venues JIMTOF2018 in Japan, AMB 2018 Stuttgart and IMTS 2018 Chicago by Sumitomo featured important developments in Cubic Boron Nitride (CBN) and Polycrystalline Boron Nitride (PCBN) for hard turning, plus new milling inserts and drill range extensions.

Developed using a totally new direct conversion sintering method, Sumitomo's SUMIBORON NCB100 was launched. Demonstrating a breakthrough for turning high specification, hard-to-cut materials, it provides up to 50 times greater insert life over more traditional carbide inserts. The high stability NCB100, based on an ultra-hard Binder-less PCBN, is produced using grains just a few tens of nano-metres in size directly bonded to each other.

Also launched and extending the Binder-less technology in turning were its NPD10 and DA90 inserts. NPD10 is targeted at high precision machining of tungsten carbide as well as hard and brittle materials and DA90, which has greater levels of stability due to its larger

polycrystalline diamond particles, making it ideal for rough machining cemented carbide as well as other hard and brittle materials.

Providing greater stability when turning heat-resisting super alloy materials, Sumitomo demonstrated the application of its latest Absotech Bronze PVD-coated technology, which uses a heat-resisting ultra-multi-layers of ALTiSiN thin film edge coating for the AC5000 Series tooling. AC5015S was launched for more general applications and AC5025S for heavier roughing cycles. The inserts have improved resistance to crater and notch wear.

For turning cast iron, the latest AC400K coated grade inserts have thicker CVD coatings enabling cutting speeds up to 700 m/min to be achieved including when machining grey and nodular materials.

Sumitomo also demonstrated its latest DGC45 deg face mill series, which introduced 16 cutting edges and the ability to machine depths up to 3 mm. Using Sumitomo's patented ZX coating technology, tool life is extended.

From the drilling stable, Sumitomo's



highly successful SMDT indexable and regrindable head carbide drills featured the latest Sumitomo alternative layers of TiAlCr and TiSi that form the high performance DEX coating. SMDT tools are now available in smaller length-to-diameter ratios of 1.5 x and greater at 12 x, in addition to its existing three, five and eight times ratio. The series uses hardened steel bodies, that accept multiple diameter tips in four different styles, to maximise performance in stainless steel, super alloy and cast iron.

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Zero-point clamping systems from AMF support revolutionary hybrid production

With the Zero-Point clamping system from AMF, setup times can be reduced by as much as 90 percent. For MATSUURA and its revolutionary hybrid machines which combine additive and subtractive methods, the AMF Zero-Point system ensures that everything runs quickly and seamlessly and that the cost-effectiveness is right.

Additive and subtractive combined in one machine

With the hybrid additive manufacturing systems of the Lumex range, MATSUURA unifies selective laser sintering (SLS) and high-speed milling (HSM) into one machine. Through this combination of laser sintering and high-speed milling, components can be fully processed on one machine. Extra finishing work, by means of other processing methods on other machines, is only necessary where there are special requirements. The AMF Zero-Point system brings with it the best conditions for both sides of production.

In the method offered by MATSUURA in two Lumex machines, unique up until now, metal powder is turned into any three-dimensional shape desired by means of selective laser melting in the powder bed in layers. In this process, a mirror galvanometer directs fibre lasers of 500 or 1,000 watts in strength, depending on the design of the machine, to the intended point with fine precision. After every pass, the scrapers spread the metal powder out again on the machine table that has been moved downwards and away. On the face of it, this is a 3D printing process, as people would understand it. However, after ten powder layers each with a layer thickness of 50 µm, something special happens. The base or substrate plate does not move downwards another time so that the coater can apply



the next layer of powder. Instead, it stays where it is for the time being.

The milling head appears out of the void of the milling head, whose high-performance spindle accelerates the cutter to up to 45,000 rpm. It then moves along the outer contours and rough-machines a section of the allowance with an R2 ball cutter, for example. This process is repeated for all ten layers generated by the laser. A tool changer holds 20 tools at the ready for this purpose and amongst them are pre-cutters for rough-machining the machining allowance generated by the laser melting. After three times ten layers, or 1.5 mm, the final contour is created with the finishing tool at the points at which the component has cooled down somewhat. This goes down to 0.005 mm and down to Rz 3.5 µm compared with 0.05 mm and Rz 25 µm. Furthermore, everything that is made possible by the ideal design options, such as cooling ducts in tool and mouldmaking, cannot be acknowledged exhaustively here. Thus, in most cases at the end of the processes, the machine-finished component with the base plate can be approved by the AMF zero-point modules.



operations at the top area of the machine table. Meanwhile, what has been going on in the substrate remains hidden from the observer but is no less critical. The zero-point clamping modules, specially tailored by AMF for additive manufacturing, meet the specific requirements and accelerate the setup processes involved. Carefully selected materials and processes are used here so that the zero-point clamping modules can defy the sometimes-adverse conditions.

For example, very high temperatures prevail in the 3D printing process. At the melting point of the metal in the powder bed it is 1,400°C. Even if the clamping modules are underneath a 30 mm-thick plate, temperatures of up to 150° and higher still occur there. AMF therefore uses seals and media which can withstand this. In order for process reliability and repeat accuracy not to suffer from the temperature fluctuations due to the constant heating up and cooling down, the Fellbach operation



Invisible performance of the clamping technology in the substrate

So far, the attention has been on the visible

uses carefully selected materials and processes. This is the only way the zero-point clamping modules can meet the requirements. Hardened surfaces are just one example in this regard. They then have to satisfy the usual requirements of the subtractive manufacturing processes.

Direct workpiece clamping

K5.3 built-in clamping modules from AMF are used in the Lumex models from MATSUURA for additive manufacturing. They open pneumatically at an operating pressure from 5 bar, which is available in every production hall and this happens with just one connection. Five modules pick up the clamping bolts, which are housed under the 3D base plate. This is more or less direct workpiece clamping.

The K5.3 built-in clamping modules achieve draw-in forces of 1.5 kN and holding forces of 13 kN. Locking is performed through spring force so that, following the opening and insertion of the clamping bolts, the pressure pipes can be disconnected at any time. Due to the optimal contour of the clamping bolt, a tilt-free retraction and extension, ensures a secure locking of the clamping modules, even if the plate has

been put on with a slight incline. The optional, integrated blow-out mechanism of the clamping modules and a contact control mechanism for querying as part of automated processes are not installed in the Lumex systems but can be supplied by AMF from the factory at any time.

Under no circumstances does MATSUURA wish to relinquish the speed it can achieve during setting up with the AMF Zero-Point system. Before an AMF sales engineer, who has long been acquainted with MATSUURA, had suggested the zero-point solution, clamping had been performed laboriously with conventional technology. Back then, the base plate was bolted down to the machine table with four screws and aligned every time with the dial gauge and calibrated with a zero-point sensor. This cumbersome calibration process had to be performed repeatedly for every component. With the AMF Zero-Point system, the setup time can be reduced to a tenth of the time.

Clamping technology indicates an efficiency advantage

Concluding, Günter Brunn, MATSUURA



sales manager, says the equipping of the Lumex machines with the AMF Zero-Point system represents consistency: "Through the lightning-quick setup operations, we are signalling to our customers right from the clamping stage that they are in the Champions League with our Lumex systems and have an advantage in terms of efficiency."

AMF

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Leader supports multi-axis manufacturing

Leader Chuck Systems has recently added the Exact Machinery range of precision CNC rotary tables and indexing units to its extensive product portfolio. The Taiwanese company has over two decades' experience in continuously developing new and innovative products to improve the manufacturing processes and productivity for precision engineering companies in every industrial sector. The ISO 9001 accredited 180-strong company produces over 3,000 units each year at its 4,800 m² state-of-the-art manufacturing facility.

The NCT, TRT and ERT range of worm and wheel drive CNC tilt and turn rotary tables are available in a wide range of sizes, from 125 to 500 mm diameter. They feature a wear-resistant design with high rotational torque, dynamic accuracy, easy installation and maintenance. Rotary tables expand any machining centres production capacity.

Mounted in either a horizontal or vertical plane, these tables are used to add 4th and 5th axis capability. Inside the rotary tables, the worm shaft and worm gear system define the accuracy and life of the table. Through the strict inspection and in-house machining of the worm system, Exact guarantees products optimal performance and high dynamic durability.

Material selection for the rotary tables includes special high-tensile aluminium-brass, equal in strength to a steel alloy, for the worm gear and a hardened alloy steel for the worm shaft. The combination of brass and alloy steel offers less friction, so the rotational motor torque is transferred efficiently. The worm gear has a large pitch diameter that creates a large engagement area and less pressure on the contact surface, resulting in increased wear resistance.

The HC range of automatic indexing tables can be used with the worktable in either the horizontal or vertical plane and are suitable for use on machining centres, rotary transfer machines and almost any type of manufacturing system. Sizes range from 200 to 500 mm diameter and up to 1,800 x 1,800 mm for the heavy-duty models. Rotation is by a worm and wheel driven via a servo motor, hydraulically clamped through a three-piece coupling that generates a resistance to high machining forces for outstanding positioning accuracy and rigidity.



Featuring a non-lifting, Hirth coupling design that has an exceptional holding force and a working surface that does not raise and lower during indexing, it allows a solid sealing system to prohibit swarf, chip or cutting fluid ingress into the housing for reliability and longevity. Hydraulic rack and pinion drive with built-in cushions ensure smooth operation with optimum cycle times, the table clamp and unclamp functions are hydraulic and monitored for safety by feedback switches.

Leader managing director Mark Jones says: "Exact is a professional global supplier built on a robust technological research and development foundation, complemented by a quality minded workforce using state-of-the-art manufacturing equipment and a stringent quality control system. Like Leader, the company is committed to finding a solution that achieves or exceeds customer satisfaction."

Exact's quality CNC tables are used in a wide variety of applications in the medical,

aerospace and motorsports industries, in the manufacturing of oil & water pipeline valves and equipment and in job shops where flexibility is required. Also, the automotive, heavy goods and passenger transit industries, that demand critical tolerances with repeatability and reliability. Here, the cost-per-part is driven down by global competition and these companies are looking to specialists, such as Exact, to provide increases in efficiency and productivity, giving them the edge by implementing process improvements.

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New workholding systems for horizontal machining

New towers have been introduced by Roemheld UK for clamping multiple workpieces on the table or pallet of horizontal machining centres. TS towers feature four vertical faces for holding four, eight or 16 parts, while TS TriStar versions have three faces for securing three, six or 12 parts. The latter models have the advantage of allowing improved spindle access for machining components from the sides.

All employ a patented guidance and sealing system without the need for sheet metal covers or plastic wipers and the monobloc design provides high stability and accuracy.

There are two sizes of the 4-sided tower, TS 100 and 125, and three of the 3-sided tower, TS 80, 100 and 125 TriStar, the numbers representing jaw width in mm. Stroke is up to 476 mm and maximum clamping force ranges from 20 to 40 kN.

Manual operation of the vices delivers reproducible clamping force, which may be low to avoid deforming delicate components, making the towers suitable for a wide variety of applications on the shop

floor. Alternatively, the largest of each type can be equipped for hydraulic operation.

In the Vector versions of the towers, applicable to all but the smallest TriStar model, a fixed jaw can be arranged in the centre on each face or, if desired, two fixed jaws can be supplied instead. Workpiece weights above 15 kg can be accommodated.

There is also a version of the clamps featuring a so-called 3rd-hand function, which has only one clamping spindle per face that moves both the upper and lower jaws simultaneously towards a fixed jaw positioned in the centre or to one side. It avoids having to juggle two workpieces during the clamping process by retaining the lower workpiece first, allowing the second to be inserted and held with one hand before operating the handle again with the other to finish the clamping of both parts. Maximum workpiece weight using these towers is 15 kg.

An extensive range of accessories, including jaws and jaw inserts, is available, as



are drawings and CAD models of the equipment, an advisory service and bespoke workholding arrangements.

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Manual indexing head saves programming and setup times

Ideal for production shops where manual mills may still be in operation, but equally well suited to use on a CNC vertical machining centre (VMC), a new, manually adjustable indexing head has been introduced by 1st Machine Tool Accessories. The RotaVice can be rapidly set to position a component at a multiplicity of rotary angles in the horizontal plane for milling and drilling.

Produced in the UK, the unit is designed to be secured in a One-LOK workholding device manufactured by Chick in the US, for which 1st MTA is the sole agent in the UK and Ireland.

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

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

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

Another advantage of the RotaVice is that once the angle has been selected, it uses the clamping force of the One-LOK to secure the rotary angle. This force, which is much higher than that offered by standard



dividing heads, allows significantly heavier machining cuts to be taken and delivers improved surface finish.

Altering the angle for a subsequent machining operation on the same component is similarly achieved without having to re-clamp the part, thereby avoiding loss of accuracy through tolerance build-up. Intermediate angles can be set using a rotary dial with a one-degree increment scale, while very fine adjustments down to ± 0.5 degree can be made using the toggle lever mounted at the top of the unit.

Importantly, RotaVice has a large through bore with a taper and an internal thread, both of which can be configured for use with chucks, mandrels, special fixtures and backstops. These are normally not associated with standard dividing head systems.

RotaVice is available from 1st MTA to existing users and new users of Chick One-LOKs in Britain and Ireland. The system can also be exported to manufacturers worldwide that use similar equipment.

1st Machine Tool Accessories is a one stop solution for all your machining requirements. It takes away the hassle of searching for the best items from the finest

manufacturers by only stocking high-quality products. Through careful reviewing of its business partners and suppliers, it maintains a level of quality that is unrivalled; providing customers with peace of mind and satisfaction guaranteed.

The company stocks a vast range of machine tool accessories, from clamping equipment such as chucks, chuck jaws and machine vices, to smaller but equally important items such as drill sharpeners. In addition, it stocks the larger items that go hand in hand with production machining processes, including rotary tables suited for all manner of application and the widest range of bar feeders on the market.

It understands the importance of reliable products that can stand the test of time and retain accuracy. It also recognises the importance of maintaining a safe, efficient and environmentally-aware working location and stocks some of the most impressive coolant and lubricant filtration systems.

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Versatile clamping module for automated machine loading

SCHUNK has developed the VERO-S NSE-A3 138 automation module specifically for automated machine tool loading, as well as for applications in handling, assembly and automation technology. The clamping module is part of the extensive SCHUNK VERO-S modular system, which enables more than 1,000 possible combinations for efficient workpiece clamping. For process-reliable workpiece and clamping device changes, the automation component is equipped with a powerful blow-off function, which carefully cleans the bearing surface during the changing process. In addition, a spring-actuated cone seal prevents chips or dirt from penetrating into the changing interface.

High rigidity

An enormous pull-down force of 8,000 N or 28,000 N with activated turbo function and a high dimensional stability of the module body benefit the rigidity of automated quick-change solutions. Thus, even high tilting moments and shear forces can be reliably absorbed. Depending on the application, the modules can be combined in any quantity. Centring inserts with flexible elements ensure positional orientation with a high repeat accuracy and maximum

process reliability in automated operations. The repeat accuracy amounts to < 0.005 mm. 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 without any external energy supply via spring force, it is form-fit and self-retaining. This means the workpieces remain safely clamped in the case of a sudden drop in pneumatic pressure. A pneumatic system pressure of six bar is enough for opening the module.

Integrated anti-twist protection and media transfer

If the modules are used individually, a standard integrated anti-twist protection device ensures a stable position. By means of the integrated media transfer unit, fluids with permissible system pressures of up to 300 bar can be transferred, for example, to control clamping devices using Plug & Work or to supply components for automated



monitoring. As a part of the VERO-S modular system, the automation module benefits from a variety of combination options, from standard plates to SCHUNK TANDEM clamping force blocks, to mechanical vises from the SCHUNK KONTEC series.

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Engineering with pinpoint accuracy

While many engineering functions can get away with some degree of tolerance, certain applications need precision and accuracy to the highest order. This can only be carried out with the correct measuring components, as Marcus Schneck, CEO of norelem, explains

What is engineering? As the Royal Academy of Engineering aptly puts it, engineering is about making things, making things work and making things work better.

That means engineers are a band of innovators, problem solvers, and tinkerers. Arguably, the mark of a good engineer is one who is continually chasing to improve; never settling for the status-quo.

Of course, the search for better solutions is welcome, as without this, progression cannot be made. Often, what allows engineers to experiment is that engineering is not an exact science, degrees of tolerances can be played with, methods can differ, and creativity can be introduced.

For instance, clamping and positioning can be done in a variety of ways, from toggle clamps to indexing plungers, magnetic clamping balls to cam screws. All are perfectly viable approaches to workholding. Some are more efficient and effective than others, but it is based on the task at hand.

However, there are undeniably engineering disciplines that do require precision and accuracy and measurements are finite. Take seat belts as an example. Most modern seat belts are stowed on spring-loaded reels called 'retractors'. These are equipped with inertia locking reels that stop the belt from extending off the reel during severe deceleration, such as



in a crash situation or in sharp braking. To engage the belt, the teeth on the retractor system must be precisely engineered. Otherwise, the seat belt locking does not happen.

