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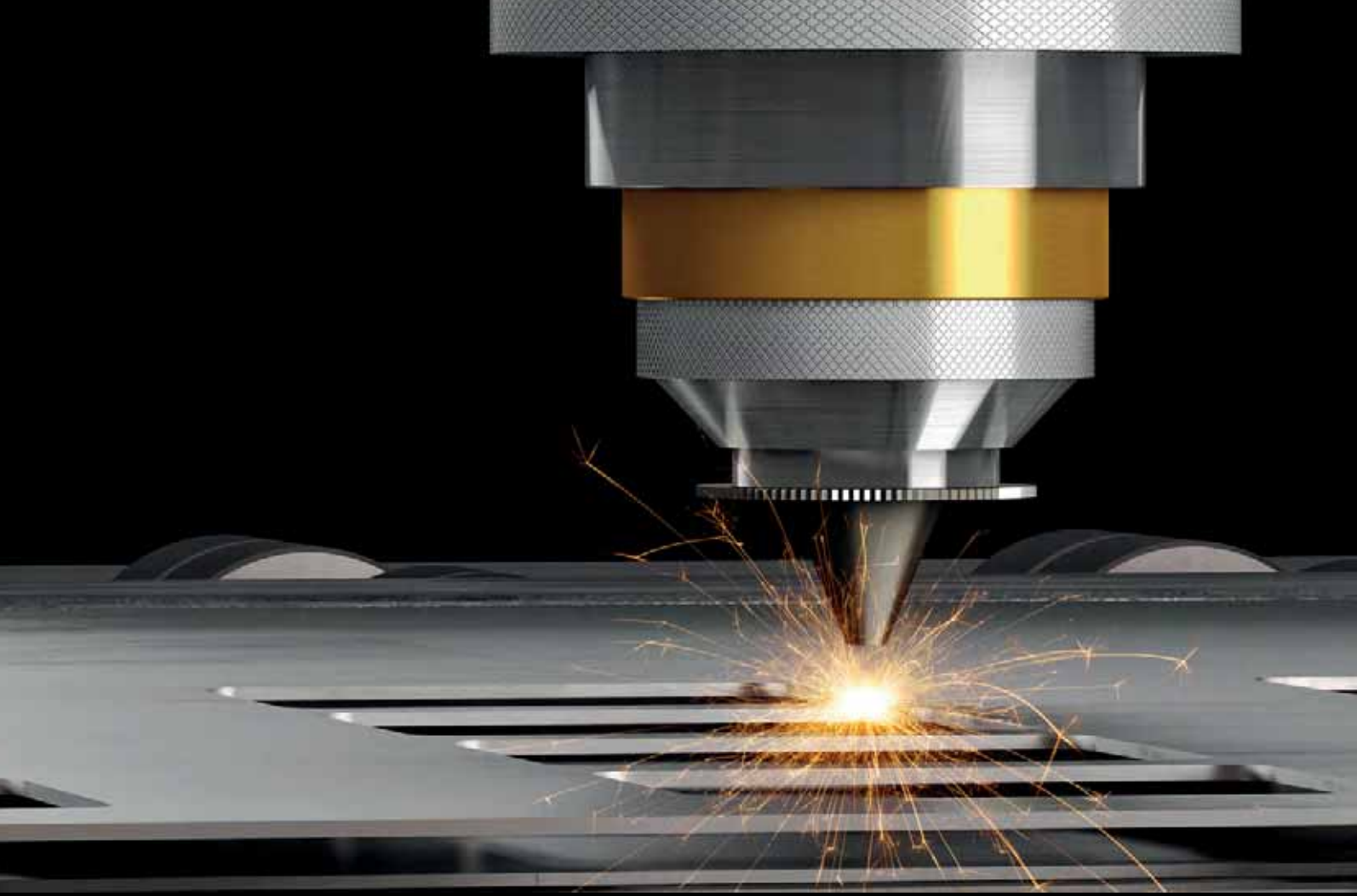
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Multiple part fixturing is the key to profitability

When milling and drilling small components in a machining centre, the likelihood is that the cycle time will be short unless it is especially complex. To machine such parts efficiently and ensure that the operator has walk-away periods that are long enough to perform other tasks such as tending another machine or carrying out a second operation, the parts need to be loaded in multiples.



Such a strategy also reduces cycle time per component, as each cutter visits several parts to machine the same feature before it needs to be exchanged, reducing the overall number of tool changes. Holding more than one part at a time in a conventional vice is not easy, however and risks components becoming dislodged from the jaws during machining.

Salisbury-based 1st Machine Tool Accessories can supply the most efficient and safest workholding methods for securing several components at once to reduce piece part production cost. Frequently, configurations are based on equipment manufactured in the US by Chick and sometimes a project involves the design of a bespoke workholding arrangement. More often than not, the Chick dual-station Qwik-Lok is involved, with its two sets of quick-change, snap-on/snap-off jaws that are tightened by a single handle.

It appears in various guises. There may be just one on the table of a 3-, 4- or 5-axis Vertical Machining Centre (VMC) to place two components securely in hard jaws under the spindle, or more if machined soft jaws are employed. Instead of clamping parts directly, the jaws can hold a Chick quick-change aluminium faceplate machined to suit a specific, high-density fixturing application. The plate snaps to a repeatability within microns into the Qwik-Lok slide assembly in the unit base, providing functionality similar to a zero-point pallet changer.

Usually there are multiple Qwik-Loks side by side on a VMC table to increase the number of parts under the spindle. The units may alternatively be mounted onto a four- or six-sided Multi-Lok tower to show many more parts to the spindle of a 4-axis HMC.

Alternatively, a Chick indexer sub-system provides similar capability on a VMC by rotating the tower around a horizontal centreline. Lastly, Pneu-Dex units improve machining flexibility on three sides of components by providing accurate incremental rather than 90 degree indexing of the tower on a VMC.

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ITC Celebrates 30 years of UK manufacturing

30 years on and the company founders get together again

For Industrial Tooling Corporation (ITC) 2021 is a landmark year as the UK cutting tool manufacturer celebrates 30 years of business. Here, we take a look back at 30 years of ITC and how this prestigious UK manufacturer has grown over the last three decades, a brand that will be celebrating its anniversary with several 2021 special offers for manufacturers to look out for.

The history of ITC dates back to the late 1980s where the three founders of ITC, Peter Graves, Roy Talbot and Bob Unsworth all worked together at Insley Industrial, the UK agent for US-based Metal Removal Company, one of the first suppliers of carbide tooling in the UK and the world. Following several late 80's mergers and acquisitions, the Metal Removal brand that was the preferred choice of several prominent aerospace and aero-engine manufacturers was looking for a new UK distributor and the three entrepreneurs spotted their opportunity.

Taking up the story, managing director Peter Graves says: "Bob, Roy and myself spoke with Metal Removal and we became the new UK agents, all leaving our jobs simultaneously to set up ITC. We had a business plan, spoke with accountants and got a bank loan to start the company with backing from Metal Removal, which included a bonded warehouse in Northamptonshire. In the early days, we



The 3 directors - Peter Graves, Roy Talbot and Bob Unsworth

provided the orders to Metal Removal and they dispatched products from the bonded warehouse, so we only paid for the products we sold."

"The reason we ended up renting a small office in Tamworth is that Bob lived in Bolton and covered the North, Roy was from the Midlands and I lived near Watford and covered the South. It was geographically central and it was close to Rolls-Royce in Derby. It all started in January 1991 and

there were the three of us, plus two other team members answering the phones. In the early days, our previous employer was trying to disrupt our business and it was a challenging period, but Metal Removal supported us throughout, and after a difficult start, the business started to grow. We bought some stock that crammed our small office before we moved to a larger unit.

"After two to three years, the business grew and Therese and Lisa joined and they are still here today. We recruited our first technical salesmen and gradually set upon our growth trajectory. We then added another brand, Vallorbe Swiss HSS end mills and, around 1995, we heard that Hanita was also looking for a UK agent. We got in touch with them and they invited us to Israel. We were taken back by the energy and R&D investment in the company. By the late 1990s, we had these independent brands on board, but Metal Removal was then bought by Kennametal and within another year or two, Hanita was also acquired by Kennametal.

"After being in business for eight or nine years, we were spending a lot of money on modifications and regrinds, sending tools to an external grinding company. For a relatively small business, this was a significant expense for us. We 'chewed the fat' on whether we should buy a grinding



30 years on and the company founders get together again

machine and subsequently visited MACH. We ended up on the Walter stand, but at that point, we hadn't made any concrete decisions.

"We eventually bought a Helitronic MiniPower, which was our first machine, along with two Deckel S11 manual machines and an S5 for necking. These were soon followed by a Schneeberger Gemini CNC. We had a small lock-up, the size of a triple garage, with three skilled men running the machines. All these machines were bought for modifications and regrinds, with a lot of work being radiusing, reducing diameters and step drills. Even at that early point, Metal Removal supported us by adding the radius to a lot of the tools to help us win business. Nowadays, we do all of the modifications and radii on tools in-house.

"Coming up to 2000, we were busy running the business and selling tools so we employed Paul Marriott as our first production manager and he's still with us more than 20 years later, albeit in a different role. It was at this time we realised we were running out of space and we then moved to our existing site, which used to be a pet food storage facility. We needed more office space, more storage space and the capacity to add more machine tools. Having a larger facility allowed us to run a centralised cooling system for all the machines.

"Manufacturing our tools probably started in the 90's with our subcontract supplier manufacturing products for us as well as undertaking the regrinding and modification of existing tools. However, it was when we moved to our current facility that we started to introduce our own product lines. We are currently on issue 15 of our product catalogue and this annual catalogue has grown year on year. We realised we needed our product catalogue and the need to publish this was expedited by Metal Removal deciding to stop publishing their product catalogue. We started publishing a catalogue full of Metal Removal products and we started adding our product lines into the catalogue. Over the years, the catalogue has grown and nearly all of the products are our own with Metal Removal products playing an ever-decreasing role."

"Since we started, we have changed from being an importer and distributor to being one of the UK's largest manufacturers of cutting tools. We now have a huge range of tools for all applications. You only have to look at the sign-making industry and the



Peter Graves in the modern ITC factory with daughter Georgia and son Elliot, now fellow directors

huge variety of tools we make there. We are the largest manufacturer of cutting tools to the sign-making industry by a considerable margin and we are forever developing new tools.

"As we have evolved, we have continually outgrown our facility. We managed to buy an adjacent facility about six or seven years ago, so we could move our stores and add more machines. This gave us a couple more years before we had to decide on a location. For more than 10 years, we had been waiting for the right opportunity to buy the unit next door. We eventually obtained the premises next door and by adding the two facilities, we have now more than doubled our floor area.

Over the last 20 years, ITC has continually evolved its product lines with the sign-making tools and the micro-cutting tools being perfect examples. Boasting one of the most diverse and high-quality product offerings in the industry is something that ITC has worked tirelessly to achieve and this has seen the addition of WIDIA and BIG KAISER to the ITC portfolio.

Peter Graves continues: "Kennametal also bought the WIDIA brand and WIDIA is one of the world's first manufacturers and longest established brands in the carbide cutting tool industry. Following the acquisition, Kennametal recognised the strength of the WIDIA brand and resurrected it and added the Hanita

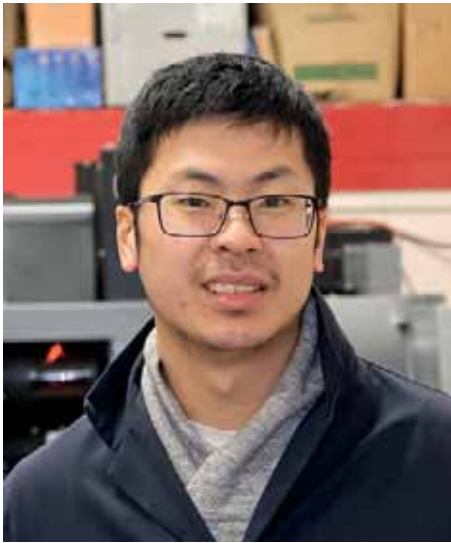
portfolio to WIDIA and this is where our connection with WIDIA started almost 15 years ago. As the Hanita agent, we became the WIDIA agent by default, or essentially the WIDIA/Hanita agent in the UK.

"We had always been recognised as a solid carbide cutting tool specialist and the opportunity to supply indexable tools was something we had long considered, and that opportunity arrived via WIDIA over six years ago. The skill and mindset of selling indexable products compared to solid carbide is somewhat different and we recognised that we needed additional staff. WIDIA was very keen for us to sell the products in the UK, and we now have five sales and applications engineers dedicated to indexable product lines."

Soon after commencing with indexable tooling sales for WIDIA, the company started to work with BIG KAISER. Peter Graves concludes: Customers are prepared to pay for the innovation and quality and, like the WIDIA indexable range, it has opened new doors for our business. It also makes ITC a complete solution integrator for manufacturing businesses."

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Young entrepreneur starts subcontracting business with a pair of Hurco machining centres



Shortlisted for the Young Entrepreneur of the Year Awards 2021 and a finalist in 2020, 27-year-old Alun Cheung attended Farnborough College of Technology and then spent a few years working for a nearby composite components manufacturer. After spells at two contract machining firms, in April 2018 he decided to start his own subcontracting business, SLAC Precision Engineering Ltd

At a time when his friends were buying their first houses, Alun used the money he had saved to rent a factory unit in Basingstoke and put a deposit on a Hurco

VM5i 3-axis vertical machining centre (VMC). It allowed him to take on work that could be machined within a 457 x 356 x 356 mm working volume and he quickly established a loyal customer base within the aerospace, automotive, medical, and oil and gas industries. Jobs so far have been mainly in aluminium, stainless steel and nylon, although virtually any material can be machined.

Two years later, in May 2020, he purchased a larger Hurco VMC, a VM10i with a 762 x 406 mm table, more than doubling his capacity. At the time he was busy fulfilling a contract for a new customer in the satellite communications sector, involving the production of a couple of dozen different, mainly aluminium components in batches of one- to 50-off. Many of the components fitted perfectly in the VM5i and those that were smaller could be fixtured two at a time on the table of the VM10i, helping to cope with the required production volumes.

Today, Alun Cheung also offers subcontract turning and shot blasting in addition to milling. It is a combination of skills that allowed him to start manufacturing his own product at the beginning of 2021, a competitively priced end stop for assisting machinists to position parts accurately in a vice on the table of a milling machine. He

markets the stops under the trade name, SLAC Workholding, wording that is engraved on each holder by the Hurco machining centres using the capability of the manufacturer's Windows-based control.

Alun Cheung comments: "It was the touch-screen CNC system running Hurco's WinMAX software, which offers both conversational and G-code programming, that persuaded me in favour of purchasing their VMCs. Their user interface makes it very intuitive and easy to control for Millennials.

"I had never operated a machine that was so user-friendly from other manufacturers before. However, the consensus among engineers at the companies where I previously worked was that Hurco is the best mid-range machining centre, especially for subcontractors, due to a combination of rigidity, price and the easy-to-use control.

"I was given the opportunity to visit a subcontractor in Aldershot, where many Hurco machines are in operation. I made my final decision after demonstrations at the supplier's High Wycombe showroom."

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Close Brothers Asset Finance funds new machining centre for Luff Engineering

Close Brothers Asset Finance has provided Luff Engineering with a bespoke Coronavirus Business Interruption Loan Scheme (CBILS) hire purchase agreement to finance the purchase of a new Grob G350 5-axis machining centre, which allows for the milling of parts made of a wide variety of materials.

Formed around 15 years ago, Wolverhampton-based Luff Engineering is a subcontract machine shop that predominantly machines cast iron parts but also aluminium.

The new machine was purchased as a replacement for a machining centre that was becoming inoperable and to service new work being promised by existing customers. It also increased the production capacity, allowing it to increase its customer base.



Andrew Maude, area sales manager for Close Brothers Asset Finance's engineering division, explains more about this complex deal: "Luff Engineering had an existing finance agreement with us with around nine months remaining and we contra-settled the existing agreement, rolling it into the new agreement, meaning the customer didn't have to put a deposit down on the new machine, conserving their cash flow; it also meant they only had one monthly direct debit to pay rather than two.

"At the same time, we settled off an existing Bounce Back Loan Scheme (BBLS) loan he had taken at start of the pandemic, which made him eligible for CBILS."

Jason McDonnell, managing director of Luff Engineering adds: "The previous machine was getting difficult to maintain and we needed to move on to something that could cope with our increased workload.

"We've been working with Close Brothers Asset Finance for some time now and we were confident they could

structure a funding deal that would work for us and I'm delighted that they've been able to do just that.

"Industry knowledge is really important, which is where Close Brothers Asset Finance really stands out. They clearly understood what we wanted to do and worked out a deal that suited our needs."

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CGTech offers a commercial FORCE

The sharp downturn in travel caused by the global COVID-19 pandemic has resulted in the grounding of many aircraft and the largest contraction in the commercial aerospace sector's history, with most airlines around the world scaling back or cancelling orders. However, seen in the right context, the current challenges faced by the aerospace industry offer opportunities for commercial OEMs and suppliers to make needed changes. This is where the complete digital NC simulation and optimisation software solution offered by VERICUT can help.

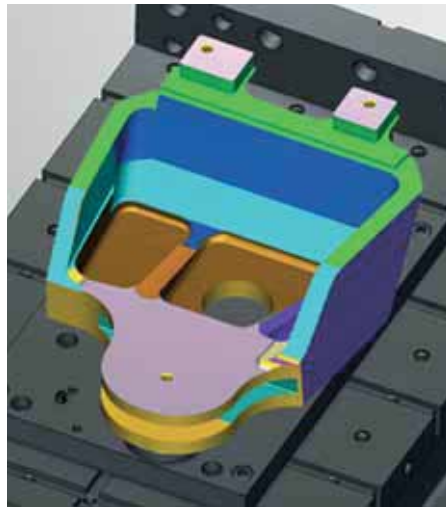
According to a recent report by Glenn Brady, global aerospace & defence leader and partner at PwC in America: "The next six to 12 months are a critical period in which to prepare for the recovery. Rather than simply focusing on cuts, we believe that OEMs and large suppliers should also make needed investments in the future, in five key areas: using technology as an accelerator, stabilising the supply chain, streamlining the workforce, focusing on sustainability and making a coordinated pitch for government support.

"The coronavirus has had a devastating impact on the commercial aerospace industry, but it can also be a catalyst for needed change. When the recovery finally comes, the winners will be those businesses that capitalised on this window and took the steps necessary to emerge stronger from the crisis."

Technology as an accelerator

The use of the digital twin and applying the digital environment to the manufacturing industry is becoming more critical than ever to access commercial business benefits. It will not only ensure that the industry will continue to operate and grow, but also that jobs within the industry are retained, further industry investment is made and a sustainably reduced carbon footprint can be achieved.

