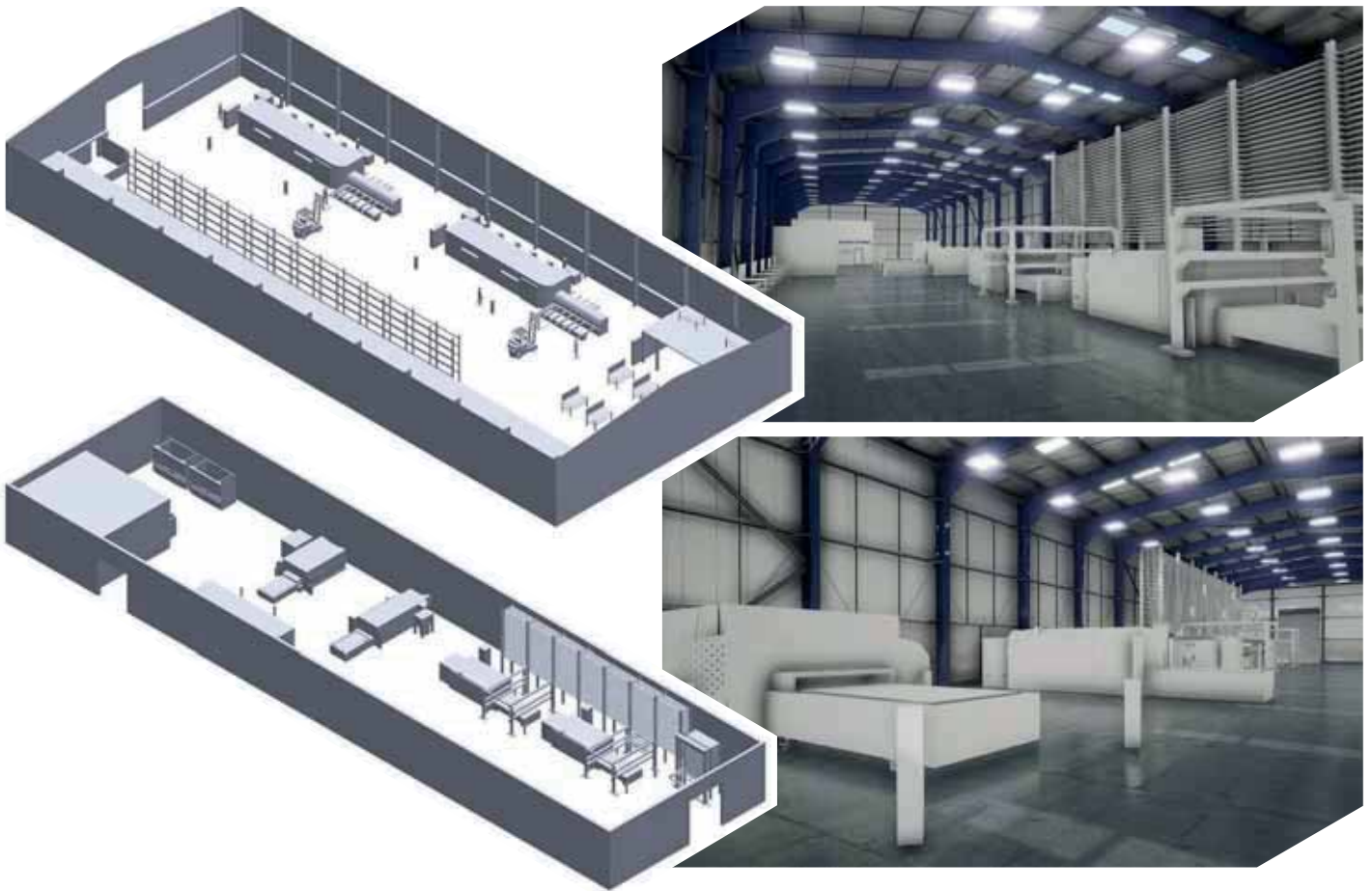


‘FC Laser see a bright future for British manufacturing’



FC Laser discuss growth in a pandemic, the investment made to double their Derbyshire production facility and how they see the future of British Manufacturing



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"The future is bright for British manufacturing"