Quite clearly, inside these mechanisms are mission critical dimensions. If not machined and measured correctly, lives could be at stake.

Similarly, aerospace and manufacturing applications need this level of accuracy. If precision is not achieved, parts could be rejected, or fail compliance. This then causes onto downtime, project delays, unnecessary maintenance and ultimately additional cost.

To measure parts accurately, engineers must be wise to the measuring tools available, the accuracy they can measure to and their uses.

Sliding into position with dovetail slides

For manufacturing and laboratory science industries, dovetail slides, like those offered by norelem, are the simplest type of linear slide that provide improved positioning accuracy. They have a dovetail shaped channel used to lock the linear rails and allow for movement along the channel.

In a dovetail slide, the moving component comes into direct contact with the load and the surface area of the dovetail slide is typically larger than that of a ball bearing linear slide, or a roller slide. Therefore, dovetail slides are more suitable for holding heavier loads.

Due to their design, they provide smooth,



linear movement without risk of backlash, crucial for fast and efficient positioning. As such, they are an ideal complement for a variety of machines, optical devices and measuring instruments.

Amongst the benefits of these versatile products are the precise adjustment of processing units, measuring cameras, mirrors, microscopes and laser heads. They can also be used to fine-tune soldering, plasma and welding heads and to focus burning nozzles.

Dovetail slides are also adaptable when more complex positioning is required. Using fastening screws, they can be quickly and simply combined to form cross tables.

Mainly used in the manufacturing and laboratory science industries, these components are durable and can provide ease of motion for over long periods of time without the need for maintenance. Indeed, norelem's dovetail slides have a life-time of up to one million strokes.

Significantly, dovetail slides can be used in conjunction with micrometer spindles and handwheels for even more accuracy. When together, the micrometer spindle allows the moving component on the slide to be graduated in 0.02 mm increments.

The best position

When measuring and testing equipment, or positioning components on machine tools, handling systems or jigs, positioning stages with electronic position indicators are often best, due to their play-free guides.

Positioning stages, also known as positioning tables, reset, chain dimension and offset settings can be managed via the buttons on the position indicator, while battery life is up to two years.

Not only do the positioning tables provide accurate measurement, but they are also modular. Cross tables, lifting tables and rotary positioning tables of the same size can be combined together to measure different axials.



A need for speed

While one side of engineering is about creativity and thinking outside the box, the precision side of engineering requires speed and accuracy. Engineers must be able to measure and position efficiently and accurately to enable better productivity.

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MAPAL gets a grip on clamping with additive manufacturing

The onset of miniaturisation is becoming more prominent in industry and the respective machining applications and production processes. This pattern is naturally seeing the necessity for clamping chucks to become smaller, more precise and more powerful. As these requirements cannot be met with conventional manufacturing, MAPAL is a cutting tool manufacturer leading the way in using additive manufacturing by selective laser melting to produce chucks and toolholders.

Whether in electrical engineering, medical technology, the aerospace, watch or robotics industries, many products are becoming ever smaller, smarter, more user-friendly and more powerful. The topic of space is therefore crucial, especially in the production halls of manufacturing companies and also in the area of clamping technology.

Perfect radial run-out and optimum balancing value

The radial run-out accuracy of clamping chucks, for a chip thickness in the range of a few thousandths of a mm must be almost zero. This is the only way to achieve good surfaces at maximum spindle speeds with a long tool life. In addition, it must be ensured that any contamination due to micro-particles is excluded. Another important topic for machining in the miniature sector is the supply of coolant lubricant. Too much cutting fluid means complex downstream part cleaning and too little or no cooling leads to a loss in quality and productivity.

Furthermore, the smaller the tool and clamping chuck, the easier handling must be. This is because with each reduction in size, the handling of external peripheral

devices becomes ever more complicated and difficult. With shrink or collet technology, it also takes considerably longer for the tools to be ready for use. In the case of multi-part attachments, the individual deviations of the components also add up to a considerable error chain.

Additive manufacturing by selective laser melting

At MAPAL, additive manufacturing by selective laser melting is now used in all product areas. This is particularly the case in all situations where additively manufactured products can offer clear added value for the customer. Thanks to this innovative manufacturing process, MAPAL has succeeded in manufacturing clamping chucks in miniature format with the HSK-E25 connection for direct clamping of tools, with a diameter of 3 mm, while meeting the challenging criteria mentioned above.

The smallest clamping chucks with the best properties

In order to guarantee radial run-out accuracy, the clamping technology specialists have integrated innovative clamping chamber systems into the new clamping chucks that fit snugly against the tool shank. They are equipped with dirt grooves to displace microscopic particles. The required balancing value is guaranteed thanks to internal balancing geometries including support structures that also optimise the weight and strength distribution. Overall, the small format chucks can achieve a more homogeneous and spindle-friendly acceleration and deceleration for the entire tool system that consists of the clamping chuck and cutting tool.



Thanks to additive manufacturing, MAPAL has succeeded in equipping the clamping chucks for the miniature sector with decentralised coolant outlets. Using parameters such as coolant pressure, setting dimensions and spindle speed, these optimised outlets are designed in such a way that they convey the lubricant directly to the cutting point.

Very easy handling without peripheral devices

The new small format clamping chucks from MAPAL enable simple and quick clamping of the tool with no training courses, high re-tooling costs or expensive peripheral devices required for implementation. This is because the hydraulic chucks are operated using a simple screw.

New possibilities

The new small hydraulic chucks also open up new possibilities for workpiece clamping. For example, the external hydraulic clamping technology can be used for clamping hip joint balls. Specially shaped chip flutes inside the chuck and a special external geometry ensure that the balls are clamped very precisely and gently at the same time. In medical technology, in particular, topics such as reproducible precision are of enormous importance.



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Kurt expands DX6 CrossOver vice line

Kurt has launched an expanded lineup of its DX6® CrossOver® vice which achieves new levels in workholding performance where flatness, parallelism and strength are critical for high precision machining. The new line-up includes a hydraulic model to eliminate manual vice clamping and performs precise clamping to the required pressure. It can also be used in automated machining systems. Additional models include Reverse and Hydraulic Reverse vices to assist in programming in the "Y" axis allowing for easier part loading and unloading.



The DX6 hydraulic model comes with single and double acting actuation. It only requires switching out a brass fitting with the supplied hydraulic fitting. Single acting vice performs hydraulic clamping and spring return for unclamping. Double acting performs both hydraulic to clamp and unclamp for faster, more precise setup.

DX6 CrossOver vice field conversion kits have also been introduced. These kits future proof existing, in-use DX6 vices, so as workholding needs changes, machinists can easily convert any DX6 CrossOver Manual Vices to Manual Reverse, Hydraulic, or Hydraulic Reverse models.

Using a crossover of design features, from both the AngLock® and Pull-Type Kurt vice designs with integration via a new 4-bolt stationary jaw, an ultra-unique strategy is created for a better vice with the DX6 CrossOver models. The AngLock design creates all-directional clamping alignment and downward force reduces jaw deflection. The Pull-type design reduces stress in the body and maintains flatness after assembly. Its 4-bolt design reduces stationary jaw deflection and alleviates body stress.

The DX6 CrossOver vice features a full 9-inch jaw opening within the inside jaw position. A lighter and narrower vice body with a footprint of 7.391" wide x 16.810" long allows more vices on the machine table. The vice body also provides chip evacuation straight through the body at sides and end of vice to prevent chip build-up.

GrooveLock® jaw plate and workstop allows for convenient part positioning, with a larger and stronger bearing pack increasing durability with longer life. New brush seal design allows for easier removal or replacement in the nut with 80,000 psi ductile iron body, nut and movable jaw, a semi-hard steel screw and a hardened vice bed and jaw plates.

The original Kurt AngLock vices were designed to provide precision part clamping for basic machining and milling applications. The line of Kurt vices includes high precision CNC vices, 5-axis vices, rotary table workholding solutions for VMCs and ToolBlox tombstones. The precision workholding solutions provide increased versatility at CNC machining stations. Precision measuring systems and accessories are also available to complement customers Kurt workholding systems.

Kurt has been designing, engineering and manufacturing precision workholding products for over half a century. From single station vices and modular vices to towers, tombstones, and more, it has the workholding solution CNC applications require. Its precision vices and workholding products are easy to integrate into new or existing automated cells and gauging systems.

In addition to its complete line of world class vices, Kurt Workholding also supplies a full range of vice replacement parts, including jaw replacement kits.

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New benchmark for UK robot integrators



Certified Robot Integrator 2019-2021

The BRITISH Automation & Robot Association (BARA) has formally announced the launch of the UK's first robot integrators' certification scheme in association with leading US trade body, Robot Industries Association (RIA).

With a growing demand for manufacturers to become more competitive due to a reduction in the availability of "low-cost labour" and ever improving workplace safety, more and more companies are looking at how they can automate their production line processes.

Over the past decade, there has been a three-fold increase in the number of robots sold in the UK, with some analysts predicting

that the global market for industrial robots could soar to a £30 billion industry by 2025. This has prompted the need for BARA to establish an industry benchmark to evaluate robot integrators' technical knowledge and safety practices.

Mike Wilson, chairman of BARA, says: "RIA represents all that we stand for, so I am delighted that we have agreed a collaborative framework with our North American partner, who have developed the certification programme in the US over many years.

"For the UK, the new robot integrators' certification scheme will add another layer of credibility for our members who are

qualified to fully-integrate one or more robots into a production line.

"It will also offer the end-user peace of mind that the company and integrator they have appointed to undertake the work has both been independently verified carried out the work.

"As things currently stand, anyone can claim to provide systems' integrator solutions, but that doesn't necessarily mean that they are trained or competent to integrate a robot into a system.

"The robot integrators' certification scheme has been developed to allow those companies with the appropriate skills and procedures to distinguish their capability by passing a rigorous audit and onsite checks," he adds.

Companies wishing to gain certification under the new RIA / BARA scheme will be able to download an application form from www.bara.co.uk/certification from April 2019. Upon gaining certification, companies will be eligible to use the RIA / BARA accreditation logo on their on- and off-line display company literature. Recertification will be required every two years.

The aim of BARA (British Automation & Robot Association) is to promote the use of; and assist in the development of industrial robots and automation in British industry, as well as having a presence overseas at the International Federation of Robotics.

In 2009, BARA joined forces with the PPMA (Processing & Packaging Machinery Association). The PPMA Group also comprises UKIVA (UK Industrial Vision Association), which provides strong support



Mike Wilson, chairman of BARA

to assist the growth of the automation sector in the UK.

Founded in 1987, the PPMA Group of Associations ('PPMA Group') comprises the three specialist trade associations of PPMA (Processing and Packaging Machinery Association), BARA (British Automation and Robot Association), UKIVA (UK Industrial Vision Association) and a separate charitable arm, PPMA BEST (Business Education, Skills and Training), which addresses the ongoing skills gap in engineering.

With over 550 member and affiliate member companies, the PPMA Group is the voice of the processing and packaging industry; representing businesses in the UK as well as those exporting overseas. The Group is also a member of several trade alliances to help lobby the UK Government on key industry issues.

At the recent First Friday Editor's Club, Mike Wilson explained the situation regarding the take up of robotics and automation in the UK:

"The British Automation & Robot Association has been around for 38 years promoting the automotive supply chain. It's not just about robot and component manufacturers but more about the automation supply chain. In 2018 robot sales were about 15 percent down, not particularly down to the automotive industry, where demand was still reasonably constant. The general trend is up, but last year we sold less robots to UK manufacturing than 2017.

"The focus in the UK has been on low cost labour, particularly from overseas. Employment is therefore good, but our productivity is not as good as our major competitors, while a proportion of our overseas labour is returning to their own countries, where productivity is improving and economies growing.

"The emphasis therefore needs be on increasing the use of automation, particularly outside of the automotive sector. The Government's industrial strategy in the shape of the "Made Smarter" initiative launched last year has identified that Industry 4.0 could be worth over £450 bn to the UK economy over the next 10 years, with robotics and automation contributing over £180 bn of that total. The other thing the Government has done is to introduce to increase the annual investment allowance to £1 million from 1st January this year, making it more economical for companies to buy equipment.

"The number of robots per 10,000



workers in the UK is significantly less than our competitors in Europe, with 18 percent more installations last year than us. We need to make our manufacturing industry as competitive as possible and that means introducing automation to more applications.

"Collaborative robots have generated a lot of interest in the manufacturing and they are appropriate in some cases. They are considered easier to apply and easier to use, allowing robots to work on the production line alongside people. There are significant opportunities to introduce collaborative robots into the UK, particularly for small batch sizes, with lower payloads and applications needing less precision and, in many cases, they are the right choice. Very often, though, the user chooses to install them without ensuring that they are installed properly and that the correct risk assessments are carried out. Just because it is collaborative, it doesn't mean it is safe.

"There is still a place for industrial robot applications, with sales significantly higher than those of collaborative robots and they will remain so for some years, especially high volume arduous, dangerous tasks where you don't need human intervention. An industrial robot carries more, works faster and is more repeatable, offering a better solution where people are not involved. They tend to be installed by professional integrators, because you need the safety and the control systems around the robots.

"So, despite the numbers, we are seeing a growing interest from users, but there are restraints on the supply chain. I spend a lot of my time walking round factories at the invitation of these users to tell them where they might be able to install robots, the best applications to use them and who they may talk to get the robots they need. They also expect the supplier to come up with the specification they need. This means that the installer doesn't necessarily know what is needed and therefore doesn't deliver the correct solution, but rather what the user thinks he wants.

"This is where BARA comes in, offering advice and producing "How to" guides for companies who want to implement robot systems, with access to independent installers that have the necessary knowledge and expertise to initiate the first steps into automation."

For more information on BARA and the joint RIA / BARA Robot Integrators' Certification Scheme, contact:

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Güdel continues to expand in-house manufacturing to meet growing demand

The Güdel name is recognised worldwide for its high quality and high-performance gantry robot systems and linear motion products. At the heart of this reputation is the company's philosophy of in-house manufacturing, which ensures adherence to the meticulous standards demanded by the company at all stages of production.

As the demand for Güdel's gantry robots and components continues to grow year on year, the company has once again made a significant investment in new machine tools at its Langenthal facility to increase capacity and reduce lead times.

To remain competitive within the global market, companies must continue to invest in modern machinery and the latest technologies. This latest round of machinery purchased by the Swiss-based company has increased manufacturing capacity in a number of areas, which will further consolidate its position as a leading manufacturer of linear motion and gantry robot systems.

Several areas have benefited from the introduction of new machinery. In surface grinding, a previous production bottleneck has been eliminated and processing times have been significantly reduced. The introduction of new continuous processing technology within the Rack Hardening shop has modernised this part of the production facility and increased capacity.

Investment in a new gear-grinding machine has removed a bottleneck in the gear grinding section and has also increased capacity in preparation for anticipated higher volumes.

The wide range of linear motion and gantry robot products manufactured by Güdel requires an equally diverse approach to the types of machine tools needed to



produce these parts. The configuration of linear-motion products is such that the length is often significantly greater than the width and height of the part and, to minimise the number of separate parts needed, it has the capability to manufacture single sections of beam that are up to 14 m long.

However, this means that standard machine tools available on the market often do not meet Güdel's requirements. The standard Y and Z axes of a machine, capable of handling this length, are too long in relation to the milling length required in the X-axis and, as a result, Güdel decided to design and build its own solution.

The company has developed its own long bed milling machine, known internally as the LFM, which is used to machine the large components that form part of Güdel's automation systems. Since the introduction of the first of these unique machines some years ago, Güdel has gone on to build another four of these production machines.

Two are located at the company's headquarters in Langenthal in Switzerland and a further two have been delivered to other Güdel sites to ensure that customers on different continents can take delivery of Güdel's products more quickly. The two latest machines are manufacturing components for local usage on a two-shift system at Güdel's sites in Ann Arbor in

the USA and in Lingang near Shanghai in China.

The performance of the Güdel machines is impressive. Each milling machine has a Reiden milling head that can be used in a horizontal or vertical position. This allows parts in a clamp to be machined on five sides. The maximum spindle speed is 7,000 rpm and the maximum torque is 750 Nm. The machines can meet the tight tolerances of just +/-0.02 mm required for the company's TMF linear axes.

Güdel UK Ltd is the United Kingdom subsidiary of Güdel Group, a global manufacturer of robotic automation products, systems and services. The company supplies linear motion modules, robot track motion units, gantry robots and components to OEM's system integrators and machine builders serving the automotive, aerospace, logistics heavy industrial and power generation industries. Güdel Lineartec UK Ltd is based in Coventry, at the heart of the UK's manufacturing base and provides a comprehensive range of services including: design, engineering, system build, customer support and service.