Dedicated to supporting aerospace and other advanced manufacturers in improving processes, CGTech is the original CNC 'Digital Twin' developer with its VERICUT software. Using a digital environment with a range of innovative solutions, VERICUT combines the real world with the digital world to ensure manufacturer's processes are detailed, safe and efficient.



VERICUT uses the CNC digital twin to provide accurate in process simulation, verification and optimisation of a true post processed NC file. The digital twin gives instant feedback on any errors or collisions and provides in-process cutting data. The product portfolio is further supported with the additions of VERICUT Composites and VERICUT Drilling and Fastening, both commonly used within the aerospace sector.

Technical director Gavin Powell says: "With most already using advanced manufacturing technologies and equipment, many commercial aerospace companies still have the opportunity to apply digital techniques to unlock more value. OEMs and major suppliers should invest in digital throughout its organisation such as upgrading how new aircraft are

designed and developed. Digital tools such as VERICUT can dramatically accelerate the development process ensuring components can be produced efficiently and reliably. This makes organisations more agile and responsive when dealing with dramatic changes in order volumes."

"In addition, any digital investment will capture better data allowing the commercial, financial and managing director to derive clear insights from it, leading to better decision making. So, the case for making digital investments is clear and we believe the global application of VERICUT along with its FORCE module within the aerospace industry speaks volumes about the commercial benefits available."

FORCE is a software module within VERICUT that uses a physics-based optimisation method to determine the maximum reliable feed rate for a given cutting condition based on four factors; force on the cutter, spindle power, maximum chip thickness, and maximum allowable feed rate. Force calculates ideal feed rates by analysing tool geometry and parameters, material properties of the stock and cutting tool, detailed cutting tool edge geometry, and of course VERICUT cut-by-cut contact conditions.

Commercial benefits

Force excels in difficult to machine materials, especially complex multi-axis cuts such as 5-axis flank milling. While the calculations undertaken within the FORCE



module are complex, the commercial benefits are straightforward and easy to measure.

Any business can access the commercial benefits available from VERICUT FORCE. The software relies on proven technology to maximise program efficiency and productivity and typically achieves savings of 8-15 percent on aluminium and more than 15 percent on difficult to cut materials. Return on investment can often be as little as one production component, with the opportunity to analyse cutting conditions, improve tool life, protect CNC machine tools and reduce operational costs.

This example of a typical aerospace component, an aircraft pylon produced from a titanium forging, has been FORCE optimised. The original cycle time for this component was two hours 47 minutes and the FORCE optimised cycle time dropped to two hours 12 minutes, a reduction of around 21 percent. Based on 500 parts charged at £100 per hour machine time, the optimised cycle would offer a £29,000 cost reduction over the batch.

"Businesses don't need to fully understand how FORCE works to apply it,



CGTech has a global technical team that can help any company unleash its commercial benefits. We know the savings the software offers are measurable and robust, so the results are sustainable. Cycle time savings of around 20 percent should not be ignored. If your machine shop has say ten machine tools running these parts using FORCE optimisation, then two of the machines are now potentially operating for zero cost. How the gains are applied to the bottom line of the business is an internal commercial decision, but with year-on-year cost down

pressures across the industry, having such an opportunity to make these savings should be a 'no brainer'," Gavin Powell explains.

He concludes: "The industry finds itself in strange and unprecedented times. It is critical that manufacturers embrace new methods, strategies and technology to ensure that processes are secure and stable. This will reduce scrap and waste, as well as increase profitability and capacity. Digital data applications can improve performance internally by showing clearly what is happening in areas such as operations, production and assembly. The array of applications is wide and varied, but VERICUT and, more recently, FORCE, have proven track records of providing commercial success for aerospace businesses around the world. If you want your company to exceed its Key Performance Indicators (KPI) you need to talk to CGTech."

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A highly dynamic duo

Premium AEROTEC's Varel plant in North Germany produces highly complex machining components made of aluminium and titanium using one of Europe's most advanced pool of machines. This pool has recently been boosted by a new, highly dynamic duo: A Starrag ECOSPEED F 2040 FMS (Flexible Manufacturing System) consisting of two linked machining centres.

It was almost 20 years ago that Europe's largest aircraft manufacturer first took a chance on the parallel kinematics of the ECOSPEED product lines, a technology that was revolutionary at the time. Thanks to highly dynamic 5-axis simultaneous cutting with a tripod head, these machines still set the benchmark for machining large, complex aluminium structural components today, especially in the aviation industry. Daily tasks include cutting pocket corners with an only slightly inclined land, which requires the angular position to be changed. While standard fork-type milling heads typically make huge swivel movements to do this, parallel kinematics are significantly faster and more dynamic. This is one of the main reasons why 13 ECOSPEED centres are now in use at the Varel site.

"In addition to their reliability, it was the high overall dynamism of the ECOSPEED machines that won us over," explains Christian Welter, head of large-part production at Premium AEROTEC. "This is why we chose two ECOSPEED F 2040 machines as our latest investment, which have been linked to create a flexible manufacturing system." This is the newest highlight of Hall 8, where Starrag machining centres with a drive power of 120 kW currently take centre stage. Having a large number of similar centres makes it easier to



train staff, operate the machinery and perform maintenance, explains Christian Welter, but with each new investment, Starrag and its ECOSPEED product lines must once again face the competition. He adds: "In this tender, we once again saw that the dynamism of the machine is still in a league of its own. But despite this, in the future we will continue to explore other options on the market."

A new angled milling head that can be changed automatically now enables aluminium workpieces measuring up to four metres long to be machined on the FMS, not just completely but in a single clamping position too. Flexibility is a must, since the aircraft manufacturer currently machines 700 different components on its ECOSPEED machining centres alone, for clients including Airbus and the European Space Agency, for Ariane 6.

What's more, this investment in new, even

more productive technology is happening in a production environment that is currently undergoing big changes. "This is a permanent construction site," says Christian Welter. "More and more sensors are being built into the machines, which generate a lot of data. We're currently in the process of learning how to handle and utilise this huge quantity of data."

One of the key aims of digitalising production is to allow the process to be carried out with only a few operators, or even no operators at all. The new Starrag manufacturing system complements this strategy perfectly because the Varel plant has recently switched to using linked systems. "We want to keep setup separate from actual machining," says Christian Welter. "This works extremely well with the new ECOSPEED F 2040 FMS, where we have operators work at separate setup stations."

The Varel plant has been pursuing digitalisation for a long time now, since before the term "Industrie 4.0" was even coined. Consequently, the company has a systematic focus on networking. "For example, we don't have any standalone Starrag machining centres; they are all networked or linked to each other," states Christian Welter. "There is also the factor of security of supply, which we must be able to offer as a manufacturer of Airbus components. This is why, next to each machine, there's another one that can perform the same tasks."

So why not adopt robot handling? "The



FMS currently machines 40 different components, which means we would have needed 40 actuators for the workpiece holder," Christian Welter continues. "It also became apparent that the robot would be stationary most of the time. A cobot system would be an interesting way of facilitating setup here. We are already robotising certain areas of small parts manufacturing, however."

It is difficult for Christian Welter to quantify the impact that Starrag's claim "Engineering precisely what you value" has had on his machine pool. The new investment has not been used for series production for long, he says, but its running time is 10 percent to 15 percent shorter than that of older ECOSPEED systems.

Machine availability plays an equally big part in production at Varel, and it all comes down to manufacturer support. "Overall, we are extremely happy with the service that Starrag offers compared to that of other manufacturers," says Christian Welter. "We've developed an excellent relationship with staff at Starrag over a very long period of time. In particular with regard to certain companies, where, due to rebranding, it's

not always clear who's responsible for what."

Technology in detail

The new flexible manufacturing system (FMS) consists of two ECOSPEED F 2040s, a conveyor system with double loading trolley, a ground-level setup point and storage for machine pallets measuring 2,000 mm x 4,000 mm. The machining centres operate at a nominal output of 120 kW and a nominal speed of 30,000 rpm. The duo enables highly dynamic 5-axis simultaneous machining with up to 1-g acceleration and a maximum jolt of 250 m/s³. The FMS boasts an angled milling head with an HSK A63/80 interface. This head can be changed automatically and receives tools from the tool change system automatically too. It also carries out cutting and drilling operations, which used to be done on a machine supplied by one of Starrag's competitors.

To keep the footprint small, save space and facilitate maintenance, auxiliary units and control cubicles are installed on a peripheral platform above the conveyor



system. A spindle monitoring system detects process fluctuations and stops the machine if it looks likely to overload. Owing to the high cutting rate of up to 95 percent, aluminium chips fall with a volume of 220 litres N each minute. A chip extraction system underneath the machine crushes these chips and transports them through pipelines into the chip unit using a vacuum.

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ASG strengthens its manufacturing offering

Aero Services Global Group (ASG) has acquired one of Liverpool's oldest surface treatment specialists and is now looking to maximise its new 'one-stop' capability with aerospace clients across the world.

The Manchester-based group, which is run by Simon Weston and backed by Amin Amiri of a2e Industries, has purchased King & Fowler in a deal that will safeguard all 59 jobs and signal a new investment drive in processes and plant at its Liverpool factory.

The move will enhance the group's operating efficiencies, provide access to an extended blue chip client base and make the most of a number of synergies that should increase sales for both parties.

It also brings a new manufacturing discipline to the rapidly expanding North West group, with it now able to access world class anodising, plating, heat treatment and non-destructive testing.

This means that ASG will be able to deliver a 'one-stop' engineering portfolio from tooling and machining to assembly and finishing.

"We are delighted to welcome King & Fowler to the ASG family and see this

acquisition as a strategic fit, adding more capability to our portfolio. This acquisition strengthens our commitment to our customers, providing end-to-end capabilities for commercial and military aerospace contracts," explains Simon Weston, group MD of ASG.

"Its reputation in the aerospace sector is well respected, with Nadcap accreditation and over 15 customers approvals already in place. More importantly, it has unrivalled expertise in the surface treatment of critical components and, with renewed investment, we believe we have the opportunity to grow sales by 30 percent over the next twelve months."

Manchester-based Aero Services Global Group manufactures and sub-assembles detail airframe structural equipment and aero engine components for more than 20 leading OEMs and Tier 1 suppliers.

Founded in 2015 with the aim of helping a global customer base consolidate their supply chains through innovation and efficiencies, it started operations with the acquisition of Phoenix Ltd and now boasts eight subsidiary companies.



The group, which employs over 350 people and boasts annual sales of £43m+, is split into two core divisions focusing on aerospace and tooling, providing a wide range of products from simple brushes, complex mill turned components and small, medium and large 5-axis milled parts to tooling, transportation media and fixtures for existing and next generation aircraft fuselages and wings.

Aero Services Global Group
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Victor Vcenter AX630 5-axis VMC

With a reputation for uncompromising build quality and stability, Victor has extended its impressive line of machine tool benefits with the Vcenter AX630 vertical machining centre. Available in the UK from GM CNC Ltd, the Vcenter AX630 takes flexibility to a new level, incorporating a B+C-axis rotary table to facilitate 5-axis machining of large parts up to 700 mm diameter by 500 mm.

The impressive Vcenter AX630 has rigidity and precision incorporated into every aspect of the machine, something that is characterised by the trunnion type B+C-axis table that has a built-in backlash-free roller cam mechanism that is seated on the machine base to maximise rigidity. The B-axis can rotate at up to 17 rpm with 6,880 Nm of torque whereas the C-axis rotation is capable of 33 rpm at 1,960 Nm. Adding to this robust and speedy rotary table that is built into the fixed table, the Vcenter AX630 optimises structure stiffness with the moving column and spindle retaining an optimised centre of gravity. The spindle is fully supported by front slideways when the Y-axis travel is shorter than 300 mm. This ensures optimal cutting performance during the most challenging of operations.

The 9,000 kg workhorse is supplied as standard with the powerful FANUC Oi-MF CNC control unit that drives the tools around the 700 by 500 by 500 mm X, Y and Z axes work envelope with unprecedented precision and speed. Built to speed around this work area is a high-speed 12,000 rpm spindle with the renowned BIG PLUS BBT-40 interface that maximises tool clamping rigidity. Powering the high-speed spindle is a continuous 11/15/18.5 kW spindle motor that generates exceptional levels of torque for heavy-duty cutting of challenging materials at impressive material removal rates. The high material removal rates achieved through a stable machine platform enhances surface finishes beyond the levels of competitor machines in its class. The spindles are manufactured in-house by Victor and each spindle has a unique I.D code to facilitate future servicing requirements and records. Supplied with up to 30 tools via a twin-arm type fast-change tool barrel, customers can also select the machine with the option of 40, 48 or 60 tool positions.

As standard, the high-quality arrival



incorporates a spindle oil cooler, fully enclosed splash guard, rigid tapping facility, remote MPG handwheel, hand tools and toolbox, built-in work light, auto power-off system, levelling pads and a screw-type chip removal system.

Concerning flexibility, the Vcenter AX630 from GM CNC provides the option of a chip conveyor with cart, through spindle coolant from 20 to 70 bar, linear scales/angular encoders for precision levels of 0.005 mm over the full machine stroke, auto tool length measurement, auto part measurement, HSK-A63 interface and also a selection of control units that include the FANUC Oi, 32i and the 31i control or the Heidenhain 640 control units.

For full simultaneous 5-axis machining, the Vcenter AX630 is now also available with the FANUC 31i-B5, the Siemens 840D or the Heidenhain TNC-640 CNC interface. This impressive level of optional additions allows GM CNC to facilitate all your machining requirements, whether you are looking for high material removal rates, flexibility, stability, unsurpassed surface finishes and

precision or all of the above. In essence, this extremely well-built machine is well suited to manufacturers that demand a blend of high productivity levels and flexibility with the guarantee that the machine tool is built to last. For further details on this exceptional addition to the GM CNC stable, please contact your nearest representative.

With decades of expertise in the machine tool industry, GM CNC Ltd is now the sole UK and Republic of Ireland agent for the Victor range of CNC machine tools, plastic injection moulding machines and robotic handling equipment.

By incorporating the Victor brand into the highly dynamic GM CNC business model, manufacturers now have the opportunity to invest in industry-leading technology that is backed by decades of machine tool expertise. This expertise is woven into the very fabric of the business.

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Subcontractor started with one sliding-head lathe and now has ten

When physics graduate Paul Cobb asked his father Reg in 1997 to help him invest in a subcontract machining business specialising in CNC sliding-head turning, Reg Cobb groaned. He knew it would mean a sizeable investment. At the time, both father and son were partners in the family's subcontracting firm in Stapleford, Hemlock Engineering, which specialised in producing mainly prismatic parts and continues to do so.

However, Paul Cobb was keen to embark on a project of his own. He chose not to become a computer programmer or geological analyst but instead started HPC Services. A small factory unit was rented in nearby Ilkeston and a Japanese-built Citizen Cincom L25 sliding-head, bar-fed, turn-mill centre was installed. At the time it was the first of a new, updated design to arrive in the UK.

From that moment onwards, HPC's approach has been to acquire the very latest, most highly productive CNC equipment available on the market, designed to slash production times, reduce costs and improve component quality. Under Paul Cobb's influence, it has become Hemlock's maxim as well.

Over the intervening 24 years, he has bought for HPC around 20 CNC sliding-head, twin-spindle lathes of



nominally 12, 20 or 32 mm bar capacity, all exclusively from the same supplier. Ten Cincoms are in operation, the others having been systematically replaced with newer models. There are also seven fixed-head, twin-spindle CNC lathes on the shop floor of the current premises, where around 30 staff are employed.

When Paul Cobb launched HPC, he took with him from Hemlock one production job to get him started, a shaft for a sell-by date label printing machine. The food industry still accounts for around one-third of HPC's turnover. The job previously involved turning the component in two operations, after which it was ground and then milled on a machining centre, all in a total time of seven minutes. On the Citizen L25, the same

job was completed in one hit in a one-minute cycle. The parts are machined today on a different slider at a rate of 1,000 per month.

Due to complete machining in one setup, the components produced by HPC were of better quality, five microns concentricity and 10 microns dimensional tolerance being held reliably. Moreover, the price charged to the customer has consistently fallen in real terms due to the progressively higher level of automation on the newer lathes, which allows longer periods of unattended running, 24/7.

Paul Cobb comments: "Over the years, turned parts subcontractors from around the world have quoted for this work. However, by harnessing the efficiency and accuracy of machines like the Cincom sliders we are globally competitive on price as well as quality, even for large production volumes.

"In the past that was not the case, but it is possible now with modern, ultra-high speed plant. And of course, our delivery times are much better than Far Eastern competition can offer, added to which control over projects is easier. As a result, we are seeing a strong trend towards reshoring of work."

Today, HPC has some 5,000 different part numbers on its books. Components are produced from 38 mm diameter bar or smaller on the Cincoms. Quantities range from 100- to 40,000-off in a vast range of materials, from exotic alloys through stainless steels, brass and aluminium to plastics. The two million parts machined annually account for two-thirds of the company's £3 million annual turnover, the remainder being fixed-head turning. 10 percent of revenue is reinvested every year in new plant and equipment, a proportion that also applies to Hemlock's £7 million turnover.

One of the latest components produced at HPC in one hit on a sliding-head lathe requires only milling, there being no turning content at all. The parts are being machined on one of a pair of recently delivered Cincom M32-VIIIIs of a radically different design compared with the earlier M32s on site. The first of the new machines was delivered in November 2020 and Paul Cobb



was so impressed with its performance that a second arrived a month later.

The prismatic component looks as though it has been machined from flat bar but is in fact milled from 303 stainless steel round bar, as it is difficult to source flat bar in that material in the UK. Part of a date-coding machine, it is produced in one operation in a cycle time of four minutes 53 seconds on the lathe, whereas it would require four operations totalling seven minutes on a vertical machining centre.

A year or so before the arrival of the two new M32s, which have been supplied with kits to allow bar up to 38 mm diameter to be accommodated, the chief designer from Citizen's Japanese factory visited HPC to ask Paul Cobb what he would like to see in the fifth generation of this sliding-head lathe. His response was, "more rigidity". The Japanese manufacturer obliged, endowing the latest model with box guideways rather than linear slides, a tang instead of a worm drive on the turret and higher power motors throughout.

Paul Cobb explains: "The difference is amazing. It is possible to machine exotic alloys at double the speed compared with on a fourth generation M32 and you get four



times the tool life, especially as coolant is now delivered through the tool platen as well as the turret.

"It is a massive step up in performance. A 10 mm cutter purrs into the bar, even using a mill with carbide inserts rather than a solid carbide tool, which we need to use on the earlier M32s. Any production

engineer would know that the new model is a very rigid machine."