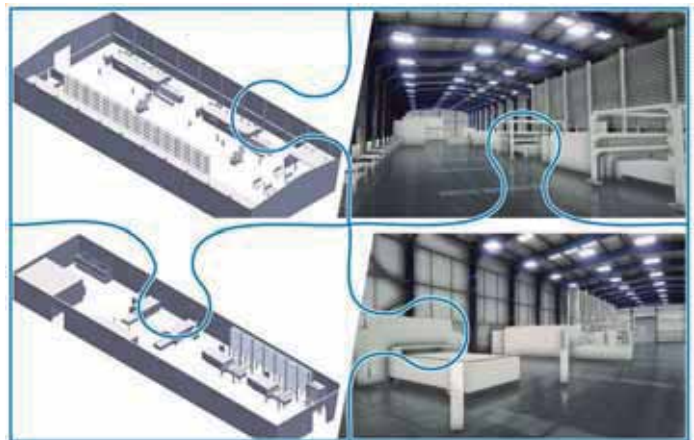
Confident words from FC Laser managing director Danny Fantom, backed up by the investment the company is making into its production facility, machinery and Team FC

Why has FC Laser decided now is the right time to invest in the expansion of its production facilities?

Danny Fantom explains: "The company has been growing organically for the past nine years, we currently operate over three sites, so it makes sense to invest now to bring all of our divisions together to maximise efficiencies enhancing the future growth of our business."

Operations manager Daryl Lowe adds: "Our operating capacity has had to grow in line with customer demand. We invested in a second 12 kW Bystar Laser cutter, our fourth Bystar in total in January to keep up with demand. With business operations running 24/7 since the summer of 2019, the further investment in the tower racking system and addition of a second tube laser is essential to manage and exceed our customers' expectations."

FC Laser has invested heavily in an additional 20,000 sq ft of manufacturing space to accommodate its forecasted growth. The current head office of FC Laser, based in Ilkeston, has begun site clearing and the foundations of a second building running parallel to the M1 motorway are underway. With the tube division currently operating just over a mile away at the Quarry Hill industrial estate and a temporary site created for their ongoing project with Sapphire Balconies, the plan was made in 2020 to bring all operations to one site, further enhancing the production synergy throughout the business.



The company has created a production facility which maximises efficiencies and delivers customers the complete laser cutting service. The final piece of the facility is planned for completion in Q4/Q1 2021-22.

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A pioneer in digitisation of sheet metal production

25 years of Lantek Germany delivers platform solution as opposed to software islands

Lantek Germany, based in Darmstadt, is celebrating its 25th anniversary. The company is one of the pioneers in digitisation of sheet metal production. It was already thinking about networking when most plants didn't even have a PC.

"It is as if Industry 4.0 was made specially for us," says Christoph Lenhard, head of the German Lantek office since it was opened. The German federal government first coined the term "Industry 4.0" at the Hanover Fair 2011, 15 years after the German Lantek office opened. The IT specialist offers solutions to companies that punch sheet metal or cut using laser, oxy-fuel, plasma or waterjet technology. With its machine manufacturer independent software portfolio, it is one of the market leaders and supports companies of all sizes on their individual path towards digitisation. Its platform solution is an efficient alternative to the software islands common in many companies for different areas of manufacture, which are often not able to communicate with each other, resulting in enormous additional effort standing in the way of an integrated system.

Christoph Lenhard is the face of Lantek in Germany and is very knowledgeable, in the German-speaking world, when it comes to software for sheet metal processing. He recalls: "At that time (1996), the CNC program for sheet metal processing began to be programmed on the PC and no longer on the machine control," he reports from the early years of CAD, computer-aided design and CAM. "Lantek was one of the first on the market to do that."

Christoph Lenhard, who studied mechanical engineering, opened up the



German market for Lantek and conveyed Lantek's approach to the industry: software that works independently of machine brands providing companies with complete freedom in developing their machine shops. He banked on the machine manufacturers to make Lantek a well-known name in the German market, establishing the Lantek brand in Germany, Austria and Switzerland with the help of the machine manufacturers programming systems that were equipped with Lantek CAD/CAM software. The great market potential that Lantek foresaw in Germany in 1996 has been borne out.

Today, the German office with 15 employees, caters for around 900 customers from contract manufacturers to international corporations. Lantek now has over 220 employees in 20 offices in 14 countries across the world, serving more than 25,700 customers in over 100 countries.

In spring this year, it entered into a strategic partnership with the German machine tool manufacturer TRUMPF. Christoph Lenhard concludes: "This is the good news for sheet metal production this year. Lantek will remain an independent brand and our development offices will also remain separate. However, our customers will benefit

from each other's know-how for even better and more sustainable solutions."

Lantek is a multinational that is leading the digital transformation of companies in the sheet metal and metal industry. With its smart manufacturing software, it enables factories to be connected, turning them into Smart Factories. It rounds off its range of services with CAD, CAM, MES, and ERP solutions for companies that manufacture metal parts from sheet metal, tubes, and profiles using any cutting technology including laser, plasma, oxycut, waterjet, shearing, and punching.