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FANUC launches medium-sized 'cobot'

A medium-sized robot for handling, picking and packing applications is the fifth model to join FANUC's collaborative robot portfolio.

The CR-15iA benefits from the same integrated sensors and highly responsive 'touch-to-stop' reactive functionality as the rest of FANUC's green 'cobot range'. As such, if the arm comes into contact with a fixed object or person, it gently stops and retracts. A safety system ensures that the robot stops at a maximum of 150 N, however this can be reduced even further if required.

The CR-15iA is able to work safely and cooperatively alongside human operators, without the need for fences or barriers.

Andrew Armstrong, marketing manager at FANUC UK, says: "Our FANUC cobots may be green on the outside, but they're yellow on the inside. By investing in a collaborative robot, manufacturers benefit from the mechanics, control and repeatability of a yellow FANUC industrial robot, but with enhanced safety and sensitivity for effective co-working with humans."

Launched at AUTOMATICA in Munich earlier this year, the CR-15iA mirrors the design and mechanics of the industrial M10iD range, making it easy for users to integrate collaborative robots into the existing robot cells, with the same parts inventory.

With a maximum payload of 15 kg and a reach of 1,441 mm, the CR-15iA bridges the gap between the CR-35iA, the strongest collaborative robot in the world and the small CR-7 range.

In addition to its sensors, which are located on the base of the robot rather than its arm, the CR-15iA comes with flexible mounting options, such as the floor, ceiling or wall.

For manufacturers who are new to collaborative, automated working, the CR-15iA comes with the R-30iB Plus controller, an intuitive user interface that guides operators through the robot's setup and programming. It also has hand-guidance functionality, which allows an operator to lead the robot through handling operations.

Manufacturers can further enhance the



functionality of the robot by integrating: FANUC's iRVision, a visual detection system for managing production settings and the Force Sensor, a detection system for force and torque that allows robots to undertake work previously done by craftsmen.

Andrew Armstrong concludes: "The latest addition to our CR range will open up automated capabilities to new customers across the UK, not just in packaging and palletising, but potentially in quality control as well."

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ABB's new ceiling-mounted SCARA robot delivers maximum flexibility

ABB has expanded its SCARA robot family with the launch of a compact, invert-mounted model for small parts assembly applications.

By mounting the IRB 910INV on the ceiling, manufacturers can increase the space efficiency and flexibility of each cell and handle more complex tasks even in cramped locations. The inverted mounting also allows the IRB 910INV to collaborate with other robots and machines simultaneously, in the same footprint, further boosting productivity.

Utilising ABB's superior motion control technology, the IRB 910INV offers class-leading repeatable accuracy for applications including: picking and placing, assembly and testing. The IRB 910INV will also be certified for cleanroom applications in the future.

Per Vegard Nerseeth, managing director of robotics at ABB, says: "Since we introduced our SCARA robot line, customers have been interested in a ceiling-mounted version that would allow them to make more efficient use of available space. The IRB 910INV satisfies this need, as well as offering the

same superior speed and accuracy they've come to expect from ABB.

"The IRB 910INV is also a reflection of the new design approach we announced earlier this year, which allows us to create a wider variety of robot sizes and variants and combine them into tailored solutions. It will make a great addition to our growing line of small parts assembly solutions."

Two variants of the IRB 910INV are available, one with a maximum payload of 3 kg with 350 mm reach and the other offering a maximum 6 kg payload with 550 mm reach.

ABB is a leading manufacturer of industrial robots and robot systems, operating in 53 countries, in over 100 locations around the world.

In addition to robots, the company manufactures and supplies robot software, peripheral equipment, process equipment, modular manufacturing cells and services for tasks such as welding, material handling, small parts assembly, painting & finishing, picking, packing, palletising and machine tending.

Key markets include: automotive; plastics;



metal fabrication; foundry; solar; consumer electronics; wood; machine tools; pharmaceutical as well as food and beverage industries. A strong solutions focus helps manufacturers improve productivity, product quality and worker safety. ABB has now installed more than 300,000 robots worldwide.

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Updating ALPHACAM slashes machine setups

Software optimises production of Swiss watch components

A Swiss company serving the microtechnology industry, including Swiss watchmakers, has improved production by updating its ALPHACAM CAD/CAM software.

VOH SA says the main focus of its products and services is the management of quality, through adapted production equipment and innovative control systems. "Watchmaking is our main sector, our source of inspiration, and the origin of our development," says Bastien Zbinden, who is responsible for the machining team.

Single watch movement holders are included in its wide range of tools and parts for the watchmaking industry, along with manual tools such as precision screwdrivers. For other industrial sectors, it produces complex metrology and quality control machines, as well as furniture accessories, such as mechanical armrests.

When Bastien Zbinden joined the company, he was tasked with improving the organisation of the workshop and increasing productivity on the company's range of CNC machine tools, including two 5-axis milling machines, three 3-axis mills, a twin-spindle single turret lathe, a 2-axis lathe, and three Swiss lathes.

It is a long-standing ALPHACAM user, having been a customer of the software's Swiss distributor MW Programmation for many years. It decided to update ALPHACAM as well as a number of tools.

Bastien Zbinden says: "Before we embarked on this course of action, when we were running an old program to reproduce parts, it was a time-consuming task for the operator to gather all the necessary information to prepare the setup on the machine tool." He says the programs were poorly listed, the latest version of the drawing was difficult to identify and they



couldn't tell if the previous production run had been as efficient as it could be.

"In short, there were a lot of hazards in production and we sometimes had trouble re-machining past batches." It meant that even for repeat orders, everything was frequently recreated anew.

He also discovered another hindrance to efficient production, the fact that VOH SA is increasingly facing small, specific part batches which require considerable setups on the machines. As the first move in his plan to deliver the required improvements, he liaised with MW Programmation and together they evaluated the situation, resulting in a software update and adapting postprocessors for the different machines.

Bastien Zbinden says: "MW Programmation also proposed a 'File Manager' module, in order to group the programs, the NC codes and all related documents, together in the same database. Personalised documentation has also been created to complete the information for the machine setup."

He explains that these new tools have considerably improved the organisation of the workshop, and increased production efficiency. "When I create a new program, it's now possible to attach the clamps and tool images along with any other photos. Therefore, we have a manufacturing file that's ultra-flexible and easy to set up."

Now, six months after the changes were commissioned, he says he simply



searches for the drawing numbers in the File Manager module and retrieves them easily. "Then I just need to print the personalised document, and I have all the information I need for the job on one page. It's a much easier way of starting the machine setups. And, as a result, there are far fewer programming issues.

"So today, the company has fully optimised the use of its ALPHACAM software to make it an even more powerful tool. Production has dramatically increased and our operators and programmers are excited about this new way of working. They particularly appreciate that they can contact MW Programmation with questions at any time during programming."

Alexandre Mercier, who is responsible for the bar turning team in the workshop, says: "The postprocessor must be perfect. We don't modify anything manually in the NC code. If necessary, we can request modifications from the MW Programmation support team."

Bastien Zbinden concludes by looking at



how they can improve production even further in the future: "We use very little machining styles today. I'd really like to start using ALPHACAM's automation tools and the software's AUTOMATION MANAGER will be very useful for batch processing our standard parts."

WORKNC automates mould maker's weekend production

A mould maker serving the automotive industry says WORKNC software has given it a distinct advantage, setting it apart from its competitors with superior lead-times, quality and expertise. And as a Beta tester for WORKNC, it found that a new item of functionality, subsequently introduced into the latest release, 2019 R1, slashed its finishing machining times by more than half on certain parts.

Operating from three sites in France and one each in Turkey and Slovakia, Julien SA manufactures moulds for interior linings, boot compartment trim and roof linings, along with parts for soundproofing, foamed parts, and aluminium and textile thermal barriers.

The company mainly produces single order parts, or two to three small series moulds for foam parts. Based at its 10,000 sq m head office in Le Creusot, France, programming manager Sergio Couto is responsible for preparing production and implementing the product manufacturing process. His department takes the lead on a range of aspects such as technical issues, monitoring and quality control for tooling production.

Although it makes a small number of moulds for the aerospace industry, most of its customers are major automotive groups who need tight turnaround times. Using

WORKNC's powerful CAD and CAM capabilities, he says practically nothing is impossible from a technical point of view.

The software is installed on seven computers on the company's network and drives three 5-axis machine tools.

Explaining how WORKNC is an integral and vital part of their full production operation, Sergio Couto says the process begins after their programming team receives an assessment from the engineering office with the purchase order: "Firstly, we analyse the CATIA file of the part to be produced, allowing us to isolate items which need to be precise and to determine what's feasible.

"With the aid of WORKNC's CATIA interface we can re-establish the CATIA construction tree, which is crucial, as that data is of paramount importance to our business. WORKNC is one of the rare applications which allows this."

They then turn their attention to the number of parts they need to produce and create the models in WORKNC, adding offset allowances and any other details required for accurate machining.

"The next step is to prepare the production phase and run toolpath calculations. We establish machining schedules and adapt WORKNC toolpaths to the specific machine being used."

However, Sergio Couto says that occasionally they don't know which machines will be available, meaning they need to generate generic toolpaths: "This highlights the importance of Machining Contexts in WORKNC, because we often



have to switch to another machine at the last moment."

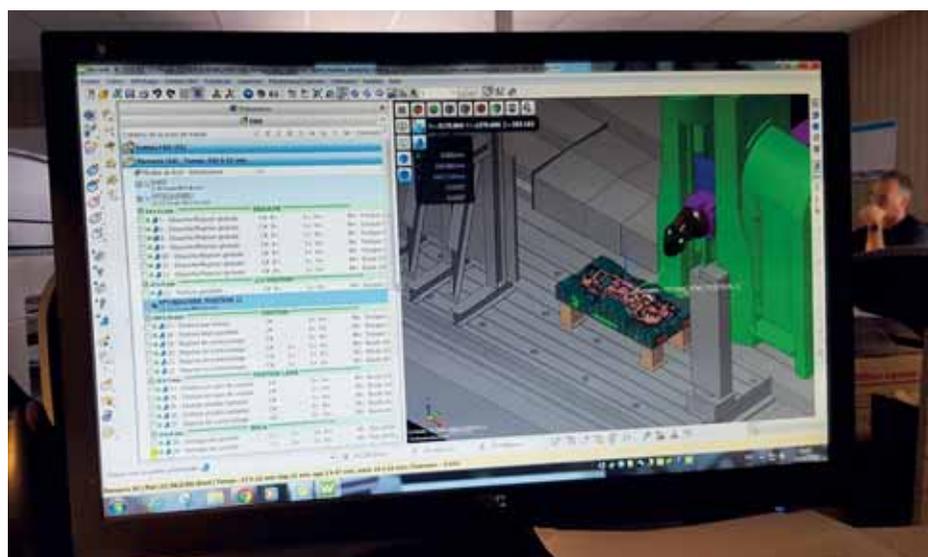
The final phase is in the workshop, where WORKNC's simulation function validates the process before the machines start cutting metal. He says that WORKNC's powerful programming allows them to undertake lights-out machining: "It means the workshop operates 24/7. From midday on Friday and over the weekend, it is fully autonomous, with automatic tool changing and head rotation. We couldn't do that without WORKNC."

As a Beta tester for WORKNC, Julien SA trialed a new finishing strategy which allows users to break free from previous constraints caused by tool shapes, and it has slashed its machining times by more than half. As a result of the trials, WORKNC 2019 R1 adds the Z-Level pattern to the Advanced Toolform technology, allowing for tool shapes like barrels, ovals and parabolic to be calculated over the part surfaces, including negative allowances.

Sergio Couto says the results of the company using the Advanced Toolform strategy with circular-segment cutters compared to traditional methods, are indisputable, having reduced its finishing machining times from 32 hours to 14.

WORKNC, part of the Production Software business of Hexagon Manufacturing Intelligence, is fully integrated into every machining phase; analysis, comparison, simulation, machining and verification.

The company has also invested in a mobile measuring arm from Hexagon, to make precise measurements at different stages of the manufacturing operation. It enables them to make immediate decisions to either modify or continue the process when a doubt arises.



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Tebis celebrates 35 Years of fast and efficient digital manufacturing technology

This year Tebis shall be celebrating 35 years at its Open House in Munich on 8th-9th of May. For over 35 years, Tebis group has proudly presented its capabilities in CAD/CAM and MES software with associated services for mechanical component, model, pattern, tool die and mould manufacture. It serves a number of industries including aerospace, automotive, motorsport and oil & gas industries. During the two-day Open House, Tebis, together with the technology partners, will present technologies to help your company gain future success, examples of end-to-end manufacturing processes and the latest advances in its software. There will be high-profile presentations by customers, practice-oriented presentations of new product development, inspiring discussions with Tebis consultants and opportunities to network with experts and colleagues from many different industries.

The secret of success

Bernhard Rindfleisch, one of the founders of Tebis, had a vision in 1984. He wanted to make computer-supported NC technology available to small and medium-sized companies. In just a few years, he introduced Version 1.0. Tebis brought the first MS DOS-based 3D CAD system into the world market. This system was controlled by a graphic input tablet overlaid with a paper



“user interface” for calling up functions. It was the first 3D CAM system in the world.

Bernhard Rindfleisch explains: “The Tebis software is the foundation of our success because it sets global standards for the highest quality and productivity with outstanding functions. We have continuously optimised our software solutions over the years, especially for customers in die, model and mould manufacturing.”

Tebis’ projects were growing quite rapidly and within just two years, after the release of the Version 1.0, Tebis introduced Version

2.0 with an interactive on-screen menu. 12 months after in 1990, the CAD/CAM experts presented the new Version 2.1 which was a real sensation at the time due to the possibility to mill across any number of surfaces.

In 1991, Tebis provided comprehensive CAD/CAM and CAQ software with the integration of Automill and quality assurance functions. The company was converted from a limited-liability GmbH to a corporation, Tebis Technische Informationssysteme AG. With its Automill® technology, Tebis made a significant contribution in the 1990s to accelerating NC programming in model, mould and die manufacturing.

Bernhard Rindfleisch says: “Since 1984, the year Tebis was founded, we have often managed to be at the forefront of futuristic technology trends. An example of this is Tebis Automill, a technology that supported the NC programming of complete parts across multiple surfaces as early as 1990 or the Tebis NC simulator. This was the very first technology that enabled the realistic simulation of toolpaths with complete collision monitoring of all machine components based on virtual machine models.”

For the next three years, Tebis concentrated on developing a new release version with more complex attributes to expand the business. In 1993, Release 3 was



introduced and, at the same time, the company opened subsidiaries in Sweden, Italy, France and USA and its office in Hamburg.

In 1997, Tebis had presented Version 3.1 and this allowed the company to calculate the toolpaths on mathematically accurate CAD surfaces, a major benefit for surface quality, and a unique characteristic that still distinguishes Tebis.

Dr Thomas Wrede says: "A central trend is the internationalisation of the markets. When new CAD/CAM products are developed in less and less time, and more and more people draw upon a common knowledge pool, automation and standardisation become especially important. We are working intensively to facilitate work with structured processes and to ensure the reliability of those processes."

Within the next five years, Tebis moved to its stand-alone office building in Martinsried and brought a completely revised design technology to the market with Version 3.2. As the years went by, the Tebis group opened other subsidiaries in Great Britain, Spain, Portugal, Canada and China in 2012.

Another Version, 3.4, was presented in 2008 supporting a new and uniform platform for all applications including machine simulation and finally, in 2015, Version 4.0 provided a new user interface specifically developed for CAD/CAM applications, an industry-oriented product structure and a new platform for NC automation.

Bernhard Rindfleisch explains: "Now Version 4.0 is setting new standards. With an innovative user interface and a broad spectrum of automation functions, we can further simplify our customers' processes and improve their competitiveness. Tebis doesn't just provide the software, we also ensure its correct integration in the customers' individual processes."

Today, Tebis employs approximately 300 employees around the world and generates revenues of roughly 38 million Euros annually. Tebis' software is being used successfully at nearly every automotive manufacturer around the world and at more than 1,500 vendor firms. Its customers include: Aston Martin, Jaguar Land Rover, Bentley, Interform, APH3G, Airbus, UTC Aerospace Systems, Liebherr, Porsche, Audi, Daimler, BMW, VW, Tesla, Ford, Opel, Chrysler, Seat, Volvo, Saab, Honda, Toyota and Hyundai.

Based on modern company structures, the company can offer much more than just software, it works responsibly and follows clear principles, wholly in the interest of its customers.

Tebis process solutions give you a lasting technological and competitive edge. The company is a well-established partner for over 2,000 customers in high-efficiency design and manufacturing chains, with over 1,000 consulting and implementation projects and nearly 9,000 installed workstations. Creative engineering has been the formula for success for over 30 years at Tebis, an inspiring leader in technology and process innovation in the world of design and industrial manufacturing.