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Plastic injection moulder upgrades toolroom

Halving of milling times creates opportunity for more subcontract work

It was as recently as 2012 that manual plus two-and-a-half-axis CNC milling gave way to full 3D machining of plastic injection moulds on a 3-axis Vertical Machining Centre (VMC) at family-run toolmaker and plastic injection moulding specialist Plasticom Group. Since that time the toolroom has undergone a transformation, with 2020 alone seeing investment of £250,000, mainly for the purchase of a Sodick die sinker and a German-built Spinner 3-axis VMC from UK sales agent Whitehouse Machine Tools.

Arrival of the latter machine at the end of September 2020 coincided with the departure of a 25-year-old CNC milling machine. It fell to toolroom coordinator Ian Alexander to investigate the best replacement for it. Three were considered and the Spinner was selected due to the comprehensive specification of the standard version of the manufacturer's VC750.

It includes linear scales, 22-bar through-spindle coolant, a swarf conveyor, Blum TC52 spindle probing, 24-station BT40 tool magazine, 12,000 rpm spindle, Siemens drives with up to 36 m/min feed rate and the latest Sinumerik 840D control with 24-inch Industry 4.0 multi-touch display. Ian Alexander estimated that the equivalent package from other suppliers would have cost half as much again.

He says: "The VMC represented the best value for money by far and the latest Siemens control is a real bonus. It allows us to program cycles to produce complex forms directly at the machine, taking the load off our CAD/CAM department.

"We also like the rigid, cross-table, C-frame design, which results in superior



cutting performance and component geometry. The ability to probe a part before it comes off the table and re-machine it if necessary is a big time-saver and makes us more competitive.

"The Spinner is between 30 and 70 percent quicker than our other VMC, depending on the type of component. I should say it halves cycle times on average due to faster axis movements, the extra rigidity which allows heavier cuts to be taken

without causing vibration, and the latest Siemens control.

"It offers so much more productive capacity that there will be a lot of spare time to take on additional subcontract machining, which at present accounts for only a few percent of turnover."

Operating from a factory of nearly 20,000 sq ft in Ashford, Kent, Plasticom has longstanding, high profile customers including household names such as

Stanley Black & Decker, Games Workshop, Qualcast and Swann-Morton, as well as a host of smaller firms that call on its services. It was invited in March to be part of the UK government's Ventilator Challenge UK consortium and staff worked long hours under considerable pressure to ship 15,000 plastic ventilator parts to McLaren Racing to a very challenging schedule.

The company is accredited to ISO13485:2016 and has a Class 7 clean room for assembly of medical devices. Its plastic injection moulding capacity utilises



machines rated from 20 to 530 tonnes, including automation and extends to twin-shot moulding and overmoulding. Manufacture of press tools, vacuum forming tools and die casting tools also forms part of its remit, while other services include ultrasonic welding, blister and other packaging techniques, laser welding and printing.

The 60-years-established company is owned by chairman Edwin Simmonds and his wife, Sonia, group finance director. Sonia Simmons comments: "More than four-fifths of the injection mould tools we make are used in-house to produce a very wide range of parts for customers, a side of the business that accounts for a similar proportion of our turnover.

"Keeping the moulding section operating is therefore crucially important to us, so we look to our machine tool suppliers to provide prompt aftersales backup.

"The service that we have received so far from Whitehouse has been fantastic, both in terms of the technical input and the training.

"Our shop floor staff have had one week's tuition so far but no limit has been placed on the amount we will receive in the future, free

of charge, which is unusual and a great reassurance."

Ian Alexander has adopted a policy of buying in bolsters from Meusburger to allow Plasticom to concentrate on 3D milling and sparking of tools. A fixture sits permanently on the table of the Spinner VC750 so that each new bolster can be clamped quickly prior to machining of mould inserts within the 760 x 460 x 460 mm working envelope, which is large for the machine's 2.6 x 1.7 m footprint.

He also advised that dimensional tolerances down to a few microns are routine and the surface finish achieved is "fantastic". In aluminium as well as Stavax, a mirror finish can be achieved using standard, mid-price, carbide end mills and considerably less polishing is needed overall.

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Embracing change

There's a transformation taking place at Southampton-based precision subcontract specialist, BSA-Regal Engineering Ltd, a division of BSA-Regal Engineering Holdings.

It's not the type of transformation that is so gradual, or so limited in its scope or scale, that its impact and effects go largely unnoticed. Instead, this is a root and branch transformation: a radical repositioning of the company focused on improvement and growth and concerned with strengthening and elevating BSA-Regal Engineering's position within its existing supply chains and on winning new high-value business in different sectors and industries.

The recent investment made in two new advanced MACH 1062-HD machining centres is a case in point and demonstrates that BSA-Regal Engineering is a company that is going places.

BSA-Regal Engineering Ltd. has recently invested in two new large-capacity vertical machining centres from MACH Machine Tools, part of the Vigilance Group of companies. The machines, both MACH 1062-HD models, X-axis/1,020 mm; Y-axis 625 mm; Z-axis 610 mm, were installed at the company's 12,000 sq ft facility in Southampton at the start of 2020 with the first arriving in January and the second in February.

Since their installation, both machines have been and, are being, put through their paces machining a range of high-precision components, prototypes and one-offs through to larger batch series, from an equally diverse range of materials for BSA-Regal Engineering's growing UK and international customer base.

The MACH 1062-HD decision

The two MACH 1062-HD machining centres selected by BSA-Regal Engineering are high performance machines. They were acquired to improve the company's machining capacity and capabilities and have replaced three of the company's older machines which were used in part exchange to help fund the new investment.

Martin Clayton workshop supervisor BSA-Regal Engineering explains: "To achieve our growth objectives and to make us more productive and competitive, we need access to high-performance CNC machine tools that deliver the accuracy, speed and process reliability we expect and that our customers demand.

"In recent years we have initiated an investment programme to replace our older manual, semi-automatic and CNC machines with more advanced machines that now includes multi-tasking lathes and a 5-axis machining centre. The two new MACH 1062-HD machines are part of this ongoing improvement programme."



The Siemens control dimension

BSA-Regal Engineering has made the decision to standardise the control systems on its machine tools in favour of Siemens. This move has helped the company achieve greater operational efficiencies and improved machine tool utilisation, allowing programs to be transferred between machines and, as a consequence, helping to reduce production bottlenecks.

Siemens control systems, with onboard ShopMill or ShopTurn conversational programming software, are also the control of choice with BSA-Regal Engineering's apprentices. Martin Clayton explains: "To plan for the future and to address the ongoing skills shortage, we have introduced an in-house apprenticeship programme in cooperation with City College Southampton. All (three) of our apprentices' favour and are more confident using, the Siemens CNC control platform."

With this in mind, BSA-Regal Engineering also traded in a relatively new Heidenhain-controlled machining centre, as well as the two older VMC's, for the two new MACH 1062-HD models.

The MACH 1062-HD machines in action

The machines are equipped with powerful, high-torque 18.5 kW/10,000 rpm, direct-drive, BBT 40 chilled spindles. This advanced spindle technology delivers excellent performance i.e. high-accuracy volumetric removal rates and superior fine finishing operations.

The MACH 1062-HD machines' through-spindle-coolant capability is also proving its worth helping to make BSA-Regal Engineering's machining processes more reliable and helping the company to reduce part cycle times, by employing higher speed and feed rates and extended tool life.

The high-efficiency chip auger system on the machines is helping to reduce machine downtime and is particularly advantageous during long machining runs. And the incorporation of the GSA 4th-axis unit, which can be used on both machines, increases the machines' flexibility.

Martin Clayton concludes: "We are delighted with the performance of our MACH 1062-HD machines. As intended, they are making us more productive, efficient and competitive.



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KMF continues to invest in production and performance

Precision engineering firm KMF has invested in a significant piece of equipment which will double critical capacity. Due to an anticipated increase in demand post COVID-19, the group has purchased a second Yamazaki Mazak QUICK TURN 250MSY to complement its suite of Mazak equipment.

The Mazak QUICK TURN is a high-performance turning centre equipped with a Smooth Mill Drive turret capable of machining a range of parts accurately and efficiently. Materials such as standard steels, aluminium, stainless steel and more exotic materials such as Inconel are easily machined to precise tolerances.

Adding to the facility's capacity with this piece of equipment means the KMF Group can further support its clients in the aerospace, instrumentation, scientific and medical industries.

Keith Nicholl, commercial director at KMF Group says: "The machine is co-located with an existing QUICK TURN 250MSY, effectively doubling our capacity to allow us to respond to increased demands from our

new and existing customers. Both machines are linked to our offline programming capability resulting in high levels of machine cutting efficiency, 24 hours a day and seven days per week and a quick response for short lead time or prototype needs.

"COVID-19 affected many businesses and as we emerge from the worst of the crisis we're positioning ourselves to ensure that we're fully prepared to support customers across various sectors with immediate effect. By investing now and being business ready, we can proactively support our customers with their own revival."

The QUICK TURN 250MSY has a 500 mm bed capacity and is equipped with a 10 inch chuck on the main spindle and a six-inch chuck on the secondary spindle enabling part sizes up to 380 mm to be effectively machined. Its capability enables most components to be machined completely off the machine, which in turn improves efficiencies. It's also equipped with a Hydrafeed Multifeed magazine bar feed, enabling unmanned running of small to medium batch quantities.



Keith Nicholl concludes: "This MSY complements KMF's collection of other Mazak machines, which includes two HCN 5000-III horizontal machining centres served by an 18 station PALLETECH system, a VTC-800/30SR vertical machining centre and a VARIAXIS i-500 simultaneous 5-axis machining centre. This machinery provides capabilities suitable for any of our customers' machining requirements."

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ROBO-TEND and vertical machining centre package make automation an easy decision

As industry recovers from the COVID pandemic, businesses will face renewed challenges as production ramps up again. The skills shortage has not gone away; if anything it will have worsened, making the availability of machine automation more pressing. To help meet these challenges, XYZ Machine Tools has created an automation and machine package that will provide a cost-effective route to maximising productivity.

The package revolves around the three machine LR series of XYZ vertical machining centres, the XYZ 500 LR, XYZ 750 LR and XYZ 1000 LR, with prices starting at £99,870 for a combination of the 500 LR and the XYZ ROBO-TEND® fully automated production cell. The ROBO-TEND system features a KUKA Cybertech robot with 10 kg lifting capacity, larger versions available, with vision system, along with an automated drawer system for storage of raw material and finished components. A major advantage of ROBO-TEND is the ability for it to be quickly disconnected and repositioned, either to another compatible XYZ machining centre or to allow conventional operation of the machine with an operator, if required.

To encourage greater use of automation, XYZ Machine Tools has made this package more tempting with the addition of several features that would normally be classed as cost options. These include automated vice,



swarf conveyor and automated door system. In addition, the package comes with complete training and warranty to ensure maximum performance from day one and complete reassurance. XYZ ROBO-TEND is a UK designed and built system that was developed to provide cost-effective automation to small and medium-sized companies, that would not normally consider automation of this type as 'being for them'.

XYZ ROBO-TEND addresses this perception, making automation viable for lower volume production. Nigel Atherton,

managing director of XYZ Machine Tools says: "The availability of skilled labour is an issue that will not disappear and small to medium sized businesses must automate lower skilled jobs, such as machine loading/unloading, freeing up valuable skilled employees to add value further down the line. We believe ROBO-TEND will open up automation to a much wider audience at an extremely competitive price. Whether purchased with finance with very low hourly costs or purchased outright where payback can be a matter of months, these packages are a powerful argument to automate the manufacturing process, whatever your production needs.

These ROBO-TEND/XYZ machine packages from XYZ Machine Tools provide a versatile, user-friendly, modular approach to automation and, subject to component size, are capable of operating unattended for a full shift, or even operate 24/7 with the only manual intervention being to restock the raw material in the part storage system if required. This makes it ideal for those companies that need to improve productivity but may be struggling to find the personnel or skills to operate machines.

The ROBO-TEND/XYZ vertical machining centre automation package presents a perfect opportunity for cost-effective unmanned machining for a wide range of customers.

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 world's best control systems, namely ProtoTRAK® and Siemens, has seen the product range become the nation's first choice for prototype and low volume production.

The company has the capacity to assemble and deliver over 100 machines per month and parts can be ordered at any time through the spares and tooling web shop. Most of XYZ's employees are long service personnel who have worked for the company for more than 15 years.



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The colour of success

Mills CNC, the exclusive distributor of Doosan machine tools in the UK and Ireland, has recently supplied Birmingham-based Cutting Blue Ltd, the newly-created manufacturing arm of engineering consultancy and training specialist Cutting Blue Solutions Ltd, with a new Doosan vertical machining centre.

The machine, a large-capacity DNM 6700, was delivered and installed at the company's 2,000 sq ft facility in Saltley in September 2020 where it is being used to machine, in mainly small batch sizes at this moment in time, high-precision and high-value components for a range of customers operating in the motorsport and general engineering sectors to name but a few.

The creation of Cutting Blue Ltd is the brainchild of owner and managing director, Piotr Parobczy. Having started his working life, first as a machine tool setter and then as a CAD/CAM programmer, Piotr Parobczy used this knowledge and experience, gained from working in a number of different manufacturing environments, to develop and hone a range of specific engineering consultancy skills.

The acquisition of these skills ultimately enabled him to start and secure work as a contractor where, over the years, he was responsible for the design and implementation of innovative and high-value projects for a number of UK and internationally-based customers.

Following on from this success and, having built up an impressive track record, in 2017 Piotr Parobczy set up Cutting Blue Ltd, an engineering service company providing specialist training and consultancy services to blue-chip and progressive manufacturing companies.

He says: "Cutting Blue Ltd, began its life as an engineering consultancy. However, even back then it was always my ambition and intention to create a manufacturing company when the time was right."

That time, as it transpired, was in Spring 2020. Piotr Parobczy explains: "The pandemic outbreak had a detrimental effect on the availability of contract work and this proved to be the catalyst I was waiting for. As the creation of a manufacturing company was a long held ambition of mine, I was not starting such an undertaking from scratch. To a large extent, much of the spadework



and planning had already been done."

These plans covered all aspects of the business including the location of the new company, the services it would provide and typical customer profiles etc.

Piotr Parobczy continues: "I chose Birmingham because of its central location and because I knew the area well. From my background and experience the company would not be a 'jack of all trades' operation but instead would offer specialist, high-precision machining, milling, services to customers typically operating in the high-end motorsport, automotive and aerospace sectors."

To realise its ambitions and objectives, Cutting Blue needed access to advanced machine tool technologies and made the decision, from a reliability perspective and to provide a clear statement of intent, to invest in a new rather than a used machining centre.

Cutting Blue approached a number of machine tool manufacturers with its requirements. Piotr Parobczy explains: "A number of companies I approached sent in literature etc., but didn't follow things up. I got a different reception and reaction from Mills CNC who, from the outset, adopted a more proactive and partnership approach. They took time to understand the business and the type of work that would be

undertaken and they worked collaboratively with me to identify the optimum machine tool solution."

Understanding the type and size of components to be machined, the typical materials to be machined, the typical part accuracies and surface finishes that would be required and the volumes/batch sizes to be machined resulted in the identification, selection and ultimately the purchase of a Doosan DNM 6700 large-capacity vertical machining centre.

The FANUC-controlled DNM 6700 installed at Cutting Blue's facility is a highly-rigid machine that delivers speed, high accuracy and unrivalled process reliability. It is equipped with a 18.5 kW/12,000 rpm directly-coupled, high-speed, spindle, a 1,500mm x 670 mm work table with a 1,300 kg maximum table load, a 30-position ATC, roller LM guideways, all axes and thermal error compensation.

The machine was also supplied with a Blum TC50 workpiece touch probe and Blum ZX Speed IR tool setting probe.

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Protecting your production with Kraft & Bauer

Many engineering companies may not have heard of Kraft & Bauer and yet most are end-users as their fire prevention equipment may be found protecting machines of all types. Major machine tool companies such as Index, Traub, Tornos, Walter, Ewag, Rollomatic and Reishauer fit these systems as standard and every year Kraft & Bauer UK retrofits its fire prevention units to machines of all kinds such as those made by Mazak and DMG MORI.

All UK engineering companies are urged to ensure that their machines are protected against fire risks as demanded to comply with the law and to make sure that the fire systems are covered under the mandatory annual service conducted by Kraft & Bauer specialists. These fire systems are not serviced as part of annual service checks carried out by the OEM machine tool companies engineers and in the event of a fire incident or insurance check a validated service certificate for each machine needs to be provided.

The consensus on risks of fire on machine tools is that any machine that uses oil, machines a self-combustible material, such as titanium or magnesium alloys when cutting dry without coolant or produces a spark, proposes a direct risk of fire and this must be protected against. End users of machines can access the "You and the Law" pages on Kraft & Bauer's website to learn more.

Besides injuries to persons, the consequences to engineering companies in the event of a machine tool fire may be high due to production stoppages leading to insolvency. Many engineering companies think that insurance is sufficient, but don't take into account that unless annual service certificates for the fire systems can be provided any insurance policy is likely to be invalid and even if it is and a claim is settled without delay, it would take many months before factories and machines may be replaced. Their customers will probably not be prepared to wait and would instead go and find alternative suppliers while they were still trying to recover from a fire incident.

Starting from a legal basis, the aim is to protect workers as comprehensively as possible against fire and explosion hazards during the use of machine tools and manufacturers of machinery and also users



of machine tools have key legal obligations. When using flammable metalworking fluids, the employer has the duty to determine within the framework of a risk assessment if a hazard caused by fire or explosions on machines is possible. For this purpose, when purchasing any machine tool, he should firstly ensure that the machine is compatible with the metalworking fluids intended to be used.

So what are the causes of machine tool fires? Most incidents are connected with the generation of incandescent chips, high-energy sparks or hot surfaces, which act as ignition sources. Root causes included broken or worn milling cutters, drills, turning inserts and grinding wheels. As a consequence of technical developments concerning machine tool feeds and speeds together with the trend towards low-viscosity metalworking fluids used at very high pressures, then the fire risk has increased dramatically in recent years.

In the immediate vicinity of the machining zone a reactive mixture of metalworking fluids and air is formed, which may be ignited by the above-mentioned ignition sources. The resulting fire propagates very quickly through the whole interior of the machine tool. The pressure increase accompanying ignition is less important than in the case of an explosion inside a totally enclosed machine. However, due to the pressure increase inside the machine, flame ejections may occur through gaps, pressed-open enclosure doors, feeding and



chip removal openings and pressure relief openings, if no relevant provisions are taken.