Founded in 1986 in the Basque Country, Spain, one of the main European centres of machine tool development, it enables the integration of sheet metal and metal processing technologies with the most advanced manufacturing control software. The company is currently a leader in its sector thanks to its capacity for innovation and commitment to internationalisation. With more than 25,700 customers in over 100 countries and 20 offices in 14 countries, it has an extensive network of distributors with an international presence. In 2020, its international business contributed to 88 percent of its revenue.

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FC Laser to attend Subcon for the first time

At this year's Subcon Show, taking place at the NEC in Birmingham from 13th-15th September, team members from the fibre, tube, folding and fabrications divisions of FC Laser look forward to meeting with visitors to discuss their specific needs and how Team FC can be of service. The company will be delighted to share an update on its brand-new production facility which maximises efficiencies and delivers customers the complete laser cutting service which is scheduled for completion in Q4/Q1 2021-22.

Subcon is the UK's premier subcontract manufacturing supply chain show. For over 40 years, the show has continued to deliver high-quality content and a variety of UK and international exhibitors. This year, Subcon will be co-located with The Engineer Expo and the very popular Manufacturing Management Show.

FC Laser is delighted to be involved, so why not visit, **Hall 12 Stand B51** where it will be showcasing a virtual tour of its production facility, case studies of some of the exciting projects recently completed and product samples to demonstrate the quality and intricacy of what Team FC has to offer.

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Hoffmann Group UK increases its capacity

Hoffmann Group UK has extended its logistics area by opening a new warehouse in Aston, Birmingham. Following a £150,000 investment, the Birmingham based warehouse, which originally opened its door in August of 2019, has increased the company's overall capacity by 45 percent, making the overall space approximately 4,000 sq ft. The additional space is an important milestone for Hoffmann Group UK, giving the company a greater ability to meet the growing demands of the UK market.

The additional space will enable Hoffmann Group UK to better manage its procurement, storage, distribution and logistics, which will subsequently enhance production workflow and increase productivity. Not only will the warehouse improve the management of Hoffmann Group UK's services and offer customers more agility and dedicated stock where required, but it will also create additional job opportunities in the area.

The expansion is part of Hoffmann Group

UK's wider vision to double the size of the business by 2023, through more effectively delivering a broad range of services designed to help customers reduce costs and increase productivity. The Group's growth will also be supported by the development of a new international central warehouse in Logistic City, Nuremberg, that will ensure that the business can deliver at over 99 percent, even during periods of constantly changing market conditions.

As part of Hoffmann Group's continued investment and expansion in the UK and internationally, the business is increasing technical expertise, introducing dedicated support for large national accounts and additional specialised resource to support services such as inventory management, calibration and repairs.

The new technical appointments come as part of Hoffmann Group UK's business reorganisation, which was implemented in 2020 to provide the businesses' growing customer base with a more bespoke, effective service through bolstering the



number of experts available to advise and consult with clients.

Tim Paddison, managing director of Hoffmann Group, says: "The new space will support Hoffmann Group UK in its mission to make our customers more successful by simplifying procurement and improving efficiency. In conjunction with our international central warehouse, Logistic City, the new space significantly enhances our ability to provide customers with the right product at the right time, whilst creating capacity for more jobs in this area."

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How surface sensitive measurements help medical device manufacturers avoid regulatory bottlenecks

The pathway to zero defect manufacturing through implementation of quality control procedures is found right there in the name. Quality control requires the control of variables to ensure quality outcomes, but it's the former that is beguiling to quality engineers.

The variables in manufacturing are essentially innumerable, vary from industry to industry and application to application and can be difficult to know which ones to focus attention on. Efficiency is also the name of the game.

Balancing both optimal efficiency and high-quality output requires relying on process experts that can analyse what aspects of the manufacturing process have the costliest effects on product performance and meeting quality tolerances.

For medical device manufacturers, meeting FDA approval requires process controls to be hardwired into production at the earliest design and development stages. The process controls must account for not just mechanical failures but cleanliness standardisations. While most medical device manufacturers focus on final assembly cleanliness, they can overlook the impact of surface cleanliness on the adhesion process that holds the whole device together.

Surface science experts agree that if you do not have controlled surface quality throughout your production process, you don't have a controlled quality process.