You can register for the Open House in May by contacting the Tebis team at info-uk@tebis.com or call 024 7615 8178. For further information regarding the Open House or Tebis products and services, visit the company website: www.tebis.com/uk/en/.

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Soaring to new heights with JETCAM

I-Cherng Refrigeration Industrial Co, based in Taiwan, manufactures heat exchangers for refrigeration products. The company was founded in 1974 and, in 1995, purchased JETCAM Expert alongside the Finn-Power Shear Genius punch press. Ian Yo, senior engineer, says: "Our first impression was that the JETCAM interface was very user-friendly."

Since the initial purchase of JETCAM, I-Cherng has purchased several further CNC punch and laser machines, Finn-Power SG6 and LP6, each time adding a postprocessor to their JETCAM license and, in 2015, it added two additional seats of JETCAM Expert.

In July 2018, the company purchased an Amada FLC 4020AJ Fiber Laser, which was supplied with alternative programming software. The machine arrived in July, but immediately the company encountered problems with the software.

Ian Yo explains: "We chose the Amada Fiber to improve our quality and productivity, having had previous positive experience of their machines. However, the original software supplied with the machine did not consider the characteristics of fibre laser cutting and still appeared to use CO₂ laser logic. There were many unnecessary codes in the NC programs. Also, it was not user-friendly. Staff had to spend time deleting unnecessary codes and some programs could not cut the parts well. We



could easily spend over four hours to modify the NC code in order to get it to run on the machine."

The following month, I-Cherng contacted JETCAM to ask if a postprocessor was available for the machine. It was and in the same month the post was installed remotely and the software upgraded to v20 across the company's three licenses.

Further tweaks were made remotely to the postprocessor in order to accommodate

the specific requirements and machine configuration, with test parts cut using NC from both JETCAM and the originally supplied software for comparison. Ian Yo noted that the resulting NC, generated automatically from JETCAM, was much shorter.

Immediately, the company noticed significant benefits. Programming time was reduced by 80 percent, as pre-defined technology tables automatically applied cutting conditions based on material, thickness and quality settings. Tooling and profiling logic could be applied automatically to parts for both punching and laser technologies, ensuring that parts were available for nesting on either machine. Features such as S.C.A.P (Single Component Automatic Processing) and S.C.A.N. (Single Component Automatic Nesting) allowed for multiple components to be imported, tooled and complete nests of each part to be created fully automatically in seconds.

Additional material savings have been achieved by employing common cutting to separate components with a single cut.

Ian Yo says: "With the previous software, we had to specify each common cut manually, but with JETCAM it's fully automatic. We've seen material utilisation improvements of between five percent and 30 percent."



Expert v20 also included two new features; JET-Cut and JET-Optimizer. JET-Cut provides automatic fly cutting, also referred to as grid cutting, based on pre-determined parameters. It intelligently locates grids of internal holes and then splits the cutting into separate short line segments that lie on the same line or circle. The cutting head is kept down during movement and the laser beam is switched ON/OFF on the fly, which dramatically reduces the cutting time of grids, etc. Rounded movement between cuts can be applied as the laser head moves to the next row, minimising acceleration changes. Once configured, the entire process is automatic and is applied with a couple of mouse-clicks.



JET-Optimizer highly optimises the sequence of cutting internal holes to minimise machine movements, while also avoiding travel over previous cut areas. Ian Yo notes: "This is a really worthwhile function that drastically reduces the risk of collision."

In comparison to the same nests generated with the originally supplied software, machine run time was reduced by 13.2 percent using JET-Cut, significantly improving the throughput available.

Ian Yo says: "Now, using JET-Cut, the full capabilities of the Amada Fiber laser can be realised, ensuring that we can achieve high cutting speeds while maintaining quality."

JETCAM Expert has seen significant advances in its user interface in recent years, but Ian Yo felt that the ethos behind the interface had not changed, with other staff agreeing: "We've already been using JETCAM for over 20 years and our engineers are familiar with JETCAM operating logic. The learning curve for the new interface was very short."

The company has written its own ERP system and imports information to it from JETCAM's automatically generated nest reports.

Ian Yo says that support has been excellent: "It's been fast and professional. I was really impressed with the speed of response and I should emphasise the ability to solve any problems quickly. Other vendors are far behind JETCAM in this regard. Also, we would often receive videos instructing us how to perform certain functions. We also have access to JETCAM's 'University' of online video tutorials, which allows us to view short videos on specific functionality."

I-Cherng is considering future investment in either more fibre lasers or Punch/Laser combination machines and has already taken the decision that JETCAM will be driving their selected technology. Ian Yo concludes: "With the combination of the massive reduction in programming time, material savings and additional throughput on the machine, we calculated our ROI on the upgrade of under four months."

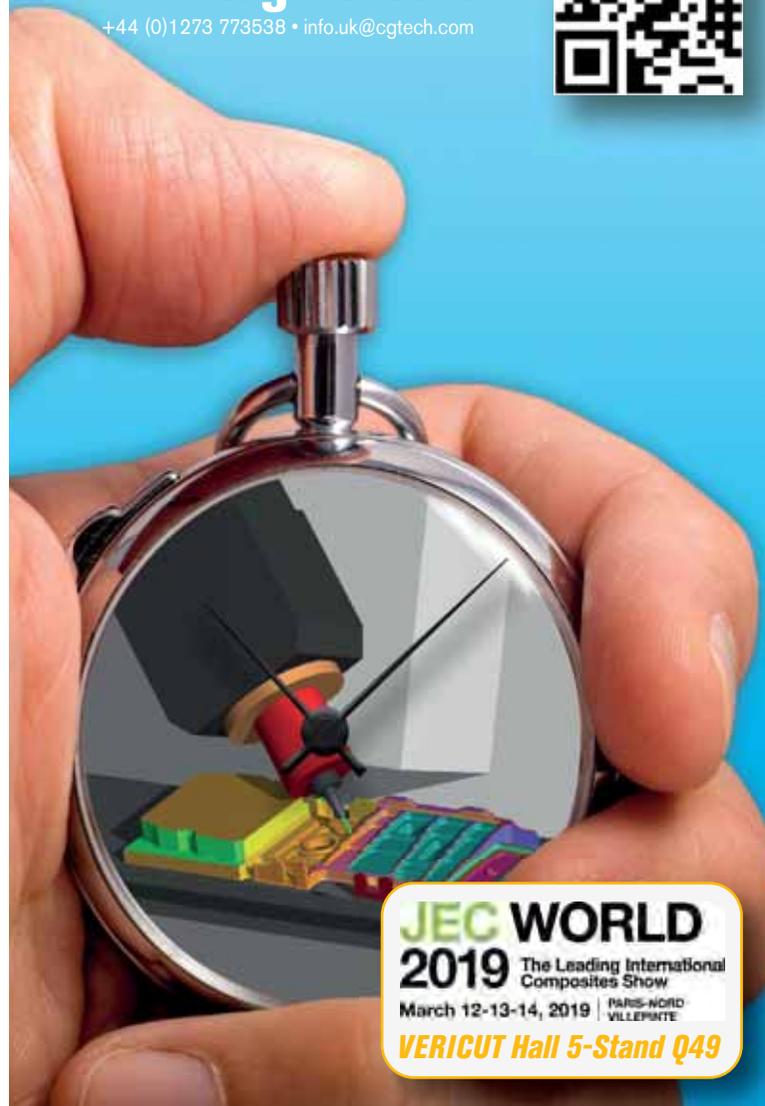
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CAD/CAM suite and high-performance package expanded

The latest version of the hyperMILL® CAD/CAM suite, 2019.1, is now available. OPEN MIND, one of the leading manufacturers of CAD/CAM solutions, has expanded the finishing module in its hyperMILL MAXX Machining performance package. Further highlights include process optimisations as well as new functions for reducing calculation times.

'5-axis Prismatic Fillet Finishing' is a new function in the finishing module of hyperMILL MAXX Machining. Thanks to the geometry and automatic setting of the barrel cutter, this feature can be used in accordance with the principle of a high-feed milling cutter.

The processing takes place in a plunging and pulling movement with an extremely high feed and this allows the highest machining performance possible with high-performance conical barrel cutters, also called circle segment or parabolic cutters. Ball and radius cutters can also be used efficiently with this strategy.

Process optimisation at a glance

Thread milling options have been completely redesigned for hyperMILL 2019.1 to improve convenience and user friendliness for the programmer. The module supports a variety of different thread milling cutter types and allows extremely easy selection of right-hand and left-hand threads or the definition of the milling direction from bottom to top or vice versa. The thread milling feature also offers automatic approach and retract macros, a selection of roughing options and simplified programming.



Changes without recalculation

hyperMILL manages the order of the processing steps with job IDs. Changes to these job numbers have so far resulted in recalculations, these are now avoided to save time. The improvement in job management now means that a job ID can be changed without having to subsequently recalculate the machining job in question. The consecutive numbering of the compound and machining job is controlled via a start value and an increment value. The benefit of this new feature is transparent structuring and reduced calculation times. The clamping position can now also be changed later without the machining jobs having to be recalculated.

Improved management of standard and special tools

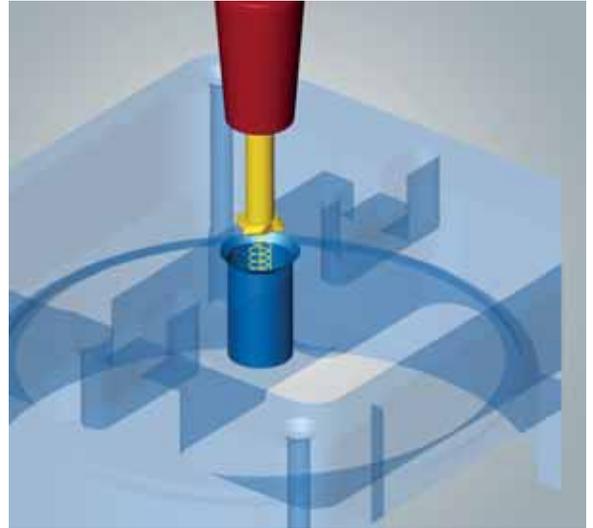
The tool database in hyperMILL has received a small but fine improvement. Until now, there was only one comment field. In Version 2019.1, users have the option of individually expanding the tool database. As a result, information such as order numbers, prices or service life can now be clearly stored and the CAM programmer is able to manage tools even better than ever before.

CAD for CAM specialists

hyperCAD®-S is the CAD component of the hyperMILL-Suite that is optimised for CAM requirements. In Version 2019.1, polyline management has been added. This allows programmers to apply all CAD functionalities such as lengthening or trimming to the element type polylines. Like all other elements, polylines can be edited with trimming, merging, orienting or selecting.

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

OPEN MIND develops optimised



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

OPEN MIND strives to be the best and most innovative CAD/CAM manufacturer in the world, helping it become one of the top five in the CAM industry according to the NC Market Analysis Report 2018 compiled by CIMdata. The CAD/CAM solutions of the company fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America and is a Mensch und Maschine company.

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CGTech to debut VERICUT Composites V8.1.2 software

At the 2019 JEC World show, held in Paris, France in March, CGTech will demonstrate how advanced programming strategies and simulation can lead to better composite parts. Throughout the show, the company will also showcase Composites V8.1.2, the latest version of VERICUT Composite Programming (VCP) & VERICUT Composite Simulation (VCS).

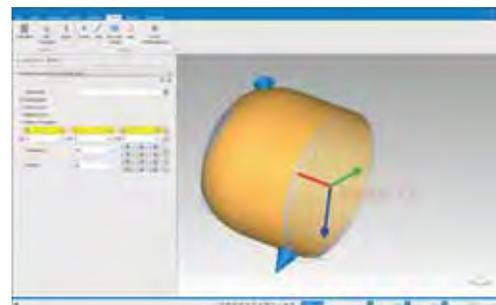
CGTech's Composites V8.1.2 release of VCP and VCS features a completely redefined Graphical User Interface (GUI), enhanced suite of programming and analysis tools and redefined methodology through the use of the powerful new Laminate Manager. The Laminate Manager helps users easily manage files, processes 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.

The aerospace industry continues to push for lighter, faster and more cost-effective

parts. To support these goals, VCP now puts more power into user's hands. With more information available than ever before, part programmers can generate and export part statistics directly from VCP. The addition of the all-new summary reports allows engineers to compare different layout strategies and feel confident the optimal design prevails.

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

CGTech will also exhibit its latest version of VERICUT software. VERICUT 8.2 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.

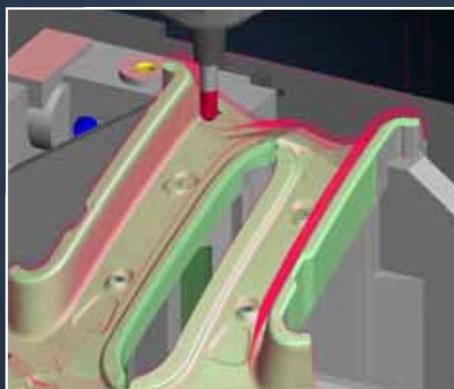
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SmartCAM v2019 released



SmartCAMcnc has announced the release of SmartCAM® v2019. The SmartCAM software family consists of applications for CNC milling, turning, fabrication and wire EDM.

SmartCAM v2019 delivers new Adaptive Solid-Pocket and Solid-Planar Processes in the SmartCAM Advanced Milling™, Advanced Turning™ and Freeform Machining™ applications, providing consistent-engagement high-speed milling toolpath for roughing solid or surface models. Also included are many customer-requested changes to the SmartCAM user interface and core functionality. Additionally, a variety of improvements have been made to NC code generation in order to provide added flexibility.

New Adaptive Solid-Pocket Process

Doug Oliver, senior product manager at SmartCAMcnc, says: "Following the well-received integration of adaptive roughing technology to our wireframe processes in v2018, we're excited to be continuing that with our solids processes in v2019. Our Advanced Milling and Turning and Free Form users will now be able to quickly and easily create high speed adaptive milling toolpath directly from a solid,"

The new Adaptive Solid Pocket Process is used to create consistent-engagement high speed rough milling toolpath when pocketing on solid or surface models.

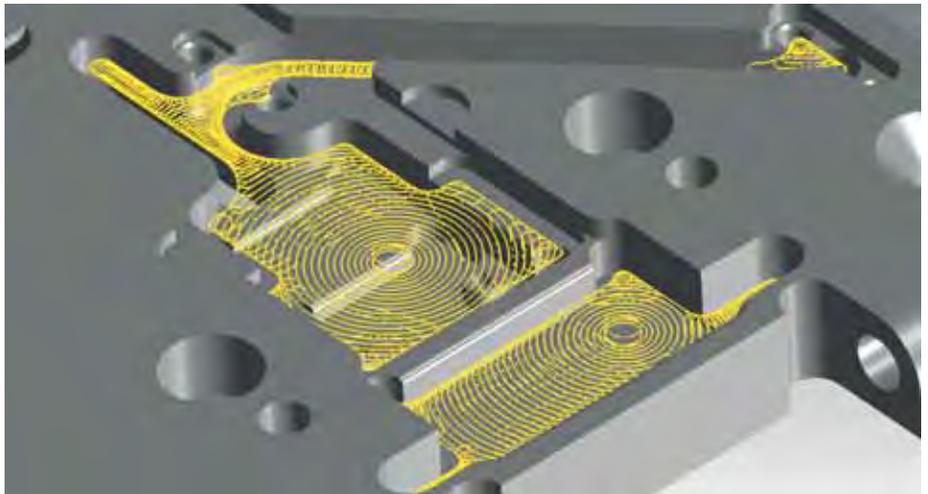
The CAD solid model may contain single or multiple closed pocket features and can be comprised of any number of islands and 'shelves'. Pocket walls can be vertical or drafted and bottom fillet radii are supported by the process.

New Adaptive Solid Planar Process

A new Adaptive Solid Planar Roughing Process has also been added to the adaptive milling toolpath modelling task set.

The process is used to create a consistent-engagement, high-speed rough

milling toolpath when it is required to remove material from a stock volume on solid or surface-models. The model may consist of any combination of core and cavity features, with open or closed, blind or through regions and can include any number of islands and 'shelves'. The process is suitable for roughing simple prismatic parts through to complex-surface moulds and dies.



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 has provided toolpath modeling and CNC programming for prismatic production work

Doug Oliver says: "We have had many users provide positive feedback on their experiences using the adaptive processes and we anticipate they will find the solid pocket and planar adaptive processes even more productive."

SmartCAM user interface improvements

SmartCAM v2019 benefits from detailed changes that deliver, to SmartCAM applications, a further refined and refreshed appearance, as well as improved ease-of-use. The size of toolbar is easily set by right-clicking on it and using the fly-out menu to select a large, medium or small setting for that toolbar. An option has also been introduced to allow the display of text around the icon used on toolbar buttons. A toolbar set stores the Toolbars that are enabled in the user interface, where they are located on-screen, their orientation, the icon size for each toolbar, whether button text is displayed and where it is positioned as per the user's preferences. The ability to zoom the graphics view to the extent of the selected "Active" group is a further, additional added benefit.