For the protection of machine tools, automatic fire extinguishing systems with gaseous extinguishing agents, commonly either carbon dioxide or, in case of machining titanium or magnesium, Argon Gas are used. The legal requirements for fire protection is that if a machine is ran automatically then a fully automatic fire system must be used and if a machine can only ever be ran manually then the fitment of a manually activated system is otherwise sometimes acceptable. However, in both cases the system must be fully integrated within the machine tool itself and having

hand-held or externally used systems is not acceptable.

Even when not using an oil-based coolant and dry machining titanium or magnesium-based alloys, a major fire risk still exists. The problem is that when being machined titanium can be prone to causing fires and explosions that can easily damage and sometimes destroy expensive production machinery. During machining, small particles of titanium can be heated up past the point of ignition and small piles of these particles will readily burn. However, when mixed with oxygen this burning can quickly extend from one particle to the next in a highly rapid manner and as the metal itself generates oxygen when burnt an explosion



results. Laboratory tests have shown that very little titanium "powder" is needed to cause a catastrophic fire or explosion and any discharge of static electricity will produce an electric spark that will raise the particles of titanium past its ignition point resulting in an explosion. Electric switches on machine tools, loose electrical connections and any metal-to-metal contact is enough to produce a single spark that can set off an explosion. To make matters worse, the amount of heat generated when machining titanium does not dissipate quickly as titanium is a poor conductor of heat and therefore the hot spot is usually concentrated right back onto the tool or cutting edge and this often results in rapid breakdown of the tool itself.

The use of worn or damaged tooling will quickly generate a great deal of heat and result in the titanium catching fire. For this reason, it is always recommended to keep a close watch on tooling and change it before it starts to wear. It is not without reason that powdered titanium is used in pyrotechnics as a source of bright-burning particles.

The cutting of magnesium alloys offers similar problems to titanium as magnesium chips or dust is also classed as self-ignitable or easily flammable and as with titanium the machining processes offer such risk that,

according to EU machine directives, production machines themselves should be equipped with fire detection and protection devices to avoid the risk of damage to machines and of course injury to operators. When heated, magnesium powder will ignite and will burn with a very intensive white light. Magnesium fire reacts very violently with and, cannot be extinguished by, water since hot magnesium reacts with the water to release hydrogen that will further feed the fire.

It is important that the chips created during the machining process are kept as large as possible and are not allowed to build up within the working area; the regular cleaning of machines is crucial as is the correct storage of magnesium swarf. Magnesium powder is used in the manufacture of incendiary bombs, fireworks and marine flares where a brilliant white light is needed; this light can be so intense that it can permanently damage the retinas of the eye.

It also has to be ensured that a fire is detected as early as possible and that the fire extinguishing system is activated without delay and the fire detection elements are a key criterion for fire protection. They must guarantee the safe detection of fires in a fast and reliable way

and activate the extinguishing process via the control system. For automatic activation of the extinguishing system, thermal heat detection elements are used in conjunction with optical fire detection elements, Infra-Red or Ultra Violet light systems. These are placed within the machine and at other places, where fire hazards exist. The sensors are linked to both optical and acoustic alarms that must be at least 5 dB louder than the background noise to alert operators to the fire incident and to warn them to vacate the area.

Mandatory annual maintenance tests have the purpose of the timely detection and repair of damage as well as ensuring safe operation and these are also required by insurance companies.

Additional information on fire detection and extinguishing systems for all machine tools is available from:

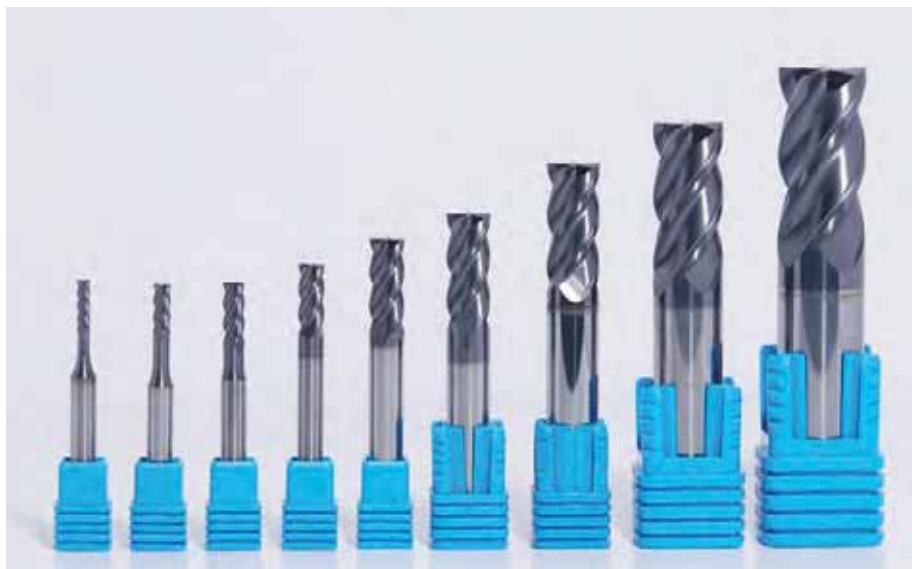
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Quickgrind now offers Amazon ordering

Purchasing cutting tools from Tewkesbury cutting tool manufacturer Quickgrind has now been simplified with the company's product lines available to purchase on Amazon. Recognised for its 'Infinite Possibilities' approach to customer requirements in the arena of cutting tools, Quickgrind is now making 'next day' delivery of standard product lines a certainty.

Quickgrind has built an established position in the industry for its level of innovation and technology that has rightly earned the company the reputation for delivering on its 'Infinite Possibilities' slogan. By making a range of standard products available on the Amazon platform, customers can now order cutting tools as late as 10 pm in most areas with guaranteed next day UK delivery. Furthermore, customers can get free One-Day Delivery on eligible items, consolidated shipping and Amazon Day with predictable and convenient weekly deliveries.

While the 'Infinite Possibilities' service of technologically advanced cutting tools that are bespoke engineered solutions will continue to be provided through the Quickgrind engineering team, the company will introduce a standard series of high-quality innovative products through the Amazon logistics platform. Quickgrind's commercial manager, Tim Darch explains the benefits of using the Amazon platform: "Amazon is the world's most successful online consumer retailer and something that every household is familiar with. Amazon Business is now growing faster than Amazon itself." Using the proven Amazon platform for selling cutting tools will open new doors for Quickgrind, while guaranteeing customers that they can order next day delivery as late as 10 pm. No cutting tool manufacturer with established logistical platforms can provide a service that offers such a responsive service. Additionally, this



move not only opens Quickgrind up to the whole UK market but also further afield as well, such as the US, Europe and Australia in the future.

Tim Darch continues: "From a business perspective, it will give Quickgrind exposure to enthusiasts, job shops and small manufacturers while simultaneously providing new and existing customers with the facility for ordering standard tools for next day delivery, even during the afternoon or night shift. Add the fact that 50 percent of the FTSE 100 companies use Amazon business, the service is equally applicable to larger manufacturers as well. This opens up access to our tooling for a wide variety of companies. At Quickgrind, we don't see why people should have to compromise on their tooling quality or prices paid just because they are ordering small volumes."

The Amazon online store is familiar to most households and businesses alike and this familiarity reduces the complexity of purchasing for work purposes and it can reduce procurement time spent on administration of orders. Being able to automate approval processes, all part of Amazon Business, can help dramatically reduce this administrative burden.

Additionally, customers control and consolidation of spend can be achieved through a single 'multi-user' account with built-in features to control how and what users buy. This eradicates what procurement staff call "long-tail spending" and rogue spending. Customers can track all their orders with ease and transparency,

leveraging the expansive Amazon Business store produces lower costs with quantity pricing available and reduced shipping costs. For example, customers can spend just £80 for unlimited deliveries per year. This provides manufacturers with the traceability and confidence that staff can order cutting tools for the urgent jobs that may come in at short notice. Following this, reconciliation against company accounts and tracking is simplified with PO numbers matching the receipt or the commercial credit card statement on your organisation's accounts.

Tim Darch concludes: "This really is an exciting opportunity for Quickgrind and we can see huge opportunities for both our business and our customers. Amazon will stock a complete line of standardised Quickgrind tools in bonded warehousing held at Amazon fulfilment centres and this will be available for enthusiasts and manufacturers to order in any quantity size that is required. Amazon will automatically update Quickgrind on purchase orders and stock levels and we will replenish and even adjust the Amazon stock levels to meet the requirements of the industry."

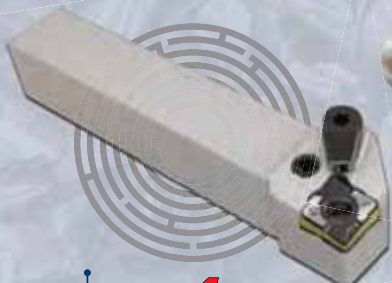
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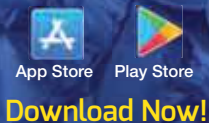
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Say goodbye to vibrations and hello to optimised surfaces and longer tool life

As a direct interface between tool and machine, toolholders and adapters have a huge influence on the machining result and efficiency of the entire process. Hydraulic chucks play a vital role when it comes to vibration damping and improved surface quality and repeatability. Maximising this role for turning and milling centres, CERATIZIT Group's Team Cutting Tools has launched new variants of its hydraulic chuck range with VDI and cylindrical shank connections as part of the WNT Performance range of tooling.

While repeatedly machining to low tolerances and achieving optimal surface finish are high on any machinist's priority list, if tool wear, setup times and downtime are neglected then efficiency will suffer. CERATIZIT's new hydraulic chuck with VDI and cylindrical shank interface ensures all of these elements can be achieved to deliver efficiency advantages.

This latest addition to CERATIZIT's portfolio provides the ideal solution when boring bars need to be precision clamped with a shank tolerance of h7. The new hydraulic chucks with VDI and cylindrical shank connections can achieve this with a repeatability of 3 µm. The key benefit is that in applications such as thread turning, fine boring or with long tool overhangs, the precise tensioning and damping properties of the CERATIZIT hydraulic technology can reduce surface roughness by up to 70 percent when compared to standard systems. Another feature of the CERATIZIT hydraulic chucks is the radial adjustment screw, which can be used to position the boring bar to µm accuracy on diameter. Similarly, the length adjustment screw can also be removed so that the boring bar can be pushed through for efficient machining of various lengths of turning tools.

The hydraulic chucks are available with a VDI interface for direct mounting in the turret of a turning centre complete with through tool coolant capability. 30 and 40 VDI comes as standard with a 20 mm bore, along with a cylindrical shank version available in 16 and 20 mm bore diameters



for the 32 mm diameter shank as well as 16, 20 and 25 mm for the 40 mm diameter shank variant.

In addition to the accuracy of hydraulic chucks, another significant advantage is the speed at which tools can be changed without having to make tedious fine adjustments. "Without any peripheral devices whatsoever, just a hex wrench, tools in turning and milling centres can be changed in a matter of seconds. The hydraulic adapter clamps the tool shaft to µm precision and the process can continue right away," says Christoph Retter, product manager at Team Cutting Tools. "It is always fascinating to see what a huge influence the clamping device has on the machining result. In our comparisons between standard holders and the new hydraulic chuck, we were immediately struck by the outstanding chip evacuation. But we were most impressed by the surface finishes achieved, which were simply sensational thanks to the almost complete absence of vibrations. Another side benefit worth highlighting is that the entire process was almost completely silent."

More information can be found at <https://cuttingtools.ceratizit.com/gb/en/machining-know-how/tool-clamping/product-overview/hydraulic-chuck.html>

For more than 95 years, CERATIZIT has been a pioneer in the field of ambitious hard material solutions for machining and protection against wear. The private company, with registered offices in Mamer, Luxembourg, develops and produces highly specialised cutting tools, indexable inserts, rods made from hard materials and wearing parts. The CERATIZIT Group is a leader in various application segments and successfully develops new carbide, cermet and ceramic grades, such as for wood and stone working.

The company is constantly investing in research and development and holds more than 1,000 patents. Innovative hard material solutions from CERATIZIT are used in various sectors, including mechanical engineering and toolmaking, in the automotive and aerospace industries and in the oil, gas and medical industries.

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New universal line from Floyd

With the recent pandemic forcing more businesses to look at their costs, Floyd Automatic Tooling has now introduced the new cost-effective MicroTurn eLine of boring tools from Ifanger. The new MicroTurn eLine MTEE is an optimised universal boring tool that is less expensive than Ifanger's existing MTEC or MTEN tools and significantly more cost-effective than solutions from alternate vendors.



Available as a right-handed boring tool with seven variants, the universal inserts are the perfect solution for small bore machining starting from Ø1.80 mm bore, Ifanger also offer solutions down to Ø0.30 mm in their main program. With the new eLine MTEE, the series incorporates a positive cut 8° rake angle and a short neck length for maximum rigidity and stability. Additionally, this cost-effective line is 25 percent less expensive than existing tools in the Ifanger MicroTurn boring series.

The new MTEE line is available with a 4 or 6 mm diameter shank with an overall length of 31 or 43 mm. It has a neck length from 5 to 19.5 mm and corner radii from 0.05 mm to 0.15 mm. The MTEE Series inserts are currently available uncoated, which retains edge sharpness and precision when machining certain materials, and with TiALN coating.

Complementing the MTEE line is the classic series of Ifanger boring inserts that incorporates the MTEC, MTEN, MTKE, MTKH boring and copying tools. For profiling applications, Ifanger has an extremely diverse range of geometries and coatings to support manufacturers with all their threading, grooving, chamfering and axial plunging requirements.

All inserts in the Ifanger MicroTurn eLine are supported by the MTHA toolholder and positional device for the rapid and precise changeover of tools. Sitting within the MTHA toolholder is the Ifanger MTHZ, MTHD and MTHS collet chuck, thrust collar and screw. The innovative and compact design ensures that end users can attain unsurpassed levels of precision, rigidity and repeatability when changing the inserts with the simple and accurate clamping design taking user friendliness to a new level.

While the new MTEE line has been designed to cater for the majority of small boring applications with the most commonly used dimension ranges initially available, Floyd Automatic Tooling and Ifanger can customise this extensive range upon demand to ensure that the entire small boring demands of the industry are met.

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Parker gets a grip on automation

As a US \$14 billion corporation, the journey of Parker Hannifin started over 100 years ago when Arthur Parker founded the Parker Appliance Company back in 1917 from a loft with business partner Carl Klamm. Through the generations, the company has moved from pneumatic brake systems for trucks, trains and buses to aerospace systems and technology, air preparation and dryers, EMI shielding, filters, separators and purifiers, fittings, couplings and much more.

With dozens of divisions, brands and a global reach, Parker Hannifin is a genuine world leader in motion and control technologies. At the company's Sheffield site that manufactures cryogenic valves, the company has recently installed a machining cell with Hainbuch workholding equipment at the heart of the investment.

Commenting upon the product range manufactured at the site, Parker Hannifin's Lloyd Cooper says: "The products we manufacture are high in diversity and low in volume numbers. In terms of part numbers, we probably have about 20,000-part numbers at the top level, so high diversity and low volume is what we do. This allows customers to order what they want and our USP is the ability to service that request. This creates a lot of demand on our machine shop with regards to setups, as we may be running a batch of three or four-off jobs before we move to the next product. This means we incur a lot of setup times and we have been looking at the ratio of 'setup to run' times. There may be a 45-minute setup for a 10 or 15-minute production cycle. These numbers didn't stack up and Parker has a real keen focus on lean manufacturing."

To streamline production, Parker Hannifin has invested around US \$500,000 in an automation cell to combat the excessive setup times in the turning department. "We



had three machines that were fully depreciated, and we wanted to remove those machines and create one comprehensive machine and cell. We really looked at how we could make it a complete cell," Lloyd Cooper says.

The new production cell incorporates a Hydrafeed MV65 bar feeding system that feeds a DMG MORI NLX2000/500 CNC turning centre that is then unloaded by an ABB Flexloader robot system. Lloyd Cooper explains: "We looked from a cradle to grave perspective on how we could make it a true cell, and this is where the ABB Flexloader helps us to do unmanned loading, unloading, deburring and clean down.

"One of the crucial solutions in this cell is the Hainbuch hydraulic chuck system. As a high-mix business, what Hainbuch has allowed us to do is switch from one collet size to another in 30 seconds or even change from a collet to a jaw configuration in two to three minutes. Previously this could have been 45 minutes. It is a 'night and day' difference to our business and whilst it may be a considerable investment, the savings we are making in efficiency will make this a sub-two-year payback.

"The workholding has probably been the singular reason as to why we wanted to do this project. We wanted something that would compress our setup times, as we were

incurring many, many setups every hour. Hainbuch did that with an off-the-shelf solution and no additional requirement from an engineering perspective. The quick-change aspect of it is astounding. The ability to change from collet size to collet size in 30 seconds is really impressive, and we have even had some changeovers in 15 seconds. This can give us a door open to door close time of less than a minute."

He concludes: "As businesses, we look at robots and we may be afraid of the complexity of it, but this has been a very smooth process and when you consider a payback of fewer than two years, it should be a formality for UK manufacturing businesses. We are planning to pass on the savings to our customers, and this is a credit to this cell and its ability to produce parts 80,



90 or even 100 percent quicker than we were previously."

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Productivity and efficiency will be the watchwords after COVID-19

As industry in the UK and Ireland emerges from the pandemic lockdown, improvements in production efficiency will be essential to maintain competitiveness in a global marketplace. Many original equipment manufacturers and the subcontractors in their supply chains will be pitching for sales in an environment characterised by fewer business opportunities in the short term, suppliers hungry for work and smaller profit margins. Only the most productive companies will survive.

The position that Salisbury-based workholding and automation specialist 1st Machine Tool Accessories takes on the challenges facing industry is that they are in fact opportunities. The current situation continues to give machine shops, at least those not involved in supplying parts for vital medical equipment, the time to take stock of how effectively they are manufacturing components. They can carry out in-depth analyses of their processes to see where cost can be driven out while still maintaining the high quality needed in order to sell the resulting goods. Unit production cost is everything and there are many ways of reducing it.

Magnetic clamping for prismatic machining

One of the most recent agency lines taken on by 1st MTA is the range of electropermanent magnetic workholding and handling equipment from Walmag in the Czech Republic. The manufacturer asserts that swapping from the use of conventional vices to a magnetic solution allows five sides of a component to be machined in one hit, typically raising output by a quarter for no increase in production cost. Further benefits of the technology include shorter lead-times, allowing jobs to be invoiced more quickly and no deformation of workpieces while they are being held for milling, drilling or grinding.

Walmag has gone so far as to calculate the comparative cost benefit of producing a part in one operation using magnetic workholding rather than in two operations using compressive clamping. The analysis is based on milling a 400 x 600 x 20 mm



component on a vertical machining centre in a 30-minute cycle. The saving derives solely from being able to fixture the billet once in one minute instead of twice in a total of eight minutes.