Supplier variation through the lens of surface science

A hearing aid manufacturer partnered with BTG Labs surface scientists to help assess the quality of parts they were receiving from a variety of suppliers. In medical device manufacturing it is extremely laborious to go through the approval process for any changes made to current production procedures. This company was hoping to do some preliminary work on a potential back up supplier for a titanium chassis it bonded an electronic component to and then over moulded with a polymeric coating. It wanted to have an alternative source in its back pocket if there were unexpected delays or shortages from the current supplier, which we all know can happen very suddenly, especially in the medical industry.

BTG Labs examined the wash process of the titanium surface to see how each supplier stacked up to expectations and requirements. Using Reflection Absorption Infrared Spectroscopy (RAIRS), it characterised the chemical makeup of each surface as it would be delivered from the supplier, pre-washed and then after the hearing aid manufacturer did its own cleaning process.

To learn more about how medical device manufacturers meet regulation requirements, download the free eBook: *How to Streamline Process Design to Production for Medical Devices*.

Water contact angle measurements are also used to see how the chemicals present on the surface affected the surface energy of the titanium. High surface energy is indicative of a truly clean surface that is ready for bonding and contact angles change based on the surface energy level. Water contact angle measurements are obtained by depositing a drop of water on the surface and measuring how it reacts. The water will react in accordance with how high the surface energy is, creating a larger or smaller contact angle, since it is sensitive to the molecular changes that occur on a surface during a cleaning process. Distinctive cleanliness variation were found after each part went through the same wash process.

During the initial RAIRS inspection, it was discovered that the titanium chassis had varying amounts of hydrocarbons and silicones on the surface, both of which are detrimental to adhesion. After washing the

parts, there were pretty extreme variations in the silicone levels left on the surface post-cleaning. Testing the surface cleanliness with water contact angle measurements showed that the parts that began the wash process with initially cleaner surfaces were not coming out cleaner than the parts that began dirtier.

One of the vendor's parts measured ~80° contact angles before being washed and came out measuring ~40°. Another vendor's parts measured ~65° before washing but came out measuring ~50°. It was noted that really similar parts had quite different responses to the cleaning process. The silicones were low molecular weight substances and had not crosslinked on the surface of the titanium because they were able to be removed on some parts but they were being mysteriously stubborn on others.

Using a technique called white light interferometry, the surface scientists dug in a little deeper and evaluated the surface roughness and topography of each part. Discovering that the roughness varied quite a bit between each vendor, it became clear why some parts were not getting as clean as other vendor's parts.

Surface sensitivity matters for accurate surface quality measurements

Sophisticated surface analysis equipment like RAIRS and white light interferometers are vital in a surface laboratory but are not practical for manufacturers to use in a production setting. Contact angle measurements, however, can be easily and



How to Streamline Process Design to Production for Medical Devices

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quickly taken directly on real parts as they move through the cleaning and adhesion process.

Contact angle measurements to evaluate surface quality can be automated or obtained using portable goniometers. With the right contact angle measurement device, they can be extremely versatile because of their accuracy in a range of manufacturing situations. Regardless of the

geometry of a part or the roughness of its surface, contact angle measurements can consistently be taken and remain as sensitive to subtle molecular changes. Contact angles can be uninhibited by surface roughness if the water droplet is deposited using a ballistic deposition method which uses a controlled kinetic energy to overcome any surface texture.

Using a simple contact angle

measurement to gather definitive surface quality data, manufacturers can have clear analytics to help streamline any FDA approvals for process changes or validations.

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The Sempre Group launches guide to metrology in medical device manufacturing

To help British medical device manufacturers understand the value in integrating metrology into production, industrial metrology supplier The Sempre Group has released *Metrology in Medical*. The whitepaper explores how medical device manufacturers can use measurement equipment and data to improve quality throughout the product lifecycle. The whitepaper can be downloaded for free on The Sempre Group website.

The medical device industry in the UK and Ireland is highly competitive. Ireland, for example, is one of the largest exporters of medical products in Europe, with annual exports of over 12.6 billion euros. As a result, medical device manufacturers are constantly looking for new ways to streamline validation, improve productivity and gain a competitive edge in the market.

This whitepaper explains how considering the role of metrology earlier in the process and integrating metrology into every stage of a medical device's product lifecycle enables manufacturers to develop a more

efficient and traceable process. It explores the factors to consider when searching for a metrology supplier, how metrology software can improve traceability and the benefits of automating reporting processes.

"There is no room for error when bringing a medical device to market," explains Jason McGlynn, commercial manager for Ireland at The Sempre Group. "Even the smallest defect can have dangerous consequences for patients, so manufacturers must document every step of the product lifecycle to prove a device meets its intended purpose.