Customers who have purchased any of

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.

SmartCAMcnc is an Oregon-based company that develops and markets the SmartCAM suite of CAM software for the benefit of its worldwide customer base. Gregg Olson, founder and president of SmartCAMcnc, has been involved in developing CNC programming systems since 1979, with over two decades of experience in various product development capacities for Weber Systems, Point Control, CAMAX, and SDRC.

SmartCAMcnc

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Geodesic and deburring technology delivers enhanced machining quality and efficiency

ModuleWorks, a leading supplier of CAD/CAM software components for machining and simulation, has announced that 3D Systems has extended its Cimatron® and GibbsCAM® software capabilities with ModuleWorks geodesic and deburring technology. The ModuleWorks technology enables 3D Systems to offer enhanced workflows that increase the quality and efficiency of 5-axis machining.

3D Systems already uses ModuleWorks' 5-axis software components for 5-axis continuous advanced toolpath generation and this latest integration project extends the ongoing and successful partnership between the two companies.

The ModuleWorks geodesic machining toolpath processor is the next evolution in pattern generation. It uses a global distance field, without a fixed direction, to provide full flexibility for calculating different pattern types whilst maintaining consistent distances between the cuts for improved surface quality, even in undercut situations. At the core of the processor is the innovative distance field, which enables advanced features for automatically creating guide curves based on the input geometry as well

as collision-free pattern generation even in sharp inner corners and strongly curved areas with multiple surface patches. Intelligent features such as, boundary detection for guide and containment curves as well as extensions and hole-filling, further optimise the efficiency and quality of the machining process.

3D systems has integrated the ModuleWorks deburring component to help accelerate the finishing process. ModuleWorks' automatic feature detection, linking, lead-in and collision avoidance enable users to simply select the part geometry and the ModuleWorks software automatically creates the deburring toolpath along the outer edges.

Roy Sterenthal, vice president of software at 3D Systems, says: "The ModuleWorks geodesic and deburring components expand the capabilities of our industry-leading Cimatron and GibbsCAM software. With these enhancements, our customers are able to improve machining efficiency and produce parts with enhanced surface quality."

Yavuz Murtezaoglu, managing director of



ModuleWorks, adds: "It's great to see how our software components continuously advance the technology of our partners. We look forward to our continued successful cooperation and to further developments in the technology."

The 3D Systems Cimatron and GibbsCAM software, with integrated ModuleWorks geodesic and deburring technology, is planned for general release in 2019.

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FARO's 4 x metre Quantum ScanArm was the ideal portable CMM for our needs. It shares many of the qualities of our existing FARO portable CMMs, although the new Quantum ScanArm boasts the latest FAROBlu Laser Line Probe HD and delivers even faster scanning times.

"As our new FARO portable CMM will be used throughout our production areas, it helps that the QuantumM is much lighter and easier to manoeuvre than our existing models.

"Now installed and fully operational, our new FARO Quantum ScanArm is making an excellent contribution to our crucial inspection operations. Whereas in the past we needed to make several scanning passes to capture all of the required data related to a large component, the FARO Quantum ScanArm is able to complete the same scanning routines in just one to two passes. In-fact its speed and ease-of-operation means that, without compromising on accuracy, we have cut our scanning inspection times in half."

Ideal for companies that want to maximise manufacturing productivity, reduce scrap levels and improve their quality control functions, the Quantum FaroArm is an advanced portable coordinate measuring machine that meets the most rigorous ISO 10360-12:2016 measurement standard in the world.

The robust Quantum FaroArm has been designed to withstand the harshest shop-floor environments and to deliver market-leading reliability and portability, along with plug-and-play 3D laser scanning integration with optically superior FAROBlu™ technology. The use of this next generation of blue laser technology delivers unparalleled non-contact measurement capabilities, providing the



highest fidelity point cloud data at high speed. It allows operators to seamlessly scan across diverse surface materials regardless of contrast, reflectivity or part complexity without any special coatings or target placement.

The Quantum is easy to manoeuvre and is always ready to use as it requires no warm up time. This immediate availability ensures improved productivity in user's inspection, design and manufacturing processes by enabling operators to work longer and more comfortably.

The Quantum enables continuous operation anywhere on the factory floor with industrial grade wireless connectivity and dual, hot swappable batteries that negate the need for external power.

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Vision Engineering doubles warranty on 'Mantis' eyepiece-less microscope

Vision Engineering has announced that it is doubling the manufacturer's warranty from 12 months to 24 months for all new Mantis eyepiece-less stereo microscopes. All systems bought from 1st December 2018 are covered by the new 2-year manufacturer's warranty and the warranty applies globally. The Mantis range includes Mantis Compact, Mantis Elite and Mantis Elite-cam.

The original eyepiece-less stereo microscope, Mantis revolutionised quality inspection when it launched in 1994. It was an ergonomic revolution that went on to win numerous design and innovation awards. In the intervening quarter of a century, Mantis has undergone numerous innovations, in appearance, capability and applicability, maintaining its status as market leader.

Mantis serves the needs of customers globally and has applications in electronics, medical device manufacture, plastics, dental equipment, automotive, aeronautics and life sciences markets.

Commenting on the warranty extension, Mark Curtis, managing director of Vision Engineering says: "We are delighted to announce the extension of our

manufacturer's warranty on Mantis systems. It is a significant declaration of our confidence in the quality of our product and our commitment to remaining at the forefront of inspection technology quality."

Vision Engineering Ltd is a global leading-edge manufacturer of patented ergonomic stereo microscopes, digital microscopes and non-contact measuring systems. Company headquarters are based in Send, Woking, UK, with manufacturing facilities in the UK and US.

Mantis is a low magnification visual inspection microscope, providing truly superb 3D view with enhanced depth perception that allows operators unparalleled freedom of head movement:

Featuring Vision Engineering's patented expanded pupil technology, Mantis is the stereo viewer of choice for a wide range of inspection, manipulation or rework tasks requiring magnification, serving customers around the world and across a wide range of industries.

Mantis Compact is the little brother of the family with all the benefits of comfortable viewing and enhanced depth perception in a compact package.



Mantis Elite packs a bigger punch with a wider range of magnification, larger field of view and quick-change lens turret for efficient operation.

Mantis Elite-Cam HD tops the range adding all important image capture, vital in so many production, quality and other working environments. Combining the ergonomic benefits of unique eyepiece-less technology with the imaging power of an HD camera, Mantis Elite-Cam HD is the ideal solution for inspection, reworking and reporting.

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Baty Profile Projector ensures quality for magnetic technology experts

Bowers Group has provided Eclipse Magnetics with a Baty SM350 FT2-E Profile Projector and Fusion Software for the accurate testing of tolerances on a range of magnets and magnetic components. As leading experts in magnetic technology, Eclipse Magnetics manufactures a wide range of high-performance magnetic materials, finished products, and magnetic assemblies, as well as a range of over 20,000 off-the-shelf standard magnetic products available in stock.

The Baty SM350 FT2-E Profile Projector has greatly improved Eclipse Magnetics' quality inspection capabilities. As well as checking the tolerances of stock parts, Eclipse Magnetics regularly uses the profile projector to measure fundamental components that make up liquid filters; high intensity magnetic separators used in pressurised transfer lines for the food industry. One of the components regularly tested is a collar that fits onto a length of magnetic tubing. The precision and accuracy of this collar is imperative to the secure reinforcement of this tubing and a key factor in the effective operation of the product. Tolerances are tight and therefore, precision measurement is key.

The Baty SM350 FT2-E Profile Projector is also used to measure magnetic blocks and disks that are used as part of OEM magnetic assemblies for a variety of industries that typically require extremely strict tolerances. Ensuring precise sizing, traceable reporting and tolerance conformity is, therefore, imperative. Customer demand for FAIR reports has also been satisfied with the Fusion Software, delivering a traceable reporting system that offers customers evidence of tolerance parts.

Paul Hampson, quality engineer for Eclipse Magnetics, says: "The Baty SM350 FT2-E Profile Projector has enabled us to measure complex shapes, radii and angles, which we have never had the capability to measure before. Although we have always been confident that our products are highly accurate and meet stated dimensions, the assurances we get from the Baty SM350 FT2-E Profile Projector allow us to provide concrete evidence to our customers. In the unlikely event that discrepancies are raised, we can produce reports to show that we have met the highest quality standards."

The accurate testing of tolerances on stock parts is a necessity for ensuring Eclipse Magnetics' high-quality standards. In addition, ensuring the tight tolerances of key components that make up Eclipse Magnetics' products is not only imperative to the reliability, safety and operation of the products, it is also necessary to provide customers with assurances that quality standards are met and tolerances are proven.

The readings obtained from the Baty SM350 FT2-E Profile Projector enables Eclipse Magnetics to prove to customers that components are within quoted tolerances. The addition of the Fusion Software to the profile projector also enables Eclipse Magnetics to generate graphical representations and instant detailed reports showing the feature name, nominal dimension, actual, error, upper and lower limits, including a green pass or red fail label for each measured dimension in tabulated format. Geometric tolerance details can also be displayed along with a



thumbnail view of the part and batch/customer information and the entire report can be duplicated as an Excel workbook for email purposes.

Paul Hampson concludes: "The measurement accuracy of the profile projector is reliable and consistent. The unit is also very user friendly and requires minimal training. As a validating and checking tool it's perfect for us; the accuracy it provides and is capable of achieving is absolutely outstanding."

Eclipse Magnetics has over 100 years of experience in the design and manufacture of high-performance magnetic systems, serving worldwide markets with innovative solutions such as industrial filtration, foreign body removal, customised magnetic assemblies, lifting and handling, workholding, workshop tools and heating system filtration.

Based in Sheffield with offices across the world, Eclipse Magnetics manufactures a wide range of high-performance magnetic materials and finished products and magnetic assemblies, including neodymium magnets, samarium cobalt magnets, ferrite magnets and alnico magnets. Extensive facilities allow Eclipse Magnetics to provide customised magnetic assemblies design and build solutions working to precise client specifications, as well as a range of over 20,000 off-the-shelf standard magnetic products which are available in stock.

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New DAQ system from HBM

Now available from HBM, a leader in the field of test and measurement, is the new GEN2tB portable measuring module, designed for high-speed measuring technology with sampling rates of up to 250 MS/s.

Featuring a modular design, the GEN2tB Data Acquisition System is suitable for use as an entry level model but can also be used as a high-end transient recorder, or even in mixed applications. Furthermore, the device has 2 slots, making it a cost-effective choice for small channel counts.

Compact in size, yet powerful in use, the new GEN2tB system is suitable for both mobile and stationary use and can also be expanded to accommodate up to 12 voltage, or current, channels, 16 high-speed sensor channels or up to 24 channels of fibre optic digitisers.

The Genesis Data Acquisition System also includes free Perception standard software, which enables the secure streaming of very large amounts of data, at a speed of up to 200 MB/s on the hard disc. This unique software allows users to access saved data,

even during running measurements whilst recording continues in the background.

Genesis HighSpeed from HBM is the modular platform for fast measurements of electrical and mechanical parameters. Featuring modular architecture, it is equipped for any high-speed measurement task. Typical applications include the testing of electrical networks (eGrids), electrical drive trains (eDrive), as well as ultra-fast mechanical testing and electrical transient detection.

The Genesis HighSpeed range of transient recorders and data acquisition systems from HBM share the highest sample rates and mid to high channel counts. Based on modular platforms, all models can be configured to the need of the application, be it a single channel or a thousand. All systems in the Genesis HighSpeed range from HBM are available out-of-the-box and are ready to use immediately.

HBM's product range covers sensors,



transducers, strain gauges, amplifiers and data acquisition systems as well as software for structural durability investigations, tests and analysis. The potential fields of application can be found in every branch of engineering and industry in both virtual and physical test and measurement.

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Why use Granite?

UK sales manager at Wenzel Metrology UK, Mark Marrable runs over the benefits of using the material as a core metrological base

Granite has long been used in 3D coordinate metrology as a solid foundation to build from. Used in applications which demand high precision, no other material naturally fits as well as granite to the requirements of metrology. With high, long-term stability and durability properties, the rock is the ideal component for production-related environments, which cannot afford to experience any costly periods of downtime.

However, while the material is generally quarried for its extreme strength, density and resistance to corrosion, granite is also a very versatile rock, which can be moulded into all shapes and sizes. At Wenzel Metrology UK, granite is the primary building material for all of our machines precisely for this reason. It is the cornerstone of our company, which is overseen as soon as the rock leaves the quarry. From rough cut to grinding and hand lapping, we control all of the manufacturing processes required to build a machine. Doing so gives us our business ultimate flexibility, granting us the



capability to mould custom products that fit our clients' needs to a tee.

For instance, if you make long, thin parts, say 150 mm x 150 mm x 3,700 mm, a machine can be built exactly to those needs just as easily as you could build to stock size. Due to the raw material and the complete process being controlled from start to finish,

you have the flexibility to create an effective stock machine for your custom application.

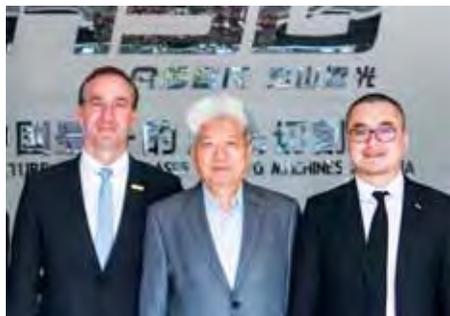
Conversely, if you have a room that will only fit a machine that is 3,500 mm x 3,500 mm x 2,200 mm, you can make a product that fits those constraints while maximising the measuring volume of your parts. Or maybe you make parts that for their size, say a cube of 1,000 mm, are very dense. Possibly weighing as much as 12,000 lbs. A machine could be built with a thicker plate that will accept these heavier loads, without having to increase the overall size of the machine.

With the demands of clients only getting more and more precise, we firmly believe in the usage of granite as a long-term choice for measurement engineers.

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XLase officially unveiled

After its premiere at EuroBLECH in October 2018, XLase GmbH has now been officially introduced at HSG Laser's headquarters in Foshan, China



The former Chinese ambassador to Germany, Ma Canrong (centre), then met with Thorsten Frauenpreiß (left), managing director of XLase GmbH, and Yong Chang, general manager of Foshan Beyond (HSG) Laser Technology Co., Ltd

In the presence of customers, partners and suppliers as well as representatives from business and politics, XLase GmbH was recently presented as the European bridgehead and new flagship brand of HSG Laser. Ma Canrong, the former ambassador of the People's Republic of China to Germany, who was also among the visitors, emphasised the importance of technological cooperation and cultural exchange between China and Germany and congratulated the company on this exciting step into the European market.

XLase GmbH in Hamburg, founded in September 2018, is the entry window to Europe for the parent company HSG Laser. HSG Laser is one of the world's largest manufacturers of fibre laser cutting systems and pursues a consistent internationalisation strategy. Above all, Europe, with its many strong and innovative markets in machine tools and sheet metal working, is an essential part of it. In addition to the further expansion of its sales network in Europe, the focus is on strengthening the service organisation and the quality of spare parts availability.

Thorsten Frauenpreiß, managing director of the Hamburg-based laser start-up, says: "Only with a coherent overall package of quality, performance and after-sales service is it possible to be successful in the highly competitive and demanding European markets."

He is confident that XLase is excellently positioned to compete with existing suppliers and, at the same time, open up

completely new market segments thanks to its technological performance and attractive pricing strategy.

Thorsten Frauenpreiß also trusts in the continued remarkable pace of innovation of the company, which was founded twelve years ago. New solutions in the field of machine control and laser beam guidance, namely the cutting head, were presented at the company's celebration. The new "XCon X" control system is characterised by a modern and intuitive user interface that can be used for all fibre laser cutting systems across platforms and meets the latest requirements in terms of interfaces, communication and Industry 4.0.

The new laser cutting head, "KLINGE", underlines the competence of the machine manufacturer. Also, in the laser-optical field, the entire cutting head, including the distance sensors, was developed in-house and guarantees the best possible interaction

predecessor series: "It was important for us to carefully further develop the success characteristics of the predecessor and, at the same time, not only create the basis for an evolution through new ideas and innovations, but also to bring about a revolution."

The machine is characterised by speeds of 100 m/min and an acceleration of 1G and it contains many other innovative ideas that make the work more productive. These include a revised supply unit, a significantly improved, separated extraction system and the optional integration of the "KLINGE" cutting head together with the "XCon X" control system. In addition, the machine is extremely compact and modular in design, which simplifies transport, installation and service.