Based on £16.20 per hour to employ an operator and £43.20 per hour for use of the machine tool, the £5,079.24 capital cost of the Walmag clamp and control unit is amortised in 49 days in single-shift operation or in half that time for a double-shift pattern. After that, there is a net saving for the manufacturer of £103.95 per shift, assuming 15 workpieces are machined.

1st MTA offers a large portfolio of workholding equipment for securing components on machining centres during 3- to 5-axis machining operations. These include the Italian Tecnomors range of manual and automatic indexing chucks, Chick workholding equipment from the US including base plates and trunnion-type arrangements for multiple workpiece clamping, Leave (Taiwanese) and Abbott (US) fixturing products, OK-Vise manual and pneumatic clamps from Finland and BEST centric, self-centring and zero-point fixturing from Germany.

There are also the RotaVice UK

manufactured manual indexing head, zero-point clamping products from Czech manufacturer V-Tech and Kitagawa (Japanese) 4th/5th-axis rotary tables as well as its Swift Klamp range of manual and automated workholding devices that exploit the simplicity of the HSK tool interface.

Quick-change chucks for lathes

Another example of monetary savings in manufacturing through reducing job setup times, this time when turning or turn-milling, comes from the use of quick-change chucks supplied by 1st MTA, which is sole agent for these and all other products from Kitagawa.

Switching from hard jaws for a first operation, op 1, to soft jaws for a second, op 2, requires removing them, cleaning the serrated interface, bolting on the soft jaws, inserting the boring ring and skimming the jaws. It all takes time, during which the spindle is not turning and production stops. A quick-change chuck, on the other hand, has the ability to eliminate a majority of this wasted time, decreasing the delay between the end of op 1 and the beginning of op 2 by as much as 90 percent. Instead of wasting 20 minutes, changeover typically takes just two minutes.

The process relies on three soft jaws

machined for securing a specific component remaining attached to their respective base jaw counterparts. Sets of these assemblies can be tightened and released quickly using a manual key, allowing them to slide in and out of a chuck with minimal delay. The solution also ensures that runout is kept within 10 µm of the original Total Indicator Reading (TIR).

As an illustration of the possible savings, 1st MTA has prepared a cost comparison that shows return on investment in a very short time when using a Kitagawa Quick Jaw Release QJR (QJR), 254 mm, 10 inch, 3-jaw, large-through-hole power chuck with five sets of standard metric quick-change jaws plus soft jaws, which all costs £6,124. The chuck interchanges directly with a standard Kitagawa BB 210 large-bore version, priced at £2,177 with five sets of jaws, with which the comparison is made.

Average time saved when exchanging the QJR instead of the BB chuck is 15 minutes. Based on three setups per day and an estimated machining cost of £60 per hour, the daily saving for the three changeovers is £45. The difference in purchase price between the two chucks is £3,947. At £45 saving per day, the time required to break even is slightly less than 88 days. On this basis, the total saving by the end of the first year is £12,478, after which the annual saving is £16,425.

Apart from the significant financial advantage, 1st MTA points out that secure, high quality workholding is an essential facet of cost-effective turning and can enhance a lathe's performance, whereas poor retention of a workpiece can reduce output, lower quality and compromise safety.

In its standard range, the company offers a wide variety of jaw, scroll and collet chucks, powered or manually operated. Tailored



solutions are also supplied for holding components during turning operations, ranging from slight modifications to a standard design in most cases to, for special requirements, highly engineered bespoke items. Although these are often elaborate and require increased initial investment, such solutions can be highly cost-effective, particularly in large volume production applications or when manufacturing awkwardly shaped parts.

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With ever more complex geometries and freeform surfaces, tool and mould construction places the highest demands on clamping technology. Koller Formenbau tackles these constantly increasing challenges with modular zero-point clamping technology from AMF. The visualisation in the 3D model clarifies interfering contours in advance and prevents collisions. This ensures great flexibility during the five-side processing and increases machine running times. What has proven itself in the upper palatinate is also spurring productivity in China.

“Today’s moulds and tools with their complex contours place significantly higher demands on clamping technology than the products of earlier years,” emphasises Markus Ferstl, head of the milling department at Formenbau Koller GmbH in Dietfurt-Oberbürg. Today, more and more features are being assimilated into the tools and thus into each assembly and module of a mould. As a result, geometries and contours are becoming increasingly complex and, by the same token, the requirements of workpiece clamping technology are increasing for collision-free cutting in the production of components. In conjunction with five-side processing that is as automated as possible, challenges must be mastered that no one could have imagined six or seven years ago.

“Thanks to the modular zero-point clamping technology from AMF, we clamp quickly and with repetition accuracy and at the same time achieve the greatest possible flexibility for largely automated five-side processing,” reports Paul Schaffner, who is jointly responsible for the milling department.

At the main site of the automotive supplier, which manufactures prototype and series tools or series plastic parts made with them for all known OEMs and suppliers,



tools for a wide variety of parts are created on more than 20 machines. Since plastic parts are also manufactured at the other sites in Schwaig and Lupburg as well as in Pécs, Hungary, Mexico and China, the group has developed into a global technology company and specialist in lightweight components. The individual companies develop and produce lightweight interior and exterior components made from intelligent composites such as PU-GF honeycomb, CFRP, SMC or individual hybrid variants. In this way, loading floors, hat racks, CFRP wet-pressed parts and injection moulded parts are created for small batch and mass production in the automotive industry with a special emphasis on lightweight construction. Therefore the new Audi A3, new Porsche Macan or SUV models from Jaguar Land-Rover benefit, for example, from the manufacturing expertise of Koller Formenbau just as much as an upcoming electric vehicle from VW.

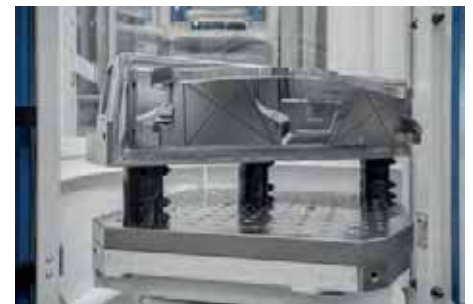
In the toolmaking facility at Dietfurt, 160 specialists manufacture tailor-made injection moulding and composite tools as well as systems and fixtures for external customers as well as for the companies in their own group. This includes both problem-solving expertise from toolmaking as well as experience from the series production of parts. Customers therefore benefit from the entire global value chain, including the vision, component

development up to the industrialisation and series production.

The toolmaking experts of Koller in Dietfurt master the challenges every day, since 2015 with the help of zero-point clamping technology from Andreas Maier GmbH & Co. KG from Fellbach. At that time, the AMF Showmobil Andreas drove to the Koller yard. The employees were able to have the technologically leading clamping technology products and solutions demonstrated live and immediately recognised the tangible advantages that can be achieved with modern clamping technology in production. “Ever since that time, AMF’s zero-point clamping technology has been indispensable for us,” assures Paul Schaffner.

Modular zero-point clamping systems from AMF’s extensive standard portfolio are used on almost all of the 22 machines. This includes clamping pallets in the dimensions 630 x 630 mms with 214 positioning holes M8 with 15 mm adjustment as well as mechanical assembly clamping modules K10 as single and double modules. The clamping module has high retracting, locking and holding forces. It is opened and locked mechanically. The two companies have cooperated closely on grid plates. AMF supplied some of the plates as well as the drawings for one machine and Koller manufactured the clamping plates itself.

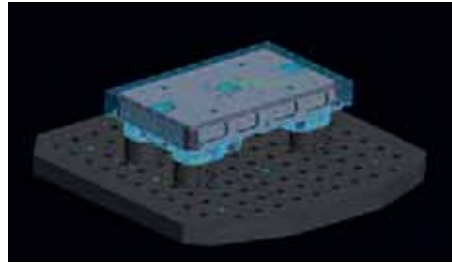
For example, a 5-axis machining centre from GROB is equipped with a circular automated pallet changer with 13 pallets. The workpieces are clamped directly on the pallets. The pull-studs with engagement screws in the hardened bushings of the clamping pallets hold the pull-studs of the structural and spacer elements. They are available from 20 to 100 mms. With the defined grid pitch, each pallet offers the greatest possible flexibility for positioning the elements. Finally, a zero-point clamping



module K10 is positioned at the top, which pulls in and locks the M8 or M10 pull-studs screwed into the workpiece with 10 kN and holds it with 25 kN force.

For direct clamping, the holes necessary for the pull-studs are made directly in the unmachined part. The visualisation in the 3D model beforehand is an indispensable aid. Paul Schaffner also explains why: "In this way, we can identify any interfering contours for the necessary five-side processing at an early stage and our designers plan the bushings in such a way that there is no risk of collision.

The components made of different materials are often first roughed and then mostly hardened. After the finishing and other processes, such as drilling or



threading, it is often necessary to erode as well. "During all of these process steps, the zero-point clamping technology from AMF brings us significant timesaving benefits, since we also incorporate the zero point that was measured once in all other machines and processes. With AMF technology we have drastically reduced setup times and increased machine running times from 80 to 140 hours," explains Paul Schaffner. With appropriate planning, we can also manufacture at weekends with minimal manpower.

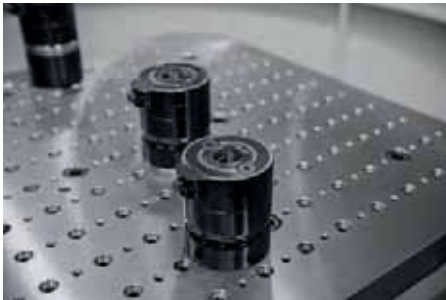
Apart from saving time, there is often another benefit, promises Christian Vogel, a sales engineer at AMF: "If workpieces are clamped with our zero-point clamping technology, there are fewer vibrations during machining. This leads to a better



surface quality, which shortens process times or sometimes makes subsequent processes superfluous."

In any case, in toolmaking of Koller in Dietfurt, the clamping solutions with zero-point clamping technology from AMF that have gradually been built up since 2015, have proven their worth. "In fact, so well that we have transferred these solutions one-to-one to our toolmaking facility in Nanjing," concludes Markus Ferstl.

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Tampa Bay steel invests in future success

Tampa Bay Steel, a proud member of the North American Steel Alliance, is one of Florida's largest steel service centres and metal processing facilities. Originally founded in 1980 in an office that was less than 200 sq ft, the company now operates in a 10,000 sq ft office, with 220,000 sq ft of warehouse space, eight acres of outside storage and 125 employees.

Specialising in cutting of both flat products and structural shapes, in various grades of carbon steel, stainless steel and aluminium. Tampa Bay Steel's laser centre features six advanced TRUMPF and Mazak machines and the recent addition of the Mazak FG-220 DDL tube laser cutting machine, the first commercial implementation in the USA. Dave Carpenter, engineering & estimating manager says: "We are an innovative company and are always looking for ways to improve our manufacturing workflow. For example, we have an automated loading and unloading system for the laser department which has delivered a huge productivity boost in cutting material up to 3/4" thick. The company has always invested in people and technology with an emphasis on manufacturing productivity. Everyone works hard to evaluate and deploy the latest technology that is most beneficial to the business. Our latest addition is the Mazak FG-220 DDL which cuts a large range of tube and pipe and can also completely process channel, beams and angle iron with high precision tolerances and great 3D flexibility."

Other manufacturing operations include CNC burning with HD plasma and flame



cutting machines, waterjet cutting with advanced bevelling, sawing and shearing, CNC milling with a number of HAAS VMCs and metal forming with four Accurpress and two SafanDarley electric press brakes.

Cutting edge software

With a comprehensive list of processing capabilities, Tampa Bay Steel is also a power user of CAD/CAM software, an eight-person engineering team uses both SolidWorks and AutoCAD for design and a production team predominantly using SigmaNEST for manufacturing. "In the past, we used to program all our machines using their own package," explains Dave Carpenter. "I had one programmer who knew how to run burning, one who knew how to run laser and another for the waterjet. Our cutting machines were operating as islands that required specialised programming and it resulted in bottle necks and machine idle time. Now we have consolidated with SigmaNEST and I can throw any program at anybody and have them program it for any machine to match workflow capacity.

"One of the reasons we chose SigmaNEST was because of future machine



purchases. We didn't want to be constrained to run each machine with its own proprietary software. We wanted a system that would allow us to purchase machines from a range of manufacturers and select the best machine for the manufacturing process. SigmaNEST allows us to focus on our core business while entrusting nesting and CNC programming to the experts.

"We are always keen to utilise the latest software developments and SigmaNEST version 20 included significantly improved bevelling capabilities. We had one particularly demanding customer project that needed parts with very tight tolerances which is especially difficult on a waterjet machine. The SigmaTEK engineers worked late on Friday evening and again on Saturday morning to troubleshoot our issues, share cutting tricks and help update the post processor. Since then, we have cut those parts two times and everything is coming up perfect with no problems at all and it's the best support I have ever received."

Efficiency is key

According to the U.S. Department of Commerce, the fabricated metals sector is the third largest U.S. manufacturing industry, when measured by employment and the most highly labour-intensive compared to the average manufacturing industry with 12 percent of all the manufacturing employees in the United States.

"Staying ahead of the industry trend line is key and ensures we remain competitive and profitable," says Dave Carpenter.



"SigmaNEST has been hugely beneficial as it's allowed us to improve all areas of the manufacturing workflow from quoting through to production. Our estimators are all using SigmaNEST and can push jobs directly into production knowing the job will be programmed exactly as quoted. Most importantly, we have been able to add new

machines and grow the capabilities of the company without needing to add more people. For example, we have just installed the latest Mazak OptiPlex 3015 Fiber Laser and were up and running with SigmaNEST on day one."

Looking to the future

The team at Tampa Bay Steel are confident about the future, even with the uncertainty of COVID-19. Importantly, Tampa Bay Steel was identified as an essential supplier during lockdown and were able to maintain production with their normal staff. Dave Carpenter concludes: "Our biggest challenge is internally balancing our schedule to meet the needs of our customers. Many of our customers require their job immediately and SigmaNEST allows us to insert a work order quickly, so we can always find a way to adjust and balance our workload."



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Smart manufacturing with four linked Hexagon solutions

With the ongoing demands to the business to reduce lead times and costs from initial design concept to final production components coming off tooling, a large toolmaking company needed to look at fresh opportunities to streamline their process.

As it looked around the market place, Petford Tools was attracted to Hexagon's renowned Smart Manufacturing solutions, as a few years earlier it had received demonstrations from VISI. In particular, it was impressed at being able to verify collision-free toolpaths with NCSIMUL, creating an identical digital twin of the machine tool to simulate the actual G-code.

Even though Petford Tools' previous system was fully integrated into their factory processes and it was a major upheaval to replace it, managing director Adrian Lloyd says having a fully connected workflow now, with four of Hexagon's seamlessly connected solutions, was "well worth it."

The four software packages are: WORKXPLORE, used by the sales team; VISI for the mould designers; WORKNC for programming its eleven 5-axis and 3+2-axis machine tools; NCSIMUL to accurately simulate the toolpaths.

Petford Tools Ltd is one half of the Petford Group, designing and producing moulds for Petford Moulding, who use them on its own injection moulding machines to



produce millions of piece parts every year for a range of industries. Products include interior and exterior automotive trim, interior aerospace trim, along with aero engine parts and a wide variety of products for construction, industrial, rail and marine industry sectors, along with commercial trucks, garden-ware and F1 racing teams.

Design director Ian Foy says it's important that the mould tools are high precision due to the complexity of the tooling, with many moving components. Also, many of the moulded products need a high-quality surface finish: "So we have to ensure that

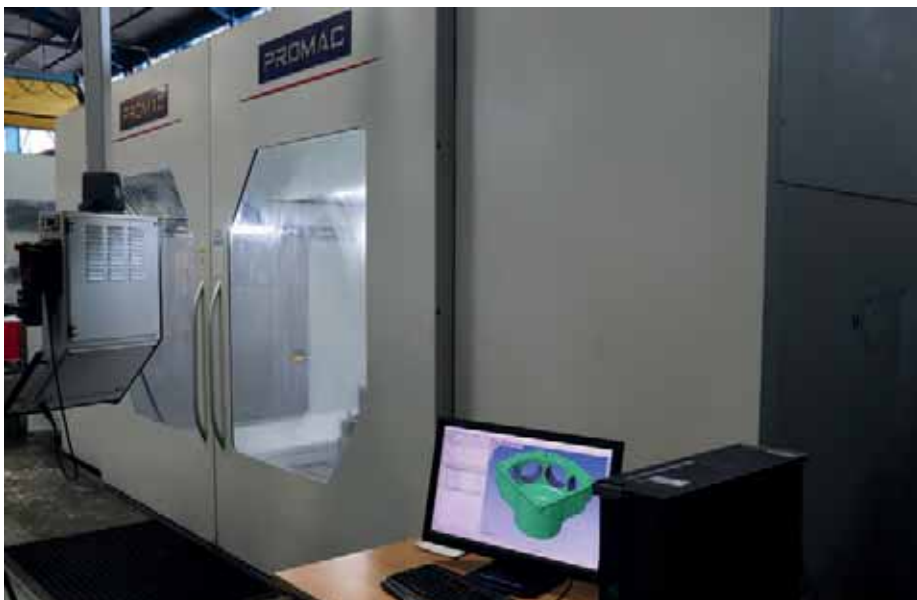
the mould cavity finishes are high quality, too. Some of the mould tool tolerances need to be +/- 0.01 mm."

Many of the 114 employees across the group, use at least one of Hexagon's solutions and tooling operations director Dave Parr says incorporating the Smart Manufacturing ethos across processes contributes to its vision: "Engineering solutions for tomorrow's challenges," and its strategy: "One-stop-shop for our customers needs, offering multiple services to our customer base."

Before a project reaches his tooling team, it has already seamlessly passed through WORKXPLORE and VISI. When the sales team receive an enquiry, often in the form of a CAD model, the file is imported into WORKXPLORE for an initial design and feasibility review, enabling them to provide an accurate costing of the job for a customer quote.

Ian Foy explains that WORKXPLORE really does live up to its reputation of being a high-speed CAD viewer and analyser: "It's particularly effective at reading different CAD formats extremely quickly, so we can import large CAD files and assess them immediately. This is a major benefit for us, as our previous CAD package was quite lethargic with larger size files."

Any additional index modifications are done in VISI. But VISI really comes into its own once the order has been placed: "We



use it to work closely with the customer on creating a final, feasible cost-effective product for robust tooling. Then we proceed with full tool design in VISI."