"Metrology is vital to gathering this accurate and traceable evidence but is often only used at the end of production to validate final parts. By creating an effective quality management strategy and integrating metrology into production from the outset, manufacturers can improve traceability to ensure regulatory compliance while streamlining production."

The Sempre Group provides UK and Irish manufacturers with the bespoke solutions

and expert support needed to improve quality at every stage of a medical device's lifecycle. The company regularly introduces new and innovative metrology systems and software from a range of leading global suppliers to find the right solution to any measurement challenge. The Sempre Group is also on hand to install systems, train staff and calibrate equipment to ensure measurements are valid in the long term. The Sempre Group is one of a few UK companies that offers UKAS certified calibration for Micro-Vu Optical CMMs.

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Taiwanese machines accurate to microns after 25 years

In August 2020, a pair of BT40 Vertical Machining Centres (VMCs) built-in Taiwan by Leadwell was supplied by UK and Ireland agent WH-Lead to the Holmfirth factory of HB Bearings, which less than a year previously had increased its turnover by one third through the acquisition of Gamet Bearings.

Low-volume manufacture of both bearing ranges, which include precision radial, taper roller, deep groove ball, cylindrical roller and angular contact as well as many other types, is being consolidated in the Holmfirth factory, where a purpose-built extension has been added to house some of the production equipment from Gamet Bearings.

The new Leadwell machines, a 4-axis model with rotary table and a 5-axis trunnion-type machining centre, were bought to strengthen production capacity for manufacturing the high precision, bespoke bearings in metric and imperial sizes. A wide range of materials are involved, including stainless steel, tool steel, plastics, bronze, aluminium and exotic alloys. The bearings are often specials, new designs or obsolete types that may need to be reverse-engineered to keep old manufacturing plant, steel mills, mining equipment, oil rigs or classic cars in operation.

Graham Hirst, managing director of HB Bearings/Gamet Bearings, comments: "We have prioritised the purchase of these Taiwanese machines ever since we bought our first one, a machining centre, more than 25 years ago.

"We sold it when the two new machines arrived, with a view to pre-empting its eventual failure. However, right to the end it still milled dowel holes in 62 Rockwell steel to within 10 microns.

"We now have five machining centres



from Leadwell and three of their lathes, including two recent models installed in August 2017, which are just as well-built, accurate and reliable."

Purchase of a second 5-axis machining centre for the factory, a Leadwell V-40iT, was down to a desire to supply increasingly complex bearings, especially to the motorsport sector, in ever shorter lead-times.

Some products have complex flanges and profiles that need simultaneous interpolation of all five axes for their production. Others have angled holes that benefit from using the machine in 3+2-axis mode. By automatically repositioning the component using the rotary axes, production can be completed in, for example, two operations rather than the four that would be needed on a 4-axis machine, reducing the manufacturing cost.

The V-40iT was selected partly due to its competitive price for an 846 x 635 x 488 mm capacity 5-axis machine having a 12,000 rpm/18.5 kW (24.8 kW-30 min) BBT spindle with through-coolant and a 40-tool magazine. Additionally, the generous width between the trunnion bearings makes it possible to accommodate on the 350 mm diameter table a 680 mm fixture for holding a 636 mm diameter bearing cage.

It was the other new machining centre, a V-30iF 4-axis VMC with 800 x 460 x 510 mm working envelope, that replaced the similarly sized, 25-year-old machining centre. The latest model has a 12,000 rpm/11 kW (14.7 kW-30 min) spindle with through-coolant and 24-tool ATC.

Nearly all programming is carried out either conversationally or by directly inputting G-code at the machine controls, the latest machine being fitted with the FANUC Series 0iMF Plus. Any particularly complex features are developed in Ansys SpaceClaim and imported.

Graham Hirst concludes: "We continue to buy Leadwell machines because they maintain their accuracy over decades. The oldest model we currently operate is more than 20 years old. Our operators like them too, as the machines do not cause any trouble and the Fanuc control option is also popular.

"Over such a long period since we bought the first machine, it has been interesting for me to observe how Leadwell has progressed as a machine tool manufacturer on the international stage. Their mills and lathes were always good, but they are even better now."

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European debut for QTE turning centres with new SmoothEz

A new easy-to-use turning centre with a revolutionary CNC for simple setup, operation and programming is being launched into the European market. The new QTE Series of high-speed, high-accuracy CNC turning centres from Yamazaki Mazak are the first machines to be equipped with SmoothEz, the latest generation of MAZATROL CNC.

MAZATROL SmoothEz CNC combines three easy features, Ez Machining, Ez Operation and Ez Setup, to deliver outstanding productivity, accuracy and, in turn, profitability.