The machine is currently in an extensive test phase, which will be accompanied by TÜV Rheinland. State-of-the-art safety and



XCut G3015X - After finishing the test phase accompanied by TÜV Rheinland, the new "XCut GX" machine series will be available to customers in Europe from mid-2019

with the machine. The result is maximum reliability and performance as well as clever solutions in cutting processes. The KLINGE cutting head is available for laser powers of up to eight kilowatts.

However, the highlight of the event was the newly developed laser cutting series "XCut GX". It's predecessor, the GA series, is the company's bestseller with several thousand installations worldwide.

Thorsten Frauenpreiß comments on the new product, which is intended to seamlessly continue the success story of the

communication concepts are therefore integrated right from the start and promise a high degree of future security, which is of great importance especially in the European markets. After completion of the test phase, the "XCut GX" will be available to customers in Europe from mid-2019.

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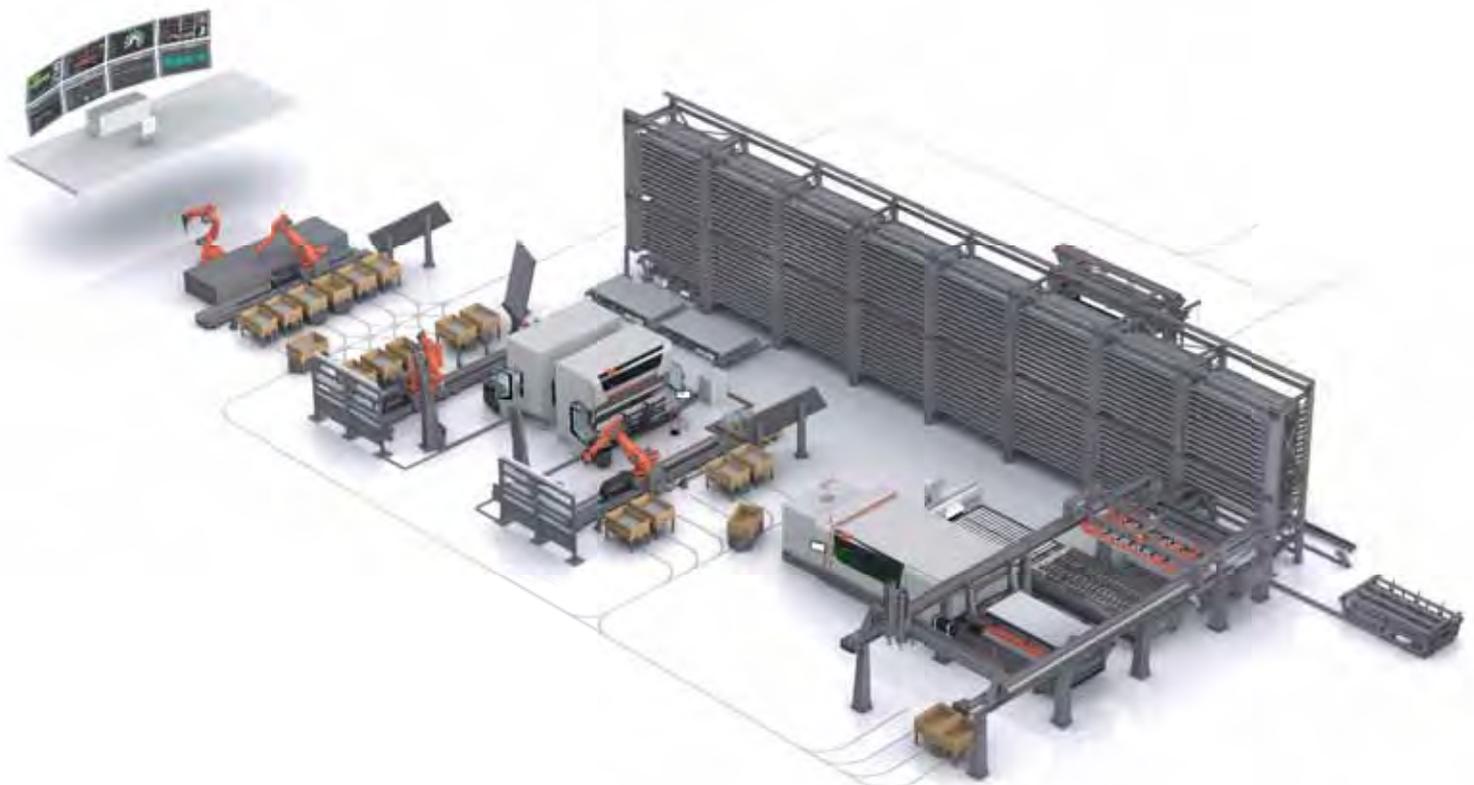
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TRUMPF laser helps ECAM achieve 20 percent growth

A specialist in precision fabricated components for the earthmoving, construction and rail industries has marked its first venture into laser cutting by investing in a 6 kW TRUMPF TruLaser 3030 fibre machine. The move has allowed Staffordshire-based Ecam Engineering Ltd to enter the market for different types of components, spurring growth of 20 percent in 2018 and introducing higher levels of cut quality and capacity.

Originally established in 1968, Ecam Engineering has half a century of experience in supplying steel welded fabrications to the UK's engineering sector. Based near Stoke-on-Trent, the ISO9001:2015 accredited company offers a complete engineering solution, manufacturing prototype components from customer design concepts through to supplying volume parts with production level drawings to daily schedules. The quality and reliability of the finished product is of paramount importance to both Ecam and its customers.

"Being able to act as a full-service provider using in-house manufacturing resources helps to keep costs down and ensures we keep a close eye on quality," explains the company's managing director and owner, Phil Arme.

Of course, facilitating comprehensive in-house manufacture requires investment, something that the company has not shied away from in recent times. In fact, over the course of the past four years, Phil Arme estimates that Ecam has invested around £1 million in the latest manufacturing technologies. This strategy has served the 35-employee business well, growing 20 percent in 2017, with a further 20 percent expansion expected this year.

The latest machine to arrive at the company's factory is a 6 kW TRUMPF TruLaser 3030 fibre laser profiling centre, which is capable of cutting 25 mm thick mild steel to an accuracy of 0.05 mm.

Phil Arme says: "We quote for lots of different work here at Ecam, but the majority is for steel between 8 mm and 20 mm thick. We've been using plasma and oxy-gas profiling but noticed more and more enquiries for a laser-cut finish. Not wanting to miss out on these opportunities, we did our due diligence and spoke with a number of laser profiling machine suppliers."



Ecam shortlisted the most suitable candidates, visiting each one to perform material cutting trials.

Phil Arme explains: "Some fibre laser machines are not the best at cutting steel up to 20 mm thick, however, we were amazed by the trial at TRUMPF. Unlike at other places we visited, there was no tweaking involved, the machine just cut the material without any issues whatsoever. Moreover, the cut quality was by far the best we had seen."

Duly installed in November 2017, the TruLaser 3030 fibre was supplied to Ecam Engineering with TRUMPF's CoolLine and BrightLine technologies. The former is proving to be particularly vital.

The CoolLine option from TRUMPF helps to prevent problems when laser cutting material of inconsistent composition and

surface quality, such as the thick, low-carbon steel processed at Ecam. Material like this can reach considerable temperatures near the point of cut, which in turn can impede the cutting process, especially where filigree shapes are involved. If the kerf overheats, it can even set off a self-burning reaction where material left in the cut burns and causes slag to stick to the rear surface of the sheet.

TRUMPF's CoolLine device keeps temperatures constant by spraying a fine water mist around the point of cut. The evaporation of just 30 ml of water per minute provides 1 kW of cooling and its use allows tighter parts nesting and narrower skeletons, resulting in better material utilisation. CoolLine can be quickly and easily retrofitted to a variety of TruLaser models.

Ecam has set its new investment to work profiling steel sheet ranging from 3 mm to 20 mm thick. With many batches supplied in low-to-medium batch sizes, the flexibility of the machine is already proving pivotal.

Phil Arme concludes: "We had never used a laser cutting machine before, but the training, both at our own premises and at TRUMPF in Luton, was first class. In addition, the phone support has been excellent. I like the fact that you get priority if the machine has stopped."



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Combination machine helps reduce cost-per-part

AMADA has developed a new fibre laser/punch combination machine that is capable of delivering the ultimate in production flexibility to any subcontractor or OEM faced with manufacturing a high mix of sheet metal components. The EML-AJ slots neatly between AMADA's existing entry level and premium machines in this category, helping fabrication shops to reduce their labour requirements and cost-per-part and ultimately improve profitability.

Among the new features of the EML-AJ are a number of innovations that help to minimise operator input. For instance, as standard the machine comes with an automatic nozzle changer, an automated scrap conveyor that prevents any possibility of overfilling and an automatic laser cutting plate cleaner to remove any spatter created by the laser profiling process. In addition, an optional punch-die changer (PDC) can be supplied that increases the tool capacity from 44 tool stations, to 220 punches and 440 dies.

Stable production is a key attribute of the EML-AJ, thanks largely to single bank 3 kW fibre laser source, which is sufficient for cutting material up to 6 mm thick. Further aiding stability during cutting is the patented bridge frame.

On the punching side, an air-blow system supplies the tooling with air and self-lubricating oil mist to prevent deposition and slug pulling. The avoidance of slug pulling is also aided by a vacuum suction system creating negative pressure beneath the turret. Punching slugs are therefore prevented from being pulled up. In this way, improved quality is also achieved, along with maximised output.

The inclusion of punching introduces the ability to produce forms as part of a single setup operation. Here, a stand-out feature unique to AMADA is P&F (Punching and Forming). P&F means that, in addition to 30 tonnes of force from the high-speed ram, the EML-AJ can deliver 16 tonnes from a ram underneath the turret and form upwards. AMADA's P&F forming is a standard feature on EML-AJ, allowing the

production of forms up to 22 mm high with no sheet distortion.

Ultimately, the new fibre laser/punch combination machine is designed to reduce cost-per-part, particularly in comparison with previous generation CO₂ laser-punch combination models. The new EML-AJ not only offers faster cutting compared with its CO₂ counterparts, but adds the ability to cut more challenging materials, such as brass, copper and titanium.

Last but not least, the running costs of the EML-AJ are extremely low. Indeed, the machine's 3 kW fibre laser is up to 58 percent more efficient than a CO₂ equivalent. Moreover, the EML-AJ offers higher quality beam with higher absorption rates for faster cutting.

As with all AMADA laser/punch combination machines, inherent advantages include reduced secondary operations and enhanced product design potential.



On the subject of automation, many bolt-on sheet load/unload options are available, including very flexible part-picking systems. If preferred, however, the EML-AJ can simply be used as a stand-alone production centre. The unique table cover design allows a fully automated EML-AJ cell to be easily loaded as a manual machine.

Vice versa, a stand-alone machine can be retrofitted with automation without the need for additional guarding, another feature that is unique to AMADA.

Automated operation is further exemplified by the use of AMADA's Z turret, offset upper/lower turret, which facilitates extremely fast tool changes. As a point of note, AMADA'S ID tooling system provides full digital tool control for ease of maintenance. In fact, there are many aspects of the EML-AJ that help to minimise maintenance costs. For instance, simplified beam delivery means there are no internal mirrors or turbo blowers.

The EML-AJ was unveiled in Europe, for the first time, at EuroBLECH 2018.

Amada UK Ltd was established over 40 years ago and has grown, along with its customers, to now provide the largest service and sales support network within the UK sheet metal industry. Its Midlands based technical centre is specifically designed for machinery demonstrations, showcasing the latest technology in lasers, punches, press brakes, tooling, automation and CAD/CAM software.

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Laser cut part production becomes automatic and more efficient

Prima Power's latest automatic solution for 2D fibre laser cutting is the high-end Laser Genius 1530. The machine is combined with the Combo Tower flexible storage system and the LST automatic stacking system.

The Laser Genius fulfils the most challenging expectations and combines flexibility with excellent dynamic performance, together with high levels of efficiency and accuracy, thanks to the innovative use of materials such as carbon fibre and synthetic granite. Its efficiency is further enhanced by high-dynamics linear motors, allowing an increased productivity of up to 15 percent with respect to traditional systems. The new cutting head and a series of dedicated optional suites, named SMART Cut, MAX Cut and NIGHT Cut, optimise the laser cutting process for each application.

The superb performance of the Laser Genius makes it the ideal machine for high productivity requirements, while the addition of Prima Power modules automate the material flow.

The Combo Tower Laser is a flexible storage system with integrated loading and unloading features for 2D lasers. The Combo Tower makes different materials available whenever needed, automatically and without delay. The storage system may have one or two shelving units, with the height selected as required. When two shelving units are included, a second machine cell can be integrated as part of the system, depending on the required production processes. These can be selected from the wide range of other Prima Power solutions for punching, laser cutting, integrated punching / shearing and combined punching / laser cutting.

To further increase the level of automation, the LST system for automatic sheet sorting is also available for the Laser



Genius. The LST automatically picks the finished parts and sorts them, sending them to the programmed location. This eliminates manual separation of cut parts from the skeleton, reducing low added-value human operations and increasing the finished quality of products and the possibilities for unmanned production.

The LST is a highly reliable system and features three different procedures for part picking: RALC (Robot Assisted Last Cut), aimed at avoiding a part jamming into the skeleton and assuring a precise and reliable picking operation; Pre-Sorting, aimed at speeding up the picking operation process and Sorting, in which the part is cut off immediately before being picked, with the gripper paused outside the working area.

Increased flexibility from the world's fastest 3D laser

The Prima Power Laser Next 2141, 3D fibre laser machine has been designed and developed to be as universal and multi-purpose as possible, in order to satisfy the needs of stamped metal parts

manufacturers in diversified industrial sectors, such as job shops, press shops, aerospace, agricultural and automotive.

The working volume of this machine is the largest in its market segment, 4,140 x 2,100 x 1,020 mm, with a very compact footprint. It is suitable for virtually all 3D stamped and flat sheet metal part sizes. Its technological features allow it to process both three-dimensional and two-dimensional parts and to easily switch from cutting to welding applications.

The Laser Next 2141, equipped with a 3 to 4 kW Prima Power fibre laser, is the perfect balance of speed, accuracy, and reliability. The linear motors on the main axes, direct drive on the focusing head and advanced control systems provide the highest dynamics in its market segment, with single axis speed of 120 m/min and trajectory speed of 208 m/min. This is combined with high accuracy, Pa and Ps = 0.03 mm, in a very large working envelope and with the best Overall Equipment Efficiency (OEE).

The Laser Next 2141 is available in several



configurations to ensure a perfect configuration for every customer. Features include: fixed tables, that exploit the entire working envelope to process large parts and featuring great accessibility; split cabin, in which the working volume is separated into two halves, where the parts are alternatively processed or loaded/unloaded in total safety; turntable, for the fastest part handling operations without changeover stops, cover time operation and shuttle tables, allowing large and heavy parts to be handled outside the working area and in case of complex setup.

Prima Power is a world-class supplier in the high-tech field of laser and sheet metal working machinery. Its product portfolio is one of the most complete in the industry.

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Taking a universal approach to laser cutting

It is increasingly common to find lasers operating as a mainstay manufacturing process within many different industry segments. The flexibility of the technology, combined with the fact that lasers offer a high performance yet economical solution to many applications, will undoubtedly continue to drive further expansion of the installed base

As laser cutting remains a significant growth area for the technology, TLM Laser's Andy Toms explains how the Universal Laser Systems range, distributed by TLM within the UK, can offer an effective solution to laser cutting operations on a diverse array of applications and material types

Many of the initial applications for laser cutting were on metals, as the technology was an attractive alternative to traditional methods such as plasma cutting. However, just as laser technology has developed over the years, so too has the range of applications and materials to which lasers can be applied.

Today's laser systems are able to cut composites, metals, elastomers, plastics, glass, ceramics and paper plus natural organic materials such as wood and leather, and even a range of inorganic materials. Having such diverse capabilities means that laser cutting systems can be found not only within high productivity industrial environments, but also in research labs, schools, colleges and craft workshops.

While many laser cutting systems used within industrial environments may be specified to suit a narrow range of material types and products, there will be some, especially those installed within "Job Shops" which may be required to process many different material types. It is in these instances where both the diversity of the ULS range and the flexibility in the way in which they can be configured, makes it possible to cover the widest range of applications and materials.

Depending upon the ULS model selected, users are able to configure the system with up to three different laser sources,

comprising of two interchangeable CO₂ lasers and one fiber laser. These different laser sources can be quickly interchanged as required, without the need for tools, or even realignment of the laser. This feature allows users to easily switch between sources of different wavelengths and peak power levels to optimise laser power delivery for the different material types that they may wish to cut. Overall, this increases the flexibility and functionality of the laser system by maximising the number of different materials that can be processed by the system. As an example, certain CO₂ lasers may have issues with reflectivity on highly reflective materials such as some types of aluminium or copper, however using a fibre laser, these reflective materials can be laser cut successfully.