Once the mould tools have been signed off, the files are imported into WORKNC where the toolpaths are created for the company's 3+2 and 5-axis machining strategies. This software solution provides automated, efficient toolpaths which deliver dramatic productivity gains through shorter machining times, longer tool life, the improved surface finish which Petford Tools need for many of its moulds and better machine utilisation.

Before starting to cut metal, however, they need to know that the toolpaths are 100 percent accurate. Dave Parr says: "With 5-axis machining, collisions would be very expensive, both in terms of money and wasted time, so we run a full simulation of the G-code in NCSIMUL."



This is achieved by virtually building up a digital twin of the real-life machining environment, which also shows tool wear and tool load. When the tools are ready, they move to Petford Moulding to start running off products on 11 Krauss-Maffei and Engle injection moulding machines ranging from 160-tonnes to 1,700-tonnes lock, equipped with pick and place robotics. Moulding services include trial support, APQP quality validation, with full dimensional analysis and 24/5 volume support.

Overall, seamlessly integrating Hexagon's four solutions to create a single, connected workflow, enhances the dedicated one-stop-shop services that Petford provides for its customers, including tooling modifications, tooling texture and 24/7 breakdown/repairs, along with full CAD technical support and project management. And for customers wanting a lower cost product, a team of technical engineers are based in Shenzhen, providing Petford's 'Low Cost Far East option.'

Concluding, Adrian Lloyd says the connected workflow that Hexagon brings to its operation, readily overcomes their biggest challenge, which is meeting customers' demands for lower costs: "WORKNC and VISI handle the full data of large models much better than our previous system, meaning we can import and work on it quicker. This allows us to be more proficient throughout the workshop. We can react quicker with WORKXPLORE at the start of a project and NCSIMUL ensures that there are no holdups during the machining process."

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ESPRIT helps Pindel Global Precision answer the call for life-saving components

Wisconsin-based contract manufacturer rises to the urgent challenge of producing ventilator parts with minimal turnaround time

Founded in Milwaukee, Wisconsin in 1947, Pindel Global Precision has endured through some of the country's toughest times including wars, economic recessions and, presently, a pandemic. The appearance of unlikely heroes is one silver lining of difficult times and Pindel might just be one of 2020's best.

Pindel, an ISO9001:2015-certified contract manufacturer of precision-machined parts for global customers, typically serves the industrial control and automation industries. When COVID-19 hit, CEO Bill Berrien saw an opportunity to help: "We put our name out there as a candidate willing to make ventilator parts at cost. There was a national, humanitarian urgency to meet the need. We had to raise our hands."

At the same time, Pindel was in the middle of another big change in switching the shop from PartMaker to ESPRIT. "PartMaker support had been gradually disappearing after it was acquired by Autodesk," says Bill Berrien. It's not getting the investment that it needs, especially when it comes to CNC Swiss and complex turned parts." Additionally, Bill Berrien and his team were frustrated by the frequent editing that PartMaker's programs required. Pindel decided to make the switch to ESPRIT due to its emphasis on continuous innovation. He adds: "ESPRIT's regular feature launches, AI capabilities and reputation for creating great, edit-free NC code make it a better choice to help the team work together and work quickly."

Bill Berrien acquired Pindel in 2012 with a professional history overflowing with



achievements. After college, he embarked on one of his most formative experiences when serving the country for nine years as a Navy SEAL officer. "They say that once you leave the SEALs, you spend your entire life trying to recreate the experience," Bill Berrien explains. After the military, he earned a graduate degree from Harvard Business School before heading to the Midwest to work for GE and, ultimately, Pindel.

"I believe that manufacturing can replicate that SEAL experience," he continues. "You've got a small, highly cohesive, highly trained team trying to do outsized things." Responding to the manufacturing needs of a global healthcare crisis only highlights the possibilities of this model.

COVID-19 was Pindel's watershed moment, and ESPRIT made the transition as smooth as possible. Bill Berrien continues: "Mark Quartana, regional sales manager and Derek Peters, application engineer, were great. We asked Derek to program the part on Friday. Our team here in Wisconsin worked through the weekend and Derek kept in touch with us. By Monday, we were cutting chips on test material on all five different part numbers. By Tuesday we were making parts and by Wednesday we were anodising them."

Bill Berrien says that the key to successfully navigating this transition was

trust, both in ESPRIT and his team: "It's very similar to what I saw in the Special Operations community. You don't have a single leader giving direction on the little points. Instead, you build a team, give them a goal and you let them go without meddling. This leadership approach empowers the team to problem solve as they need to."

Today, as Pindel continues to manufacture ventilator parts at full speed while simultaneously pursuing AS9100D certification, Bill Berrien looks toward the future: "I believe that on the other side of this crisis, there is going to be a realisation that the legacy mindset around supply chains is no longer applicable. The default setting of OEM sourcing teams, using the cheapest components from Asia-based chains, is misplaced. We've got a tremendous amount of automation right here and a capability and capacity to deliver production parts immediately. We've got the technology, the ecosystem, plenty of untapped capacity and an incredibly skilled workforce. We can change the paradigm; we should be the factory floor for the world," he concludes.

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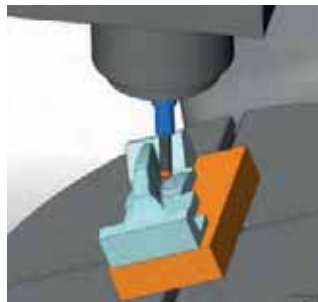
NTT chooses ModuleWorks 3+2 automated roughing technology

NTT Data Engineering Systems has integrated ModuleWorks automated 3+2 roughing cycles into its Space-E/CAM software. The ModuleWorks components enable Space-E/CAM to automatically calculate the optimal roughing toolpath to reduce setup and machining time.

Integrated into the Space-E/CAM software, the ModuleWorks components automatically calculate the machining directions and create a collision-free 3+2 roughing toolpath, even for complex shapes with undercuts. This significantly accelerates job setup because Space-E/CAM operators no longer need to determine the machining direction by eye. The automatic indexing algorithms fully exploit the maximum reach of each tool to reduce the number of tool changes for each job and because the toolpath areas do not overlap, there is no over-machining. The algorithms control the tool axis and encompass the entire machining area, which means they also generate safe and reliable toolpaths for 5-axis simultaneous roughing.

Space-E/CAM with integrated 3+2 roughing technology

For finishing cycles, automatic 5-axis indexing allows NTT to use a shorter tool overhang which increases the quality of the machined part. The ModuleWorks algorithms can also be used with lens and barrel tools to bring further performance advantages, for example by using large stepovers.



As part of the integration project, NTT Data Engineering Systems and ModuleWorks worked together to test and optimise the automatic 3+2 roughing algorithms. During machining trials at the Okinawa Manufacturing Lab, the Space-E/CAM software with integrated ModuleWorks algorithms accelerated toolpath generation by 78 percent, compared to Space-E/CAM without the integrated ModuleWorks components.

Heiko Weber, head of digital manufacturing at ModuleWorks, says: "It's great to see how our 3+2 automated roughing components help NTT take Space-E/CAM to the next level of development and improve machining efficiency, especially in the complex field of die and mould machining. Working closely together was the key because it enabled experts in different disciplines to analyse the process chain in detail and brainstorm solutions to get the most out of our combined technologies for every step, from the roughing to the finishing processes. We look forward to an ongoing successful cooperation and to continued developments in our solutions."

ModuleWorks is a leading software component provider for the digital manufacturing industry. With over 200 employees and 900-man years of software development, ModuleWorks' expertise in toolpath creation and simulation is recognised throughout the industry.

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OPEN MIND hyperMILL 2021.1

Innovative functions for mould making and mill turning

The new 2021.1 version of the hyperMILL® CAD/CAM suite offers a wide range of new functions for even higher surface qualities primarily in tool and mould making. In mill turning, OPEN MIND now offers an option for simultaneous turning and HPC machining. In addition, a new function available in hyperCAD®-S allows you to easily align stock and model data, which is particularly useful before reworking additively manufactured stocks.

The 5-axis Radial Machining function makes programming easier while delivering top surface quality. This new strategy allows toolpaths for bottle shapes, for example, to be calculated much more quickly using a radial projection method. An indexed tilt per cut allows each step to achieve the best possible surface quality. In addition, the standard integrated high-precision surface mode, for ultra-precise surfaces in the µm range and smooth overlap strategies are available in transition areas.

Best possible surface quality

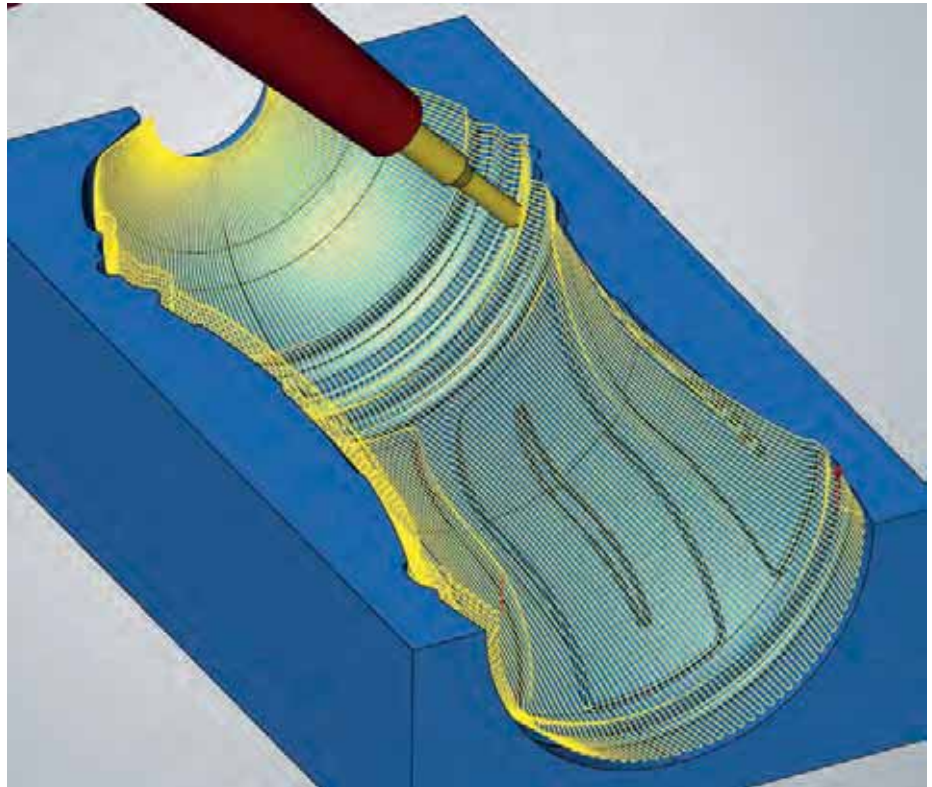
The new XY Optimisation in 3D Profile Finishing function, which improves machining with X- or Y-axis infeed strategies, hones the smooth overlap strategy to perfection. If an area cannot be optimally machined in the X-orientation on a steep wall, for example, it is automatically machined in the Y-orientation in order to maintain a constant infeed. The optimised blending in the overlap area makes changes to the machining direction invisible on the workpiece.

Edit toolpaths interactively

hyperMILL 2021.1 from OPEN MIND provides a new, extremely convenient and intuitive option for subsequently editing toolpaths. The "Edit toolpath" Interactive mode gives you great flexibility, for example, to select and remove existing toolpaths at selected points and curves or entire toolpath sequences between two G0 movements.

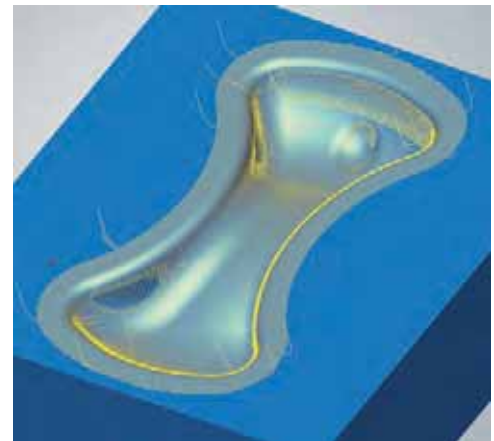
hyperMILL adds turning to its repertoire

With the optional hyperMILL MILL-TURN Machining module, OPEN MIND once again demonstrates that it's a leader in the field of multi-axis machining strategies and now



applies its milling expertise to turning. To combine all the advantages of HPC turning and simultaneous turning, the high-performance mode has been integrated into 3-axis simultaneous roughing. This makes it very easy to use high-performance toolpaths with an optimised approach and retract movements during simultaneous turning. Simultaneous roughing is enhanced with the advantages of HPC turning at the push of a button, so combining both technologies with maximum user-friendliness. The benefits include not only shorter machining times, but also increased process reliability, a longer tool life and the option to use shorter clamped tools.

The integrated hyperCAD-S CAD software provides a new function, which is particularly helpful when the workpiece to be milled differs only slightly from the stock. In cases where a high-precision pre-cast part or an additively manufactured workpiece needs to be reworked, the "Align Best Fit" function ensures that the CAD model of the workpiece fits perfectly in the stock's model. CAD model data can be aligned with each



other on the basis of defined pairs of points, an algorithm automatically calculates the best possible alignment and the user can use various parameters to control exactly how the alignment should look. They can lock translation and rotation axes as well as define a weighting between the individual pairs of points. This allows, for example, meshes of stocks or welding areas to be optimally and quickly aligned in relation to the actual CAD model.

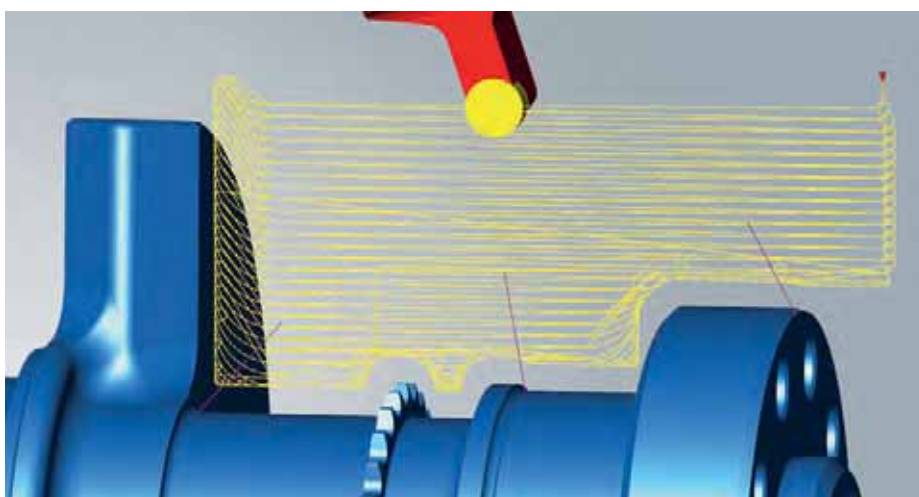
OPEN MIND is one of the world's most sought-after developers of powerful CAM

solutions for machine and controller-independent programming.

The company 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 2020" compiled by CIMdata. The CAD/CAM solutions of OPEN MIND 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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SmartCAM v2021 released

SmartCAM® v2021 features new viewer applications which extend the applications scope for SmartCAM; SmartCAM Toolpath/Process Model file read-only capability, designed to be used by any personnel requiring access to information held in the SmartCAM CAM program file. Additionally, the release includes enhancements to the User Interface, Customisation, Code Generation and macro system capabilities

Viewers are available for each of the Turning, Milling, Fabrication and Wire EDM SmartCAM product application families. SmartCAM Toolpath/Process Model files contain manufacturing information over and above toolpath. Anyone who requires access to toolpath and supporting information and data can benefit from using a SmartCAM Viewer. These include CAM engineers & machine setter operators reading job information and verifying toolpath during prove-out in the machine shop, tool setters viewing tool reports and other tool and setup information, fixture builders viewing workholding arrangements, estimators accessing cycle times and sales engineers demonstrating technology when selling a manufacturing or parts service in the field.

"Without doubt, 2020 was a challenging year for everybody. Our development plan took a new turn in remote working and team communication, but we are pleased to deliver the set of practical enhancements in this our latest release of SmartCAM," observes Doug Oliver, senior product manager at SmartCAMcnc. "It has been good to be able to offer a little piece of normality with our customary new release around this time of year."

Many enhancements are customer-led: they are often in response to requests from the SmartCAM user base. This release is no different.

User interface/usability and toolpath modelling

A new, more intuitive and easier to use Layer Manager has been added. Add and manage CAD layers using a new at-a-glance composite interface. CAD Layer management and layer attribute control interactive tasks and time have been reduced compared to previous methods.

Toolbar Button Editor enables improved handling of toolbar content preferences is enabled with a new edit option available on a toolbar right-click menu while Check Distance provides a simple but productive change with the ability to define a Check Distance per tool versus a global setting as previously.

Customisation

SmartCAM has always been strong on customisation. A number of enhancements are included in Version 2021. Image Support, the SmartCAM Visual Customisation ToolKit (VCTK) can now incorporate an image in custom panels and

dialog boxes. A picture is worth a thousand words. User interface customisations can be visually enhanced and made easier to use.

Macro Subroutine data is a set of new Macro system commands enabling improved access to sub-program definitions and use data.

Code Generators

Is the term used by the SmartCAM community for what are referred to as post processors in other CAM systems. The v2021 Code Generator tool set provides a number of new technical functions to creators of SmartCAM Code Generators.

ACIS

Finally, SmartCAM is built using the ACIS kernel which has been updated to ACIS 2020. The ACIS update includes support for Solid Edge Version 2020 native CAD files.

SmartCAM & SmartCAMcnc

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

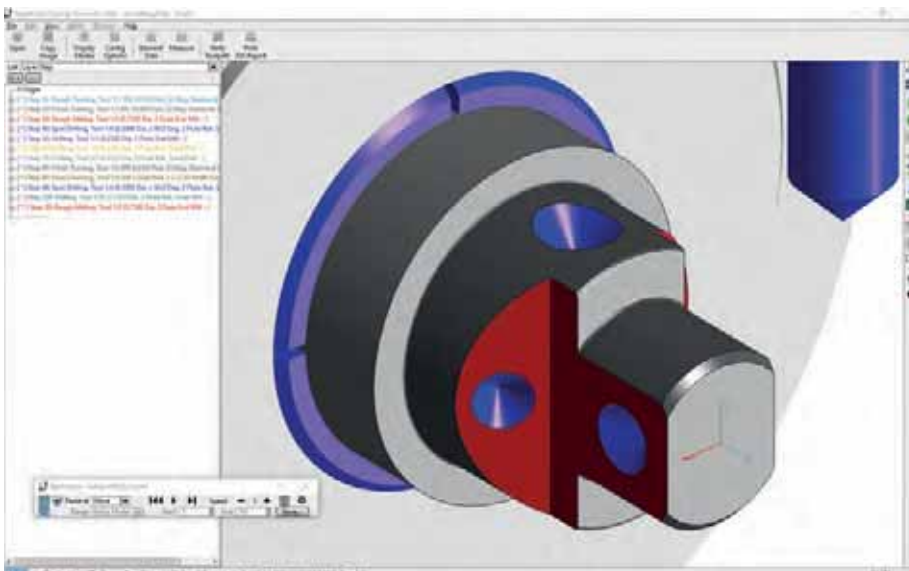
SmartCAMcnc is an Oregon-based company that develops and markets the SmartCAM suite of CAM software for the benefit of its worldwide customer base. Gregg Olson, founder and president of SmartCAMcnc, has been involved in developing CNC programming systems since 1979.