Ez Machining offers machine users high-speed, high-accuracy machining with thermal compensation control, delivered by Mazak's Thermal Shield, to maximise accuracy by automatically compensating for temperature changes in the machining area.

Ez Operation includes QUICK MAZATROL for fast conversational programming with a 15" touch screen and intuitive operating system that can be customised according to the operator's preference.

By integrating Mazak's Smooth CAM Ai

and Mazatrol Twins a virtual copy of the machine can be replicated in the office for enhanced setup. Collective management of machine data is synchronised between the factory and office with Smooth Project Manager to conveniently manage data required to execute machining programs, including tool data, workholding, system coordination, parameters and workpiece 3D models.

Additionally, Smooth CAM Ai can dramatically reduce programming time with Solid MAZATROL to automatically generate a program from a 3D model using Ai deep-learning to determine the optimal process from past programs.

The simple and compact QTE Series, which is manufactured in Mazak's Singapore factory, is designed to fit into even the smallest machine shop, but with no compromise on power.

The QTE Series is equipped with a powerful 5,000 rpm built-in spindle motor that is capable of ultra-high-speed acceleration and deceleration delivering high-efficiency, high-accuracy machining.

Since there is no loss of power through



mechanical transmission, the built-in-motor delivers more power during cutting, while vibration is minimised during high-speed operation to ensure exceptional surface finishes and maximum tool life.

Two turret selections are available with a 12-position drum turret as standard and an 8-position turret as an option. Each utilise a 25 mm turning tool shank size.

The QTE Series also comes equipped with an NC tailstock - providing support for the workpiece during the machining process to improve accuracy and workpiece finish.

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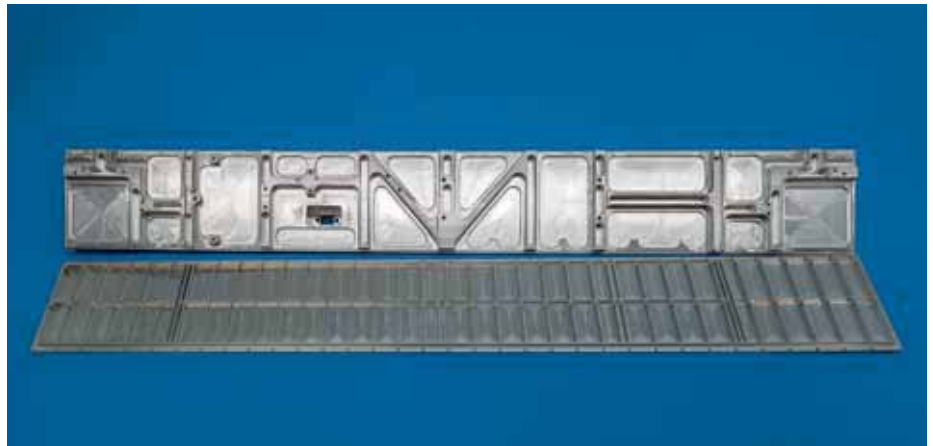
Pinacho



Space Rover gets 'scientific eyes' with help from XYZ Machine Tools

The European Space Agency's Rosalind Franklin Rover is due for launch from Baikonur, Kazakhstan in Summer 2022, with a target to land on the surface of Mars in March 2023. Once arrived it will be tasked with identifying signs of water-rich minerals, that could indicate potential for past life. Key to these investigations will be the Optical Bench that will be the eyes of the rover, containing two stereo cameras, a mono high-definition camera and array of electronics. Known as the Pan Cam this device was developed and manufactured by the Mullard Space Science Laboratory, the home of UCL's Department for Space & Climate Physics.

The optical bench comprises a box with separate top and bottom, machined from 5083 grade aluminium and joined together using electron beam welding techniques. Machining was completed in the laboratory's workshop in Surrey using XYZ Machine Tools smallest Vertical Machining Centre (VMC). Due to the complex design, there are some extremely fine details to machine, such as an O-ring groove around the lid, measuring just .35 mm wide, as well as numerous M1.6 threaded holes, which were thread milled using the latest tooling from Ceratizit. The other challenge was that the parts had to be machined from billet material, with the machine and tooling having some extremely thin wall thicknesses to contend with.



While the initial thought process may have been to use CAD/CAM to generate the programs for these complicated parts, with their numerous pockets and features; the decision was taken to program directly at the machine using the ShopMill software within the Siemens control. "Due to the low volume, only a few prototypes and the final finished parts were required, it was easier to program at the machine, as the control makes it so easy to finesse the toolpath and achieve the fine details that might not have been possible using an automated CAD/CAM program," says Simon Hemsley, head of mechanical workshop.