Built upon several decades of research and development by scientists and engineers, Universal Laser's Intelligent Materials Database is an extensive source of laser materials processing parameters, covering a range of 10 watts to 500 watts. The full power and capability of the database is accessible to users via the Universal Control Panel (UCP) and Laser System Manager (LSM). This feature constantly evolves, as new materials and capabilities are added every day, providing users with a wide range of benefits.

In the absence of software assistance,

users will often resort to iterative testing and of course past experience, to achieve adequate results on each new material that they wish to laser cut. This however can be a highly unproductive and time-consuming process, sometimes temperamental and does not always transfer from system to system or between laser sources of different power ranges.

The creation of the Intelligent Materials Database helps guide users through the laser cutting process in a simple three step process: The first step is to select a compatible material from a list, secondly choose the type of processes to be performed, in this case cutting and finally enter the material thickness. From this information, the Intelligent Materials Database is able to automatically generate the material's optimal processing parameters, allowing the user to focus on being productive and not be burdened with the need for ongoing experimentation.

The combination of a comprehensive product range, a choice of laser sources, and power levels from 10 W to 500 W means that there is a Universal Laser Systems solution for all laser cutting applications.

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New automation options for Phoenix large-format fibre lasers

LVD has introduced new automation offerings for its Phoenix FL 4020 and Phoenix FL 6020 large-format fibre laser cutting machines, including options for an automated load/unload system and a range of Compact Tower (CT-L) solutions for the Phoenix FL 4020. The flexible automation systems keep pace with the high-speed cutting of the Phoenix laser and reduce material handling and preparation time to maximise machine productivity. They also facilitate fully automated, lights-out processing.

The load/unload automation system available for Phoenix fibre laser models 4020 and 6020 handles maximum sheet sizes of 4,000 x 2,000 mm (Phoenix FL 4020) and 6,000 x 2,000 mm (Phoenix FL 6020) as well as material thicknesses from 0.8 to 25 mm. It offers fast process cycle times for complete loading and unloading; just 65 seconds for Phoenix FL 4020 and 90 seconds for the Phoenix FL 6020.

The load/unload system is a robust construction to handle large pallets. Unprocessed material can be stacked to a

height of 159 mm and finished parts can be stacked as high as 240 mm.

The system features a streamlined design that enables access to the raw material and for the unload pallet from above to be easily removed. The area above the laser table remains free for manual load and unloading.

LVD's load/unload system is ideal for shops with high production volumes and for fabricators processing a high variety of jobs, where parts separation and sorting is a bottleneck. It is offered as an option or can be retrofitted to a Phoenix FL 4020 or 6020 machine.

The Phoenix FL 4020 is available with six different versions of Compact Tower (CT-L) for loading, unloading and storage of raw material and finished parts. The CT-L enables automated production from stored raw material to stacked, cut parts in a compact, small footprint system. CT-L versions for the Phoenix FL 4020 include a



basic system with one tower in five, 10 or 14-pallet configurations, as well as a two-tower CT-L system for high-volume applications. The second tower adds nine pallets to the CT-L 5, 14 pallets to the CT-L 10, and 18 pallets to the CT-L 14. Each input and output pallet has a capacity of up to 3,000 kg and 240 mm of stacking height. Maximum sheet dimensions are 4,095 x 2,055 mm, 20 mm thickness.

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Subcontractor upgrades laser cutting and press braking capacity

Nestling in the Dorset countryside on the edge of Bridport, sheet metal subcontractor Ackerman Engineering's freehold, 1,500 m² factory was purpose-built in 2006 by the current managing director, Graham Ackerman, great-grandson of the company's founder, William, who started the enterprise in 1885.

It was a seminal year that saw the purchase of a Bystronic BySpeed 4.4 kW CO₂ laser cutting machine, another press brake from the same supplier and a generation facility for nitrogen. It is the assist gas of choice when laser cutting, as it produces a non-oxidised edge for painting without the need for fettling and also allows cutting speeds up to three times faster in thinner to mid-range gauges.

CO₂ laser technology, which had been used by the company since 2001, was phased out in August 2018 when the 4.4 kW machine was part-exchanged for a ByStar Fiber 8 kW fibre laser cutting centre, which joined a 3 kW BySprint Fiber installed four years earlier. Both are of 3 m x 1.5 m sheet capacity. At the same time, an Xpert 150-tonne, 3.1-metre press brake was added to the six Bystronic models already on-site, one of which dates back to 2001 and is badged Edwards Pearson, which the Swiss manufacturer acquired in 2002.

The advantage of profiling and bending components on the same make of equipment is that Bystronic's offline Bysoft 7 software modules, Laser and Bend, work seamlessly together to produce very precise 3D sheet metal parts. Graham Ackerman says that drawing tolerances are almost incidental, as they are routinely held due to the accuracy of machining. Inspection is scarcely needed, as quality is virtually



guaranteed once a job is in production. Any mistakes are almost always down to human error, so most of inspection effort is at the CAD/CAM stage.

A customer's drawing or model, which usually arrives in DXF, DWG, IGES or STEP format, is interrogated in the subcontractor's CAD department to ensure the sheet metal component's manufacturability. The file is then exported as a flat blank to the Bysoft CAM environment, where the programs for fibre laser profiling and bending are generated automatically.

Graham Ackerman says: "Fibre laser cutting is massively faster than CO₂. When we installed the 3 k BySprint Fiber alongside the 4.4 kW BySpeed CO₂, the former was so productive that we could have sold the other machine and still hit production targets. The only reason we didn't was to retain back-up capacity for servicing or unusual peaks in order to guarantee customer service and deliveries."

He added that the Bridport factory mainly processes aluminium, stainless steel and mild steel sheet from 0.7 mm to 8 mm thick, with a lot of material in the 1.2 mm to 2 mm range for the manufacture of electrical cabinets destined for the electronics and telecommunications industries. When cutting these gauges, the 3 kW fibre machine is typically two to three times faster than CO₂. When the 8 kW fibre laser was installed, a further increase in throughput was seen, as processing times are less than half those using the 3 kW fibre source.

Additionally, CO₂ machines require a 15-minute warm-up in the morning and a similar time to close down at the end of the

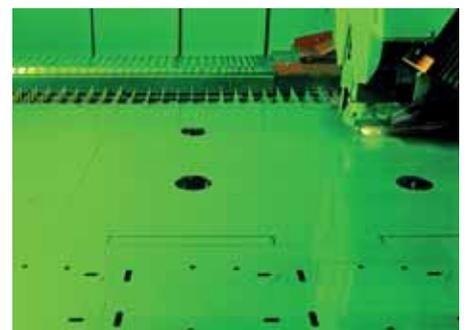
day, whereas these unproductive periods are avoided with fibre laser cutting. Another benefit of the technology is its low running costs.

Graham Ackerman notes that the firm's larger fibre source draws less than half the power of the previous CO₂ machine yet delivers nearly twice the power to the point of cutting. The wasted energy previously had to go somewhere, which was into the factory in the form of heat, so the fibre-only working environment was more pleasant during the summer months.

Appraising his company's use of fibre laser cutting, Graham Ackerman made a couple of interesting observations. One was that the 8 kW machine is so fast that the expected increase in nitrogen usage did not materialise due to the short cycle times, so it has not been necessary to increase the size of the gas generation plant.

Another comment was that on some delicate parts, which are frequent bearing in mind that the subcontractor operates at the high-quality end of the market, the 8 kW laser beam can be too strong for cutting 0.8 mm or 1.2 mm material, a problem that is easily overcome by turning down the power of the source. To maximise productivity, however, the lower power fibre machine is designated to cut the thinner gauges and the 8 kW laser cutting centre is kept on full power for processing thicker materials.

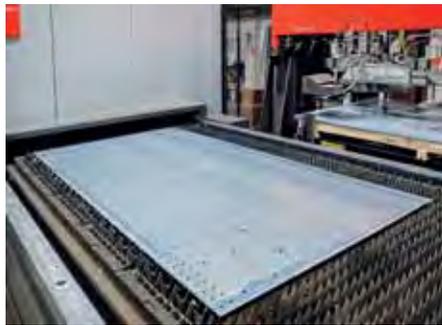
As to his company's move away from other makes of laser profiling equipment to standardise on Bystronic equipment, Graham Ackerman says: "We recognised more than a decade ago, these Swiss-built machines are among the best in the world and highly productive, both in terms of processing speed and maximising uptime.



"We especially like the quickness of changeover to the next job, which is important to us as we produce small batches of high added-value work, typically within the range 5- to 50-off."

It is due to these relatively low batch sizes that Ackerman Engineering has restricted its automation equipment to simple ByLoaders for feeding the fibre laser machines with material. The step up to a ByTrans automated sheet loading/unloading arrangement would have not lent itself to such small runs. In any case it would have necessitated tagging components within the sheet, then shaking them out and depipping them, which is not conducive to the premium quality work for which the subcontractor is known.

Modern press braking technology has been a similar boon to the firm's business. Graham Ackerman is particularly impressed with the latest Bystronic Xpert 150, for which he has bought a comprehensive suite of the manufacturer's RF-A segmented tooling. He says it is twice as fast to set up compared with older style tooling, as the punch and die segments are automatically centred when loaded from the front and hydraulically clamped.



Moreover, the system is fully compatible with the Bystronic bending database in the machine control and it is practically impossible to insert an incorrect tool due to laser beam recognition of its profile. Part quality is improved, especially when bending long components.

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Agile material flow concepts enhance productivity

State-of-the-art laser cutting systems combine high performance with incredible speed. Unfortunately, they spend far too much time not in use. What may sound like a paradox is actually a reality and a costly one at that, in many production facilities. Companies looking to invest in a new laser cutting system often see it as a stand-alone solution. It is a situation that intralogistics specialist Remmert is all too familiar with. What these companies need is a consistent material flow and automation concept. That's because the only way to achieve the return on investment they seek is by ensuring that the laser cutting system is in continuous operation. That is why Remmert advises companies, that process sheet metal, to consider establishing an efficient, future-proof material flow before they purchase such systems.

The cutting speeds of laser cutting systems have more than doubled. Rather than having to produce more and more in less and less time, many sheet metal processing firms find themselves facing a problem they had not seen coming; their cost-intensive laser cutting systems are not operating at full capacity.

Strategic sales manager at Remmert, Michael Göbel explains: "The problem is that staff simply can't load and unload the systems quickly enough. When every pallet needs to be transported to the system individually and then each sheet of metal has to be placed on the loading platform by hand, capacity utilisation is at around 25 percent."

At that rate, the significant investment in a laser cutting system will never pay off.

Michael Göbel continues: "Every second that the laser remains inactive costs the company money. However, if laser cutting systems are integrated into a coordinated material flow concept, the capacity utilisation of the machines can be increased to more than 80 percent."

Companies looking to acquire a laser cutting machine should protect their investment and seek advice from an independent specialist in material flow processes before purchasing. Making the right choice when it comes to automation is paramount when attempting to safeguard production for the future.

Technical manager at Remmert, Dr Thomas Peitz says: "Laser cutting



Strategic sales manager at Remmert GmbH, Michael Göbel

systems have a short life cycle of up to six years. In contrast, the automation solutions into which they are embedded have much longer life cycles. A loading and unloading system that is compatible with all laser cutting systems, like the Remmert LaserFLEX, ensures maximum investment security. That is why selecting the right automation solution should always be the top priority."

Another aspect in the investment security offered by automated material flow solutions is their modularity. Michael Göbel says: "Our portfolio is a system of modular,

versatile elements that can be expanded. This means that customers receive a tailored system that can be upgraded swiftly at any time with the addition of new components."

Once customers have enhanced their productivity and become more competitive through the initial automation processes, they then have the flexibility to increase the level of automation and expand their production systems through the addition of various modules, like the BASIC Tower solution for buffer stock.

Remmert has been implementing custom material-flow solutions with international clients for many years. Remmert experts start by analysing each existing layout and the customer's production requirements. Numerous factors come into play here. What level of productivity is the customer looking to achieve? Which material needs to be processed? And in what quantity? What staffing capacities are available? How can the machinery be arranged most efficiently? An effective material flow concept is then drawn up on this basis. Remmert subsequently incorporates these insights into its plans for integrating its modular, manufacturer-independent automation systems.

The intralogistics specialist devises automation concepts that ensure an agile material flow. Solutions range from simple handling to fully automatic operation. A key element here is the LaserFLEX system, which can simultaneously load and unload raw materials from up to four laser cutting machines as part of a fully automated





process, irrespective of whether the laser cutting machines are made by the same manufacturer. The LaserFLEX system can supply the material in just 60 seconds per laser cutting machine, making it the fastest system on the market. Used in combination with the "BASIC Tower sheet metal" solution, automated production becomes a possibility. Warehouse automation is a suitable solution for storing raw materials and buffer stock that has undergone the cutting process. The LaserFLEX removes the metal sheets in the BASIC Tower and then stores the cut material as required.

Dr Thomas Peitz says: "If the finished parts are stored at night and sorted by staff the next morning, laser cutting machines can operate around the clock. This increases return on investment."

Connecting the BeltFlex conveyor belt to the LaserFLEX enables the finished parts to be sorted by hand after cutting or removal from the BASIC Tower, as part of a simple, quick and ergonomic process. Forming part of the Remmert FLEX product line, this additional module enables staff to adopt an ergonomic body posture that reduces strain on their backs while they go about their sorting duties.

A key characteristic of a functioning material flow process is that all processes are managed and operated centrally in a simple and intuitive process. Michael Göbel says: "You can have the best automation solution around, but it's not much good if the information required for effective and agile material flow is either not available or not utilised correctly."

This is where Remmert can help companies to enhance their control possibilities. SMART Control is a software and control system for the entire production process. Simple to use, the intuitive system can be seamlessly integrated into existing systems. Featuring pictograms that are easy to understand for an international user base, and only a small amount of text, the system enables users to control connected Remmert components such as the LaserFLEX and the BASIC Tower with ease. In addition, the software immediately displays potential hazards in visual form.

The software also features a user administration system, ensuring secure authorisation management.

There is a huge amount of potential in the automation of sheet metal processing. However, before this potential can be harnessed,

material flows need to be aligned with individual production processes. This is how production efficiency can be enhanced.

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FARO Quantum aids Goodwin International's in-process checks

Operating from a 38,000 m²+ world class manufacturing facility located in the heart of Staffordshire, Goodwin International Ltd manufactures components for a wide range of demanding sectors including the nuclear, defence, oil & gas, power generation, aerospace and renewable industries.

From large primary circuit reactor components standing at 4 m in height and 5.5 m in diameter, to machined and welded assemblies of up to 100,000 kg in weight, Goodwin International is able to manufacture a multitude of large, high-specification components. In addition; the company also produces small speciality items such as non-return valves with a diameter of 105 mm, weighing just 3 kg.

Working on a three-shift pattern, 24 hours a day, seven days a week, Goodwin International's 300 strong workforce have access to more than £30 million worth of high precision CNC machines. The company's impressive plant list includes advanced, large capacity CNC milling and turning capabilities and the latest, multi axis machining centres.

Goodwin International is an established ISO 9001 accredited business. The company's continuous improvement system is used to constantly monitor all processes to ensure that maximum efficiency gains are achieved and to help guarantee the delivery of quality in all aspects of the business.

An extensive range of advanced quality control equipment is used for functions such as material verification, dimensional measurement and component performance confirmation. All production and inspection processes are managed through a comprehensive library of procedures that dictates the use of accurate inspection and testing processes.

As a result of the huge size and the demanding dimensional tolerances of many of its manufactured components, the company make use of one of the largest capacity Coordinate Measuring Machines (CMMs) in the UK. The impressive Gantry CMM has the ability to measure components of up to 5 m x 3 m x 2 m (X, Y, Z).

Given the problems associated with transporting large heavy workpieces to the company's static CMM, to ensure that



accurate dimensional inspection of components can be undertaken throughout the manufacturing process and to confirm that all components are manufactured to the standards demanded by its customers, the company use a range of advanced FARO portable CMMs with both tactile measurement and scanning capabilities to perform regular in-process checks.

A growing order book and the increasing need for the scanning and dimensional inspection of large components and comparing them to CAD models, recently prompted Goodwin International to purchase a 4-metre version of FARO's recently launched QuantumM FaroArm, used in combination with a FAROBlu Laser Line Probe HD High Definition. The resulting FARO Quantum ScanArm offers best-in-class scanning capabilities.

Mark Woolmer, quality control manager of Goodwin International, explains: "Our advanced facilities allow us to manufacture components for a wide range of sectors including the nuclear, defence, oil and gas, power generation, aerospace and renewable industries. Our world class manufacturing facility, together with our wide range capabilities, enables us to deliver machined and fabricated components for projects such as new build and retrofit power plants.

"Given the nature of the challenging

sectors that we serve, we are able to demonstrate full traceability of our materials and processes and to provide detailed quality reports that are tailored to our client's and their projects. To ensure that we meet the requirements stipulated to us for each project, meticulous inspection routines are undertaken throughout all stages of manufacture.