To monitor further developments, visit www.SmartCAMcnc.com

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Tebis cutting tool library for CAM automation

Tebis CAD/CAM software offers a unique cloud-based cutting tool library to store best practice manufacturing information together with four other database libraries:



Virtual machines with clamping devices, geometric features associated with machining features, machining cycles and machining processes. Tebis cutting tool library not only stores cutting tool geometry shape information, but also stores advanced machining parameters grouped for different materials and different machine tools as well as different toolholders.

Tebis cutting tool library is capable of storing the exact geometry of cutting tools, toolholders and intermediate toolholders and validate the assembly. This ensures these elements used by the CAM users are correct and available on the shop floor.

With the cloud-based environment, Tebis has the master tool library sitting on the cloud and this is the tool library which is managed by the administrator and the management to ensure consistent uses among all users even across different work shifts and sites. Tebis software automatically downloads the latest library data by activating the system and users always work with the latest data. This is beneficial to large and also small installations.

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Innovation and productivity combined

Latest laser technology developments from GF Machining Solutions include the introduction of a new innovative laser texturing machine and, through its partnership with Swiss-based specialist machine tool manufacturer, Crevoisier SA, a new high-productivity automated laser manufacturing cell.

GF Machining Solutions, the EDM, 3- and 5-axis milling, Additive Manufacturing (AM) and laser ablation machine tool manufacturing specialist and automation and tooling systems solutions provider has introduced a new laser texturing machine into the market.

The AgieCharmilles LASER P 400U Femto Flexipulse, designed specifically for aesthetic and functional laser texturing, integrates a laser source that enables two different wavelengths to be used. The machine delivers high-accuracy and repeatable results and is primarily aimed at customers operating in the watch, jewellery, mould making and cutting tool industries, as well as other sectors where micro-machined components are required.

The laser source inside the LASER P 400 U allows the use of two different wavelengths, making it possible to machine complex parts exploiting, to the full, the machine's 3- or 5-axis capabilities.

The LASER P 400U Femto Flexipulse is the first machine combining the use of a femtosecond laser with 5-axis texturing capability. The texturing operation delivers completely burr free results and eliminates the need for post-treatment and secondary operations. The green wavelength, with its reduced spot size, is ideal for use with/on reflective materials such as copper, gold and nickel.

The machine's modular design includes an integrated bi-laser solution that combines two laser beams for texturing and engraving the same surface.

The laser head's versatility enables manufacturers to switch, quickly and seamlessly, from one beam to the other, helping to significantly reduce production processing times and increasing the machine's application potential to machine a multitude of materials from aluminium and steel through to graphite, glass, sapphires and polymers.

The latest version of GF Machining Solutions' GF Laser machine software brings



additional intelligence and reliability to the laser texturing process. The company's much-vaunted 'Smartpatch' technology improves texturing quality and process productivity and the innovative 3D Map software allows the import and use of any 3D CAD for the seemingly unlimited reproduction of textures, forms and shapes.

The LASER P 400 U is a laser machine for production and for R & D. With more than four million parameter combinations, the machine pushes the boundaries for the laser machining of metals, ceramics, polymers, glasses, etc.

With its user-friendly interface, the modification of the machining parameters i.e., power, pulse sequences, wavelengths, frequencies, are quickly achieved and increase the machine's appeal and application potential.

The machine is also the centre-piece of an automated manufacturing cell developed by GF Machining Solutions in partnership with Crevoisier SA, the Swiss-based automation, polishing and grinding machine tool manufacturer.

To meet the growing requirements from manufacturers to improve their productivity, flexibility and efficiency, both companies have combined their collective machine tool and automation expertise to create a robot loading cell specifically designed for GF Machining Solutions' laser texturing machines.

In addition to the LASER P 400 U the cell includes a compact, versatile and high-speed C-66 robot. The loading robot, with its user-friendly touchscreen interface, features a flexible palletising system, a



double gripper and a part alignment and turnover station. Loading times, from robot to machine, are quick and typically less than 10 seconds.

GF Machining Solutions is a leading provider of machines, automation solutions and services to the tool and mould making industry and to manufacturers of precision components. Products range from electric discharge machines and high-speed and high-performance milling machines, including clamping and palletisation systems, to 3D laser surface texturing machines and 3D metal printing machines, services, spare and expendable parts, consumables and automation solutions.

Based in Switzerland, GF Machining Solutions, belongs to Georg Fischer Group and 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, in the US, in Sweden and China.

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ETG introduces affordable 'best-in-class' 3D printing

Now available from the Engineering Technology Group (ETG) is the ProJet® MJP 2500 Series of additive manufacturing machines from 3D Systems. Designed from the ground up to deliver a productive, in-office 3D printing solution that improves and accelerates today's engineering workflow, the ProJet MJP 2500 Series is part of 3D Systems MultiJet Printing (MJP) line that delivers simple, clean operation and easy post-processing.

Providing the highest feature fidelity in its class, the affordable-yet-powerful 2500 Series enables design professionals to create precision models, prototypes and injection-moulded-quality parts, without leaving the workplace. The 2500 Series now available from ETG, utilises 3D Systems' revolutionary MJP EasyClean System, offering hands-off, chemical-free finishing without the need for waterlines or any special disposal considerations.

In conjunction with 3D Systems' exclusive non-toxic melt-away wax supports, the EasyClean System delivers simple post-processing with no damage to delicate

feature details, thus reducing the time and waste associated with reprinting broken parts. This allows developers to confidently test ideas faster and more frequently, shortening design cycles, lowering development costs and achieving better end products.

"We have been extremely impressed with the results from the ProJet MJP 2500," says Haleigh Doremus, rapid prototyping manager at Nike, a 3D Systems beta tester. "It complements our current technologies and processes and allows us to print complex geometries that were previously impossible on other printers in this class. The consistency of parts and hands-off post-processing it provides gives us time to accomplish more in a day, adding even more value to our team."

Engineered to deliver detailed, true-to-CAD parts, the ProJet MJP 2500 Series features two models, the MJP 2500 and the MJP 2500 Plus. Each printer in the series is compatible with robust and versatile VisiJet® M2 materials in durable white and black plastic. These materials



deliver parts with an exceptional surface finish that look and feel like injection-moulded plastic and enable rigorous testing and functional use. The ProJet MJP 2500 Plus offers additional material capability with rigid clear plastic as well as flexible elastomeric black and elastomeric natural, each newly developed for printing rubber-like parts that provide pliability, strength and full elastic recovery.

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LVD phoenix laser cuts costs and cuts faster

A new LVD Phoenix 10 kW laser at Dutton Engineering has halved cutting times, cut energy bills and eliminated a time consuming finishing operation. The new 4 m by 2 m capacity machine joins a 4 kW LVD Sirius CO₂ laser with a tower automation system and replaces an LVD Impuls CO₂ laser that was installed in 2005. As well as the lasers, Dutton also operates a waterjet cutting machine and a number of LVD press brakes. It complements these with manual welding capabilities, surface finishing and graining, bead blasting and assembly. It can also offer customers help with component design and development.

Dutton's managing director Andrew Read says: "We have a two-fold approach, offering both pure laser cutting and a complete fabrication and assembly service and they are treated fairly separately.

"A lead time on fabrication may be 14 days, but on laser may be the next day to three days. So it is a much quicker turnaround which is great for us because it focuses your mind when somebody wants something the next day and the number of hours you put into fabrication brings more added value into the business."

The Sirius laser, with tower storage and automatic load and unload has been and remains, the workhorse for large volume production.

"It literally revolutionised our ability to sell laser cutting services and works 24 hours a day," says Andrew Read.

The company processes over 500 tonnes of material a year, but rather than being a pure volume player it specialises in stainless steel.

"We don't try and compete on lots of mild steel because there are companies out there that will churn through tons and tons of thin mild steel every single day. Around 99 percent of our work is on stainless steel,



in both pure cutting and in fabrication and it is mainly destined for the food and pharmaceutical sectors."

This is a key differentiator, as customers in industries like these can't risk any mild steel contamination on their stainless steel products. Nevertheless, it is still a very competitive market and that is part of the reason Andrew Read decided to invest in a new fibre laser cutting machine.

He explains: "CO₂ lasers are being superseded as they are not as cost-effective as fibre lasers. On a CO₂ laser the beam is delivered using mirrors and you run into problems with the consistency of the cut when the mirrors start to degrade. With the fibre you don't have any of that, the beam comes straight down an optic cable.

"You are also consuming significantly less electricity and we have also noticed that we are using less gas too. Our electricity bill was huge and it has dropped by at least a third since we installed the new Phoenix, just by

replacing the old machine with a new one.

"It is also significantly faster, not just a little bit faster; you are talking twice as fast on some jobs. On some of the thinner material it is cutting faster than a minute a sheet."

Compared to waterjet cutting, the fibre laser is orders of magnitude faster on thick aluminium, work that Dutton sometimes has to do as part of a larger project.

"The normal range of material we cut on the laser is 3 mm to 10 mm," explains Andrew Read. "As we have the waterjet we would always use that if we had thicker material to cut. We used to cut 20 mm aluminium on the waterjet and it would take eight to nine hours to do a plate. We put that same plate on the fibre laser and it was done in 17 minutes."

Finally, he says that the repeatability is better: "Unlike the CO₂ laser where you have to adjust it over time, once you have the controller set you have none of that.



From an operating perspective it is much simpler. You just press the button and go."

A major, unanticipated benefit has come on cutting steel covered with plastic protective film, which is common on high-quality stainless steel work.

Andrew Read says: "One of the major problems we have had for years is that the protective plastic coating on the stainless sheet gets stuck to it when you cut it. It leaves a black residue which is horrible to get off. It might take a minute to cut it and then 10 minutes to take the plastic off, it was horrendous stuff and the bane of our life.

"Now, because of the power of the laser and the narrowness of the beam, the Phoenix fibre laser cuts the plastic with absolutely no residue. You cut the plastic film in one pass and then go back and cut the metal. That has been a massive saving for us and cut out a time-consuming manual operation."

When choosing to buy LVD machines he says that reliability and ease-of-use are key factors. "We have been a customer of LVD for many years and one of the reasons is that we know their machines are so reliable. With LVD you get a lot of machine for your



money. A solid and robust machine with tried and tested, in-house built technology. We don't want a complicated machine with lots of adjustments to make, we just want to cut metal. LVD has a simple controller and is easy to use. Everything else is taken care of, you don't need a very highly skilled operator."

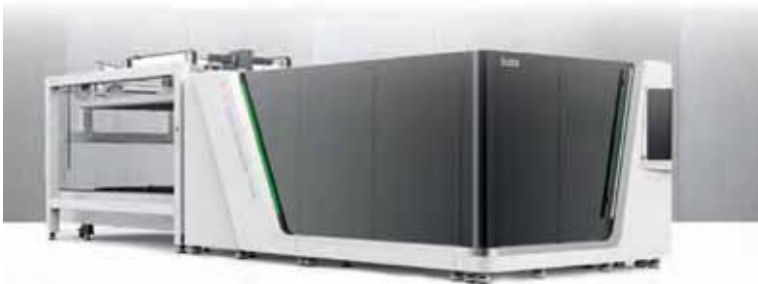
He says that Dutton has been quite lucky during the COVID pandemic because of the markets it serves. "We just carried on. There is always demand for food packaging machines and there has been more demand from the medical sector because of all the testing that is being done.

"That said, it is difficult to predict what is

going to happen in the market over the next 12 months. The big pharmaceutical companies are only predicting a quarter ahead and large food manufacturers are hesitating before committing to new installations." This means that being flexible and cost-competitive are more critical than ever.





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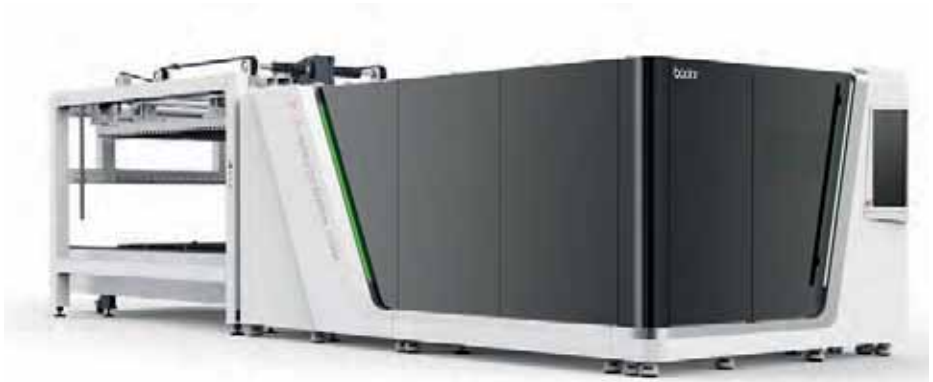
Large format flat-bed and tube laser cutting systems play an important role within many industry sectors, producing the individual parts required for the fabrication of a multitude of component assemblies. The benefits of laser technology for these applications mean that it continues to replace other cutting methods such as plasma, oxy-acetylene and even waterjet. However, for some, the initial investment cost of these systems from mainstream suppliers has been such that the technology has remained out of reach.

A new partnership agreement between Bromsgrove-based TLM Laser and Chinese metal laser cutting equipment manufacturer BODOR is set to break down the cost inhibiting barrier to ownership of these types of systems within the UK and Ireland.

Recognised as one of the UK's leading suppliers of laser technology and systems, TLM Laser continually evaluates opportunities to enhance its comprehensive product portfolio, in order to be able to offer the most technologically advanced and cost-effective solutions to a wide range of laser processing applications.

As an advanced domestic supplier within its home market of China, BODOR Laser specialises in laser systems applications and integration. The company manufactures a wide range of flat-bed laser cutting and tube processing systems, designated CE compliant from TUV and therefore meeting European standards and International quality control levels.

With options on fibre laser sources from IPG or Maxphotonics and laser power up to 40 kW these systems are ideally suited for applications on a wide range of metals including carbon steels, stainless steels, alloys, aluminium, copper and brass.



TLM Laser's Andy Toms explains the economic benefits of the BODOR Systems: "With the largest laser cutting equipment production workshop in the world, BODOR can leverage the benefits of scale when it comes to manufacturing cost. These systems are not only extremely attractively priced but also offer a wide range of innovations to ensure the highest levels of performance and reliability."

The full range of BODOR systems now available from TLM Laser have working envelopes ranging from 600 mm x 600 mm up to 6 m x 2 m for the flat-bed systems, and up to 6.5 m in length for tube processing. Capable of cutting carbon steel up to 100 mm thick, depending upon model and laser power and with the ability to cut bevel edges to 45 degrees, the systems also feature a 360 degree fully enclosed design surrounding the working area, which provides a safe working environment by isolating both fumes and laser radiation.

A series of features such as auto-focusing which is suitable for multiple focal lengths, with the focal position automatically adjusted based on sheet thickness and automatic obstacle avoidance, which offers full 360 degree monitoring of the



environment to avoid collisions further enhance the capability of these attractively priced systems.

Andy Toms concludes: "There is no doubt that the price performance characteristics of these systems will open up new opportunities for investment from a wide range of companies, including SME's, who have until now been unable to take advantage of this type of technology. This is great news, especially at a time when many UK companies are seeking to reshore manufacture and shorten the supply chain."

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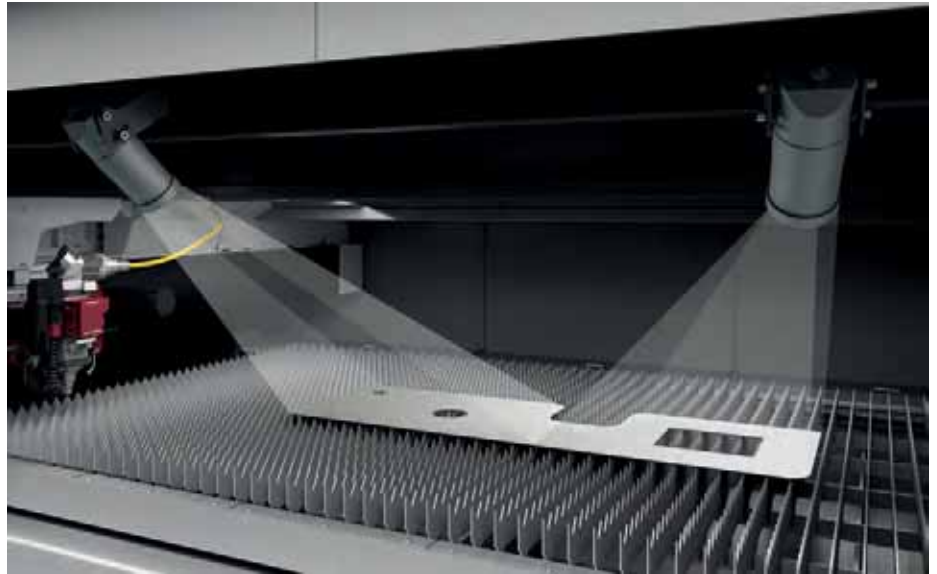
With its progressive shift from a make-to-stock strategy and from the economic batch to a lean, make-to-order, just-in-time strategy, the modern economic and industrial context has been driving Salvagnini's product development for some time.

The two Salvagnini laser product lines are both based on fibre technology: L3, a versatile system intended for transversal use, whatever the applications, materials and thicknesses and L5, a highly performing, high-dynamic system for thin and medium-thin material. The adoption rates of the L3 and L5 vary according to the customer's industrial sectors but, above all for the L5, there is an interesting trend: the choice of relatively low powers, precisely in those sectors where thin sheet metal is used the most, demonstrating that increased power is not always the best answer. It is particularly interesting that this is confirmed by the customers themselves, when seeking the most suitable solutions for their own sector and their own needs.

However, Salvagnini has also extended its cutting power range, introducing first a 6 kW high-density power source, and then a 10 kW source. This extension has benefited the L5, its high dynamics have further improved the cutting speed reached by more powerful sources. From early 2021, both product lines will have higher XY positioning speeds.