In addition to being able to fine tune the program, another key element of programming at the machine is the ability to adjust the step-over distance when milling. The default amount is set at 45 percent, but due to a requirement to achieve finer finishes and not having any great restriction on cycle time, this was adjusted to two percent. "Reducing the step over to two percent and using a 3 mm ball nose cutter greatly improved surface finish. The obvious compromise was cycle time, with some parts taking 40 hours to machine complete from billet material," says mechanical engineer, Adrian White. "This extended cycle time wasn't an issue as not being in a production

environment, pressure to finish parts is not the same. Prior to having the tool change facility provided by the XYZ machining centre we were restricted to bed mill type machines and extended running would not be possible. The benefit of the tool changer was a game changer for us, allowing us to run lights out."

The success of this project convinced Simon Hemsley and his team of the value and flexibility provided by machining centres, with tool change, so much so that an order has just been placed for an XYZ 500 LR linear rail VMC. This machine, which has been part funded through the Government's Research Capital Investment Fund, comes with the latest Siemens 828D control with the optional advanced programming software package that includes the Shopmill technology. This, along with the MiniMill, will ensure machine programming continues for the foreseeable future as the exploration of our solar system continues.

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New control software optimises roughing, high-speed milling and jig grinding

German machining centre manufacturer Rödgers has introduced to its machining centre range an upgraded CNC system capable of programming and controlling a full range of metalcutting operations more efficiently, from roughing through high-speed milling to micron-accuracy jig grinding.

Available on its 3-axis and 5-axis machines, the Racecut control enables the most demanding requirements for precision to be met, while at the same time delivering high cutting performance including when machining hard materials. Availability of the machines in the UK and Ireland is through sole sales and service agent Hurco Europe, High Wycombe.

Underpinning the high performance in terms of accuracy and speed are frictionless linear drives and 5 Nm resolution glass scales. These are combined with the benefits of the new CNC system, which has an exceptionally high clock rate of 32 kHz. The smallest deviations in cutter paths can be detected and corrected, even during high-speed cutting, raising processing speed and optimising surface quality. Tests carried out by the manufacturer indicate that machining time can be reduced by as much as 20 percent while maintaining the same surface finish.

Additionally, extensive compensation in the control for deviations in the angular position of the rotary table and swivelling trunnion of 5-axis machines plays a central role. Particular attention has also been paid to the control's ability to compensate precisely for spindle growth.

For thermal stability to ensure positioning accuracy of less than one micron, the machine has sophisticated temperature management. The temperature of the medium that flows through all key elements is controlled to an accuracy of $\pm 0.1^\circ\text{C}$. That may be extended down to an astonishing $\pm 0.02^\circ\text{C}$ for certain applications, such as the manufacture of plastic injection moulds for producing smartphone camera lenses.

Diamond-tipped dressers are provided for dressing the grinding wheels. The position of the tool magazine and its roller shutter prevents the ingress of even the smallest particles, ensuring that errors cannot occur due to contamination between the tool and the machine interface.

To facilitate the inclusion of jig grinding routines during shop floor programming, Rödgers has incorporated into its Windows-based control a database containing pre-defined parameter sets. They speed program preparation and reduce the risk of incorrect data being entered. Users can expand the database with values gained from their own experience.

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Sliding-head lathe with two tool platens slashes production cycle times

At the subcontract machining facility of Witon Engineering, Barnstaple, turn-milling of relatively complex components from 16 mm diameter bar used to be carried out on 32 mm capacity sliding-head lathes, rather than smaller capacity models, to take advantage of the extra CNC axes and tools available on the larger machines. This type of work has now been transferred to a nimbler, 25 mm bar capacity Citizen Cincom D25-VIII LFV sliding-head turning centre, installed in January 2021. The first two jobs have shown significant cycle time reductions of 20 percent or more.

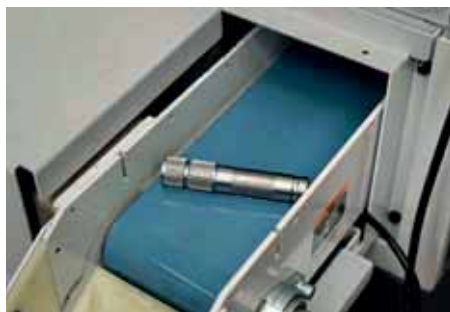
Since the mid-90s, the contract machinist has bought 17 bar fed lathes from this supplier, of which one was a 42 mm bar capacity Miyano fixed-head machine, the others being various Cincom sliding-head models for turning up to 32 mm stock. There are currently 11 Citizen machines on the shop floor, earlier models having been exchanged over the years. Lathes from this supplier therefore account for approaching half of the 25 of bar autos in the factory, comprising 13 sliding-head models, eight single-spindle fixed-head turning centres and four CNC multi-spindle automatics.