"Although we make use of a wide range of advanced inspection and testing equipment, our growing collection of portable FARO CMMs are particularly useful for carrying-out high-precision, in-process dimensional inspection routines. Given the enormous size of many of the components that we produce, it helps that our FARO equipment has advanced, non-contact laser measuring capability and can carry out precise, in-depth inspection of the largest of our components.

"As our portable FARO CMMs are used for in-process inspection on our shop floor, in addition to their accuracy and ease-of-use, it helps that they are extremely robust and able to make the required accurate dimensional checks quickly. This speed of use enables the work that has been carried out up to that time to be quickly verified and subsequent manufacturing processed to be immediately commenced.

"Having compared several similar options, I came to the conclusion that

Saving time and space

Implementation of a sophisticated safety concept for the monitoring of container filling levels

In the light alloy foundry at the BMW Group's plant in Landshut, all scrap products such as punching waste and sprue systems are recycled and then remelted. For this purpose, the die-cast parts were previously collected in containers without being shredded and were removed from the basement of the foundry with considerable use of manpower. In the course of a renewal of the casting cells in the foundry hall, the work processes were optimised and more efficient processes set up. Erdwich Zerkleinerungs-Systeme GmbH was awarded the contract to design a plant that enabled the collection and shredding of the foundry's aluminium waste directly from the press. For this task, the recycling expert adapted the RM 1350 pre-shredder to the local conditions. On-site shredding means that the containers with scrap parts and punching waste have to be transported far less frequently to a large container, which contributes to a significant increase in operating efficiency. In cooperation with the technical department of the BMW Group, Erdwich also developed a sophisticated safety system for monitoring the condition of the machine.



The light alloy foundry at the BMW Group plant in Landshut is one of the most modern foundries in the world. Every year, around five million aluminium casting components, such as engine components or structural components for the vehicle body, are produced there using five different casting processes, with a total weight of 84,000 tonnes. As in all areas of the company, the aluminium foundry works with maximum efficiency in order to keep the scrap rate as low as possible. In the past, the regularly occurring scrap was collected in containers without being shredded, removed from the basement and then returned to the melting process. The cast aluminium parts had dimensions of up to 2,000 x 1,400 mm and therefore took up a lot of space in the collection containers. This, in turn, meant that the containers had to be emptied frequently, which required a great deal of time and manpower. In the course of reconstruction measures in the foundry hall, during which the casting cells were replaced one after the other, it was planned to optimise the recycling process.

New plant achieves significant increase in efficiency

Erdwich Zerkleinerungs-Systeme GmbH from Igling in Upper Bavaria, which has decades of experience in the construction of recycling plants, got the order to plan and commission the metal shredder. This was

particularly beneficial for the project in Landshut, as Richard Adelwarth, project manager at Erdwich Zerkleinerungs-Systeme GmbH, reports: "When we visited the site, it quickly became clear that the solution required in the tender would not have the desired effect. We therefore carried out many trials and consulted another company in the industry, with whom we regularly work on larger projects in order to be able to offer an optimum solution." Erdwich finally made a machine available with which a typical production process was executed.

The recycling experts designed a machine based on the RM 1350 pre-shredder. This machine is characterised by fast and easy maintenance, long service life, optimum shredding and high throughput. To date, seven systems with soundproof enclosures have been installed for the eight casting cells and punch presses in the plant.

Richard Adelwarth explains: "Loading takes place in free fall, that means the moulds, which are to be returned to the melting process, now fall from the pressing plant directly into the hopper of the pre-shredder and then into a container measuring 1,400 x 1,400 x 900 mm."

When the container is full, it is transported outside, emptied into a large container; and this in turn is brought to the smelter. The shredding process has reduced the volume of cast parts by 50 to 60 percent, which

means that the disposal containers have to be emptied far less frequently and thus require less time and manpower.

Sophisticated safety system developed together with BMW Group technicians

The pre-shredders were adapted to the special conditions prevailing on site. The drives of the machines, for example, had to be mounted on one side instead of the usual two. The reason for this was the columns of the building, which were located in the area of the installation site and therefore required a narrower design. In addition, the crushing tools themselves and their arrangement within the cutting chamber were adapted to the local conditions.

Over and above this, the standard version of the RM 1350 already has a safety system. This includes a PLC control system with automatic reverse and cut-out control, so that the machine is protected from damage in the event of overload or bulky solid parts. In addition, each shaft is equipped with an energy-optimised frequency converter, which ensures that the two cutting gear shafts are driven separately. This enables optimum adaptation to the shredding process. Together with the technical department of the BMW Group, the safety system was extended by new features.

Richard Adelwarth explains: "Both the filling level of the removal box located in the basement and the monitoring of the shredder itself are now displayed transparently, so that a quick response can be made if necessary."



Further optimisation potential available

As soon as all casting cells have been replaced, a conveyor belt system could be installed in a further expansion stage in order to further optimise the disposal process. Therefore, the shredded rejects would no longer be collected in containers that have to be removed and emptied by hand, instead, the rejects would be transported directly into the large container via a conveyor belt. In this way, scrap products and punching waste from all casting cells can be disposed of simultaneously and without additional logistical effort. For the current expansion stage, all necessary alterations were quickly implemented so that Erdwich was able to meet the requirements placed on the machines. As a result, the work processes were considerably accelerated.

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Fully electric tube bending machines for exhaust technology

For particularly challenging components, Schwarze-Robitec has combined the benefits of two different machines in the CNC 80/60 E TB MR. The Cologne-based manufacturer of tube bending machines has successfully commissioned two of these fully electric, multiple-radius tube bending machines featuring transport boost technology at automotive supplier Eberspächer's site in Portugal. As one of the world's leading system developers and suppliers of exhaust technology, Eberspächer utilises the energy-efficient machines from Schwarze-Robitec's high performance series to manufacture tubes for complex exhaust systems.

International emissions standards require manufacturers to lower fuel consumption and CO₂ emissions, reinforcing the need for increasingly efficient systems to reduce pollution from cars and commercial vehicles. It's a challenge that Eberspächer faces at its exhaust technology product unit. The company designs efficient systems for exhaust gas post treatment, ranging from conventional mufflers to highly complex purification technology. In manufacturing, this not only requires the use of lightweight and thin materials, but also the short cycle times and high speeds that are typical for the automotive industry and, on top of that, a large degree of process security. With the two new CNC 80/60 E TB MR tube bending machines supplied by Schwarze-Robitec, the company is now perfectly equipped to tackle these challenges at its production site in Tondela, Portugal.

Intermediate size delivers high bending performance and process security

With the CNC 80/60 E TB MR, Schwarze-Robitec is combining two special requirements in one machine. At an intermediate size, it features the bending head transmission and thus the bending capacity of a CNC 80. In addition, its vertical multiple-radius construction matches that of a more compact CNC 60, as Eberspächer processes tubes with diameters of no more than 50 mm. This enables the company to produce its challenging exhaust technology components with a sufficient level of machine performance and high process



security yet in a cost-efficient manner. By supplying tube bending machines like these, Schwarze-Robitec is displaying its flexibility in addressing the individual requirements of its clients.

When it comes to purchasing new machines for its sites in Europe, Eberspächer has been placing its trust in Schwarze-Robitec for years. Its production facility in Tondela is now for the first time equipped with machines featuring cutting-edge NxG control systems. These are up to 35 percent faster in operation than machines without NxG control systems.

The company, founded in 1903, is one of the leading international experts in the sector of tube cold bending machines. At its headquarters in Cologne, the manufacturer currently employs 130 staff. The company is represented worldwide via long-term partner enterprises and Schwarze-Robitec has been active in North America for over 40 years. It has had its own branch office in the region since 2015 and, since then, it has been implementing the entire sales and service for the high-quality tube cold bending machines made in Germany. Regular customers and new customers from

the USA, Canada and Mexico benefit from the customer-specific on-site advice and shorter delivery times for spare parts.

The bending specialist already manufactured the world's first CNC controlled tube bending machine back in 1977.

To date, more than 3,000 machines have been sold, some of these have been used in production unrestrictedly for far more than 35 years. The Schwarze-Robitec product range includes, in addition to tube bending machines and bending tools, tube perforating machines, measuring stations, as well as solutions in the area of special machinery construction. The reference list of the tube bending expert includes, without exception, all renowned leading manufacturers from the automotive industry and energy sector as well as shipbuilding. Above and beyond that, the company solutions are employed in the aerospace sector as well as many other industries.

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Additional capacity of waterjet cutting machine to help meet new business growth

Barely a month into 2019, high-end precision fabrication specialist LTI Metaltech is already building on its growth success of 2018, with the addition of a new state-of-the-art Ridder waterjet cutting machine, which has just been installed at its Abingdon factory. Complementing its existing capabilities, the new waterjet machine provides crucial extra capacity to serve newer growth areas of LTI's business, in addition to its ongoing cryogenic work for long-time client, Siemens for its MRI machines.

With its twin-head cutting capability, a larger cutting area of 8 m x 4 m and, most crucially, a high-pressure water pump with an increased capacity of 75 kW that boosts cutting speeds, the new waterjet cutting machine will allow LTI to significantly ramp up its production going forward. Having for many years achieved great success in the healthcare market, LTI has been securing a fast-growing number of contracts in new

high growth sectors including energy, science and nuclear; making this latest investment vital in enabling the company to increase and consolidate its presence in these markets. In addition, the company is also currently the only UK manufacturer of its type, with a machine of this size able to cut components, which will further strengthen its value proposition to customers going forward.

2018 was a successful year for LTI, but 2019 looks to be even more exciting, which is something LTI Metaltech's technical director, Edgar Rayner is relishing: "The next 12 months will be crucial for us, but it's another year we are really looking forward to following the great success we had during 2018 in the energy, science and nuclear markets. The rigorous requirements of these sectors already play to our strengths in areas such as audit compliance and quality assurance. And with this latest investment on board, we will be in an even better



position to seize on new market opportunities and grow."

LTI Metaltech is a private limited company and part of the LTI Group of Companies, which was founded in 1969. LTI Metaltech specialises in the precision fabrication and welding of high-performance vessels and structures.

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Precise tube forming for medical applications

Axial and rolling transfluid solutions guarantee secure processing of many materials, from stainless steel to titanium alloys

Without modern medical technology, it is not possible to provide a reliable standard of care, in order to help cure diseases and to ensure that the hygiene standards are maintained. Special solutions for tubes are needed in order to meet these requirements, like the sophisticated components of medical devices or the correct disposal of waste liquids. Most of these tubes are very fine and thin.

The forming techniques, that are usually used in the automotive and industrial sectors, are therefore more and more important. What matters here is to be able to process high and ultra high-strength materials, such as titanium and stainless steel, that are used as flexible aids in microsurgery. With its forming machines, the high-tech machine manufacturer transfluid makes it possible to form tubes with an axial and rolling forming process, with impressive results. For instance, it is possible to execute very accurate symmetrical and asymmetrical axial forming,

with a great variety of very specific materials.

Process for tubes with an external diameter between 1.5 and 8 mm

Stefanie Flaeper, sales and marketing director at transfluid, says: "The rolling forming is clearly very important, as it can be applied with great effect. Our rotary forming machine can reduce or form the tubes partially or over a long distance. In both cases, the process guarantees an outstanding precision. After all, we are working with tubes with an external diameter between 1.5 and 8 mm."

These fine tubes are used in endoscopy, emergency medicine and much more. They also play an important role in the hospital equipment, the care equipment and sterilisation processes.

As a very special connection technique is required in this case, it may be necessary to use lasers for the cutting during the forming of the tubes.



Alternative forms of lubrication

The manufacturing of formed tubes for medical technology is done in laboratory-like conditions or in clean rooms. In order to prevent contamination, the forming machine cannot always use the usual techniques. Therefore, ceramics or special metals with specific coatings are chosen as materials for the tools, to meet those requirements.

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WDS stainless steel components range grows to support increasing demand

Demanding engineering applications require extraordinary solutions based on exceptional components. This is the principle that drives WDS Component Parts Ltd to constantly expand its range of stainless-steel parts.

Stainless steel components are highly resistant to corrosion, so are favoured in environments that are wet, salty, corrosive, or otherwise challenging. They are an absolute must in many fields of engineering including medical and pharmaceutical, where hygiene must be maintained to a high standard; food and beverage, where washdowns are frequent; marine and shoreside, where water and salt are constants as well as chemical and acid environments, where corrosive materials and atmospheres abound.

WDS offers stainless steel versions of many of the components that it supplies to machine and equipment builders across the UK and around the world. Wherever possible, it offers stainless steel versions of its most popular components.

Handwheels are one example where stainless steel is very popular. As people have physical contact with handwheels they can be a collection point for bacteria, which is an important issue for food and drink processing equipment, pharmaceutical production and medical equipment. They are also popular for harsh and extreme environments where plain steel would corrode and are even preferred in mildly demanding applications where unsightly rust staining may occur. Other advantages of stainless steel handwheels include aesthetic appeal and being smooth to touch.

For some components, such as gas struts, WDS marries stainless steel with brass, aluminium and other non-corroding alloys, as well as with high performance engineering polymers to create sophisticated solutions for demanding requirements. A common use for gas struts is to hold open hoods, lids and access doors and prevent them from slamming shut. Many such installations are outdoors, where stainless steel can withstand whatever the weather brings. Indoors, hoods and lids are often used on machinery and equipment

where they are subjected to a hostile environment due to the presence of harmful materials or flying oil; so again, stainless steel struts are favoured.

At floor level, many environments can be a bit more challenging when maintaining hygiene is important. Dirt, dust and other materials will naturally tend to fall to floor level, so castors often have to be able to contend with harsher conditions than the equipment they are supporting. Thus, it is not surprising that many OEMs specify stainless steel castors for many of their designs. They will be more hygienic, less likely to suffer corrosion problems and allow robust washdown of the equipment above.

In all cases, WDS's developments are market-led. If customers flag up a desire for a new product or a new variation on an existing product, WDS will try to help. Common requests include enquiries for non-corroding versions of pins, studs, hinges, handwheels, bolts and locks. These can be intended for use on virtually anything from gardening equipment to boating and camping accessories, catering equipment, medical aids and healthcare equipment and industrial and commercial machinery.

In keeping with the company's philosophy of rapid delivery, its stainless-steel parts are nearly all available for overnight despatch. As such, they can be in the hands of potential users within hours of the order being placed.

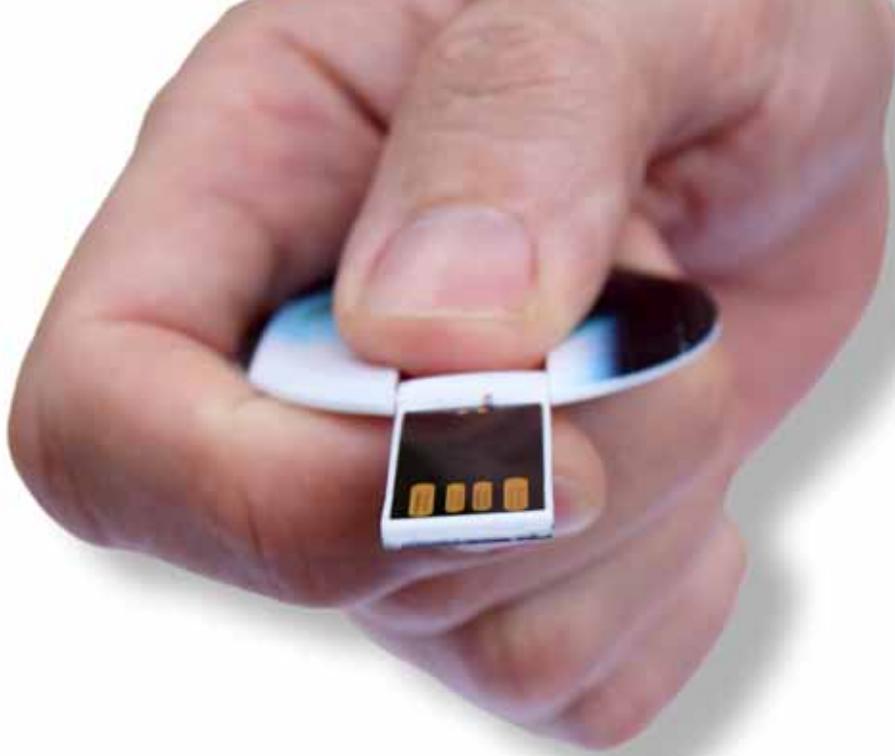
WDS is a leading UK manufacturer of standard parts for use in machine build components, standard parts, jigs & fixtures, and consumer products. The range of products available from WDS grows daily and so has the methods available to designers and engineers for identifying, specifying and purchasing any of the 20,000+ parts currently held in stock. For example, WDS has made ordering workholding solutions cheaper and quicker by removing small order surcharges.

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