So, the L3 and L5 are both consolidated systems on the market but, in line with the Salvagnini tradition, they are constantly perfected with the introduction of new hardware and software solutions.

"We have focused on three main trends," explains Pierandrea Bello, Salvagnini product manager for laser technologies. "The first is that of simplification, developing easy-to-use, lean solutions allowing operators to effortlessly solve some



of the everyday problems involved in their work. This category includes, for example, a series of artificial vision devices, including the recent addition, the NVS. The second area is that of automation, which helps to recover significant efficiencies. The third is that of process optimisation, to improve overall factory performance through digitalisation and OPS, the modular production management software."

Solving problems with artificial vision

For some time, Salvagnini has been developing and implementing artificial vision applications on its systems, allowing operators to effortlessly solve some of the everyday problems involved in their work. These lean, easy-to-use solutions have the advantage of increasing flexibility and extending the sectors of laser cutting applications.

"To accelerate sheet metal centering and to allow centering even on parts that have already been punched or pre-holed, we have introduced the AVS," Pierandrea Bello explains. "The AVS can transform laser

cutting into a downstream workstation after punching, then we focused on the SVS."

The Sheet/Scrap Vision System (SVS), helps to re-use sheet metal leftovers. These are the residues of previous machining which are often used for samples, to make urgent parts of different sizes, in single batches and to replace any machining scrap after cutting. Directly on the machine, the SVS calculates a dxf to use as the starting sheet for quick, easy and error-free nesting of the new parts to be cut. The SVS is supplied combined with STREAMLASER on Machine, the on-board version of the Salvagnini CAM.

"The SVS comes in two versions," Pierandrea Bello continues. "SVS1, which has a single camera focusing on the leftover and a working range of 1,600 x 1,500 mm and SVS2, which uses two cameras and has a much larger working range of 3,000 x 1,500 mm. The latest innovation is the Nozzle Vision System (NVS). The NVS checks the centering of the laser beam and the state of the nozzle, solving various imprecisions in a truly rapid and intuitive manner. With the machine learning algorithms applied, it can suggest solutions that help to reduce waste."

Automation for recovering efficiency

In the world of laser cutting systems, automation plays an increasingly important role. On one hand, the cutting speeds achieved today have shifted the attention of many companies in the sheet metal sector to the phases immediately up and downstream



of the actual cutting; unloading and loading often risk becoming dangerous bottlenecks. On the other, automation can help reduce the impact of labour costs.

“With LINKS, our IoT solution that continuously monitors the data from systems connected all around the world, we have assessed the efficiency of their configurations, analysing the many variables that come into play, such as the type and weight of the sheet metal used and the material handling and waiting times. The results of this study are remarkable: while stand-alone solutions have an average efficiency of around 60 percent, automated systems have much higher efficiency values, reaching 80 percent or even 90 percent, if we consider the LTWS store-tower,” Pierandrea Bello explains.

Automated loading/unloading coupled to a store-tower is an enabling factor for increasing the autonomy of the cutting system, as it makes different materials and thicknesses available continuously for just-in-time machining, reducing waiting times due to sheet metal feeding. Above all, in production contexts marked by low volumes and rapid production changes, combining the store-tower with automatic

loading/unloading devices is a winning strategy.

Complete, modular product range

The Salvagnini laser automation range has always been very wide and modular and each system can be configured differently to suit different production needs. Today the whole range has been updated, not only to respond to practically all layout and configuration needs, but above all the need to reduce loading/unloading times even further. While faster cutting speeds have reduced cutting times, Salvagnini automation has naturally evolved as a consequence. The new ADLU connection automates the sheet metal loading and the machined sheet unloading phases, with a cycle time of less than one minute. It is equipped with a suction-cups loading device and independent forks unloader and is naturally set up for integration with the MCU or with any tray store if required.

ADLU is also a flexible solution in terms of layout, because its floor-based structure is modular and can be adapted to the available spaces in the workshop. At the same time, ADLL, the Salvagnini connection with performance similar to the ADLU, but



used in longitudinal configuration and which can be integrated with either a store-tower or an MCU, is particularly suited to situations in which depth is a constraint. In configurations from five to 20 trays, with ultra-rapid cycles and high autonomy, the LTWS store-tower is an extremely compact high-end solution. It is available in single or double tower versions, with wooden pallets, without wooden pallets or mixed.

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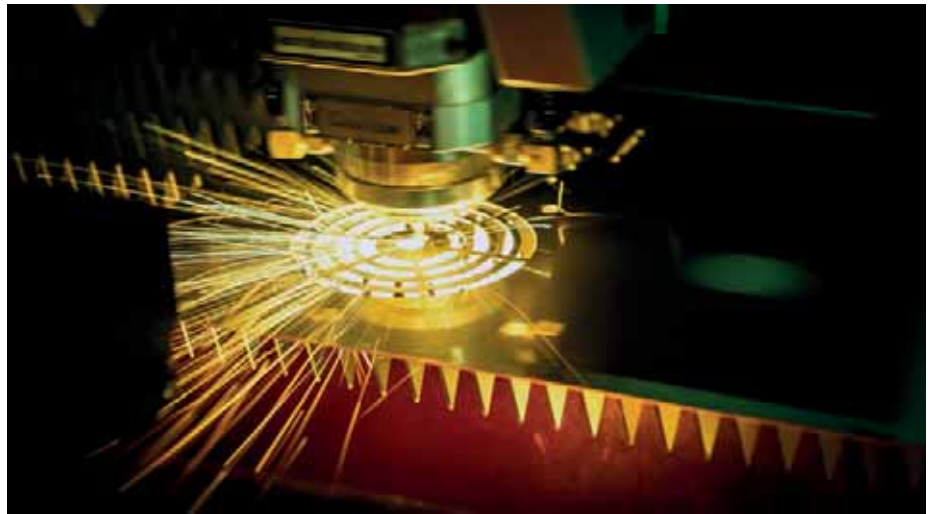
In 2019, AMADA unveiled its VENTIS-3015AJ fibre laser cutting machine to great fanfare. The machine is the first of its type to feature the company's Locus Beam Control (LBC) technology, which improves both quality and productivity, particularly in stainless steel and aluminium. Along with a new single-diode module 4 kW fibre-laser oscillator, the VENTIS has set a new world standard for laser profiling.

To verify the achievable gains in performance, a number of VENTIS users in the UK have come forward to voice their thoughts and opinions.

When using conventional fibre laser cutting systems, energy density reduces as material thickness increases, leading to a lack of efficiency and the need for defocussing the beam. Conversely, the use of LBC, which is a world first for the laser cutting market, offers flexible beam pattern control matched to each application, while retaining high-efficiency cutting and high energy density. Defocussing is therefore no longer required. In short, LBC can freely manipulate the laser beam to create an infinite number of patterns that are advantageous to cutting performance.

LBC is equipped with three primary functions: Productivity mode, Quality mode and Kerf-Control mode.

In Productivity mode, users can realise a significant improvement in throughput when cutting stainless steel and aluminium with nitrogen. For instance, when processing stainless steel, the VENTIS with LBC technology will prove twice as fast as using a conventional 4 kW fibre machine, while aluminium will be 2-3 times faster. These performance levels, in tandem with lower energy consumption, can reduce processing costs by up to 75 percent in some instances. Among those able to



support these claims is Kevin Harris, technical sales director at Pershore-based subcontract fabricator G&C Engineering: "I estimate that the VENTIS is twice the speed of our existing 4 kW LCG3015AJ. Moreover, our laser-cutting costs have fallen dramatically, without any compromise in quality, to the extent that material has probably become a bigger cost."

With 65 employees operating from a 50,000 ft² facility, G&C Engineering describes itself as a "one-stop shop for sheet-metal fabrication", serving sectors that include machine guarding, security, seating, office furniture, IT, sports equipment, heating and retail.

Kevin Harris adds: "The market is definitely getting more competitive, so one of the ideas behind investing in the VENTIS was that we could cut at the upper end of the speed scale."

Another admirer of the speed that VENTIS provides is Prakash Chavda, operations manager at Leicester-based JC Metalworks: "The new VENTIS is opening up more opportunities in terms of

productivity compared with our FOL3015AJ.

With 85 employees, JC Metalworks serves sectors that include retail, HVAC, machine guards, refrigeration and utility lockers from its 60,000 ft² factory. Prakash Chavda continues: "Although the company has remained busy throughout the pandemic, lead-times have shortened for our customers, in turn this means that the company would need a faster more reliable laser cutter. The speed of VENTIS is great, but I also like that the next sheet is ready as soon as cutting has finished."

Productivity gains

Despite the VENTIS offering three modes of operation, another subcontractor, Yorkshire Profiles prefers to keep its machine in Productivity mode all the time.

"When we placed the order for our VENTIS, we drew up a list of which jobs we were going to run in which mode," explains the company's owner Matthew Halliwell. "However, in reality we find that the edge quality in Productivity mode is so good that



we just leave it there and enjoy the extra speed."

Located close to York, the company employs 20 people and serves industries such as telecoms, retail and medical. Yorkshire Profiles can fulfil all forms of metalworking requirements, including bulk contract orders.

"The on-off times are also much better compared with our previous F1," states Matthew Halliwell. "With VENTIS we simply turn it on and within a couple of minutes we are cutting metal. Also, if switching from stainless to mild steel, for example, the machine changes the nozzle while the tables are moving in and out. It only saves a minute or two but, over a day of production, it can really add up."

Start of things to come

Even start-up businesses can benefit from VENTIS. A case in point is Telford-based Fab-Tech, which commenced trading in July 2020 as a subcontract sheet-metal fabrication specialist. The company also favours Productivity mode.

"We like to keep it in Productivity mode, unless an exceptionally high level of cut is

required - as it means we can minimise cycle times," explains managing director Roger Lavender, who has been in the industry for 27 years. "Productivity mode is particularly good for parts with a high number of piercings, such as perforated sheet. We are saving 40-50 percent in terms of production time on some jobs. Time is money; that's the reality of laser cutting."

Serving sectors such as retail, automotive, drinks dispensing and agriculture, Fab-Tech is targeting revenue of £1.2 million in its first year. "AMADA has been great at supporting our start-up business with flexible financial packages from the start," adds Roger Lavender.

For those using conventional fibre-laser systems, the only way to negate the loss of energy density is to increase the power output of the laser oscillator, but this comes at a cost, both in terms of purchase price and greater electricity consumption. In contrast, the new VENTIS, with its single diode module 4 kW oscillator and LBC technology, ensures a reduction in energy consumption of circa 30 percent.

"We've certainly noticed a difference to our electricity bills," says Matthew Halliwell.

"The VENTIS consumes significantly less electricity than our previous F1."

While high productivity and energy savings are major benefits for VENTIS users, quality stands on equal footing. Cut-edge quality on the VENTIS reduces surface roughness by approximately 50 percent when compared with a conventional machine, while dross is minimised to less than 10 µm.

Even in Productivity mode, the quality performance is notable, as Matthew Halliwell concludes: "We actually bought the machine to cut mid-range aluminium, typically 5 mm. Customers are just loving the quality of it. On our F1, if the gas mix was slightly off or the temperature was wrong, we would end up with dross on the underside of aluminium parts. But with the VENTIS we just turn it on, start cutting, and the parts come off dross-free."

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"In nearly 40 years of business, there aren't many industries we've not worked with," says Simon Pepper, sales & business development manager at JSR Precision Engineers Ltd. "We have an exceptionally diverse customer base which reflects the company's versatility and flexibility and ability to provide services and precision parts across a wide spectrum of industries, including, among others, the construction, automotive, nuclear, medical and railway sectors."

Founded in 1981 as a family-run business, JSR offers subcontract sheet metal work, machining, laser cutting and part manufacturing services, supplying everything from one-offs to small batches and high volumes from two sites in Sheffield. The company has grown considerably since its establishment, forging an enviable reputation in the steel and engineering industry through continued investment in the latest laser cutting, CNC milling and turning technology.

JSR's continued success saw it become a limited company in 2006 and gain ISO 9001 accreditation in 2008. It now employs 20 members of staff and enjoys a turnover of over £2 million per annum, with its



dedication to quality and efficiency meaning the business has retained its ISO standard since it was first awarded. JSR is also a proud, accredited license holder of the 'Made in Sheffield' trademark, an internationally famous mark of quality for manufactured products.

"As a company, we pride ourselves on putting quality and customer satisfaction at the forefront of everything we do," explains Simon Pepper. "We've grown year-on-year through continued investment in training and equipment and now operate over 30 machines on our premises. This includes milling, drilling and turning centres, as well as sawing and laser cutting equipment."

With the company priding itself on its ability to exceed industry standards of performance and excellence across its operations, it was keen to avoid any situation where it would need to outsource services from external suppliers. This ethos was put under strain with new success, as JSR began to supply increasing quantities of components to the agricultural market. As this work grew to become a major part of the business's overall income, so too did JSR's reliance on subcontracting its laser cutting work out to other suppliers.

Simon Pepper continues: "Our rapid success in the agricultural sector meant we were continuously purchasing parts to fulfill our order book, to the extent that it became clear investing in our own laser would be a much more cost-effective course of action. This also gave us the added benefit of being



able to reduce lead times and costs for our customers, as we no longer had to rely on third-party sources."

When JSR's customers discovered the company had invested in laser technology, the orders rapidly started to increase. Although enquiries for laser cutting work grew even further, when JSR's original machine began to falter, it risked undermining the reputation the company had worked so hard to build.

"While purchasing our first laser was originally seen as a way to streamline our processes, it soon developed into the company establishing a separate, rapidly expanding laser cutting division," explains Simon Pepper. "Servicing the increasing demands of our agricultural customers meant this aspect of the business became even more vital, so when our laser experienced a number of faults that put its reliability in doubt, it was a serious concern. We therefore decided the best course of action would be to cut our losses, sell it and replace it with a machine we could trust implicitly."

The fact that the existing laser was vital to JSR's operations meant the company needed to source the best possible machinery when deciding on its replacement. Having previously purchased two Yamazaki Mazak VTC 20-C CNC turning centres and another FJV-25 machining centre, the team at JSR were well aware of the machine tool supplier's reputation for providing reliable, high-quality solutions.

Specifically, the team had noticed that Mazak's OPTIPLEX NEXUS 3015 FIBER laser processing solution during a visit to Mazak's European Technology Centre in Worcester. As this model was similar in specification to the company's existing laser, it would be ideal for machining JSR's products.

The latest machine in its series, the OPTIPLEX NEXUS 3015 FIBER uses flying optics and a helical rack and pinion positioning system that allows for high cutting speeds, maximum throughput and rugged construction. Its flexible design also allows for stable cutting of highly reflective materials such as copper, brass and aluminum, and higher productivity when cutting thin-to-medium-thickness material, which proved beneficial to JSR.

"Not only did the new machine seamlessly replace our old laser with no compromise in quality, the increased reliability of the OPTIPLEX NEXUS meant there was less downtime than the previous model," Simon Pepper continues. "This combined with the faster cutting times, means we can fulfil complex orders even quicker, allowing the business to grow further."

One such example of a difficult project made easier by the OPTIPLEX NEXUS' innovative design was a recent enquiry for 1,500 mild steel parts, made up of 190 drawings of components ranging in thickness from 5 mm to 20 mm. Utilising JSR's programming software to record off-cuts that could be repurposed, the OPTIPLEX NEXUS was able to quickly machine parts while keeping waste material to a minimum. As a result, the customer was able to save money while enjoying highly precise processing work and a lead time of only three days from initial enquiry to order delivery.

Simon Pepper concludes: "The innovative design of the new laser processing machine means it has fitted seamlessly into our existing operations and become an integral part in a highly important and continually expanding part of the business. Next year is our 40th anniversary and will be very important to us. Yet with the support of well-designed Mazak machinery such as the OPTIPLEX NEXUS, we are confident that the company can maintain a level of success befitting this anniversary."

Alan Mucklow, managing director UK & Ireland sales & service division at Yamazaki Mazak, adds: "We pride ourselves on the



precision and reliability of our machinery, and are flattered that JSR Precision Engineers, a company with a reputation for high-quality work, share this opinion.

"The flexibility and productivity offered by the OPTIPLEX NEXUS speaks for itself and we are confident it can continue to assist the company in its mission to reduce lead time and costs, while maintaining a competitive edge in an increasingly demanding marketplace."

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Fast, precise and comprehensive laser cutting service from FC Laser

FC Laser now has four Bystar machines and is the only facility to have two 12 kW Bystar laser cutters. It provides some of the fastest, most precise and comprehensive laser cutting services in the UK and has increased production capacity by 154 hours per week.

Last year FC Laser added the LT7 Tube Laser, the number one Tube Laser in the industry

Entire traditional machining operations can now be laser cut, removing from the manufacturing process sawing, deburring, punching, notching, drilling and milling

With timely quotes which are always precisely based on all information supplied in line with its right-first-time philosophy, the company is ideally placed to supply flat laser and tube cutting requirements.

The industry-leading knowledge of its skilled sales team, when working with customers and technical teams, provides the best advice to produce to the quality and tolerance standards required. Comprehensive folding and machining services provide a one-stop-shop, ensuring the shortest lead times at the most cost-effective price possible.

With a creative and talented design team, it constructs and calculates parts, creates cutting plans and bending programs while planning and monitoring manufacturing processes. This means customers have the choice, they can have as much or as little involvement in design as they require, but the most cost-effective solution is always provided.

FC Laser Employee ownership trust

Six months on how has it evolved?

All members of FC Laser have an added incentive to push the business forward, primarily because they own it. In the last six months, the business has embarked on a variety of initiatives including internal promotions, new team members and internal audits.

Greg Kirkby has been promoted to tube division general manager. He has been with the company for the past five years, occupying the role of senior account manager since 2019. He will now oversee the daily operation and lead the sales



Please see printed insert

strategy of the tube services FC Laser offer. Bringing a wealth of experience to the position, he will continue to grow this area of the business.

The company has also recruited three new business development managers. Craig Dermody will take up the mantle of working with new clients across a variety of sectors focusing on new business. Marcia Jackson joins the business with a wealth of experience in providing tube cutting services and will lead the growth of the 3D fibre cutting facility. Adam Blake has joined the company to grow the online and marketing channels, bringing FC Laser to more businesses across the UK.

Having completed its first culture audit, FC Laser prides itself on delivering excellent service. This can only be achieved by having a high performing team, who take pride in

their work. The results have been overwhelmingly positive, especially when discussing trust in the workplace. There is always room for improvement, but this is an excellent start.

The company's philosophy is simple: invest in the best people, technology and materials. With these, it creates working practices that ensure delivery of the most important thing, the quality of products and service to a standard that exceeds its customer's expectations.

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