The first component to be transferred to the D25 was an EN1A steel shaft for a lawnmower. The part was formerly produced on an L32-VII, of which there are three on site. As 180,000 have to be produced to fulfil the current contract, the 20 percent cycle time reduction leads to a significant production cost saving.

The second component benefiting from being machined on the D25 is a 304 stainless steel fuel inlet fitting for an automotive customer. It used to be turn-milled on one of a pair of Cincom M32s in a cycle time of 72 seconds. This has been cut to 53 seconds, representing a 26 percent saving. With 55,000-off needed, the economy gained is significant.

Ian Clapp, workshop manager at the Barnstaple factory explains: "We operate a couple of 20 mm capacity, dual-platen sliders of another make and knew this configuration offered quick cycle times.

"However, we saw what our longstanding sliding-head lathe supplier Citizen was offering in the D25, a machine with larger



bar capacity plus the ability to carry out work up to 32 mm diameter without the guide bush for more economical material usage when producing shorter components.

"The model also has the benefit of a programmable B-axis, so we decided to go for this option."

The gang tool platens are in front of and behind the spindle centreline, with Z-axis motion provided on the rear carrier to allow balanced turning, milling or drilling, or simultaneous rough and finish turning. The B-axis on the front post, carrying up to four driven tools on either side to service either the main or counter spindle, swivels by up to 135 degrees. A further feature of the lathe is that three axis groups can be controlled simultaneously by the Mitsubishi 800 CNC system.

Another potential benefit of this 12-axis CNC turn-mill centre is that it incorporates Citizen's programmable Low Frequency Vibration (LFV) chipbreaking technology in the control. It automatically breaks into smaller pieces the long, stringy swarf produced when machining materials such as copper, plastics and high alloy steels. Birds-nesting around the tool and component and the consequent damage that may be caused is therefore avoided. Although LFV cycles have not been included



in programs run so far on the D25 at Barnstaple, it is nevertheless there to use when appropriate jobs come along.

Witon Engineering underwent a change of management at the end of 2016 when second-generation owner and managing director Ian Sheldon retired. The firm is now run by Ian's son-in-law Tom Courtney, who is the general manager and Ian's daughters, directors Hayley Neate and Gemma Courtney. Operations still predominantly centre on precision turned parts production on CNC lathes, the cam multi-spindle auto shop having closed in 2018. Two 3-axis, vertical-spindle machining centres are also in use.

Large batch runs are the norm: one electrical connector part is produced at a rate of 100,000 per month and even one of the machining centres is currently completing a contract for 500,000-off prismatic components.

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Heckert T45 cell puts gear production savings on another planet

A fully automatic production cell based around two Heckert 5-axis horizontal T45 machining centres from Starrag, with integrated robot handling, is manufacturing process-intensive planetary gear carriers in half the time taken by conventional methods, reducing tool expenditure by around 25 percent while halving traditional equipment costs.

The capabilities of the T45 machining centres combine effectively with robotised pallet, gripper and tool handling, as well as with seamless cell control technology. This has enabled Germany-based mechanical engineering and automation specialist Voith to increase its productivity by producing the carriers in the shortest possible lead times and with extremely high levels of precision and process reliability.

Assuming an annual output of 50,000 parts per year, the system is also enabling productivity per unit area to be increased by up to two and a half times thanks to a

reduction in the number of machines being used compared to traditional methods. The compactness of the T45 is impressive as the machine's footprint is 38 percent smaller than a conventional horizontal machining centre.

In 2018, Voith approved the construction of a plant for the automated production of planetary gear carriers. The requirements were demanding, including an annual output of several thousand parts and the production of multiple variants in just two clamping positions. The requirements for precision, fault tolerance and process reliability were also high, of course.

Starrag engineers and designers, together with automation specialist SAV, set out to develop the unique production cell. While it was clear that Starrag's proven Heckert T45 machining centre would meet the requirements for milling, turning and drilling, a particular challenge was to develop automated, time-saving solutions



for workpiece preparation and setup, as well as effective process handling.

The successful result consists of two compact Heckert T45 machines in an integrated robot cell where the robot is effectively the 'master', orchestrating everything from checking incoming components to loading/unloading the machines. Identical or differing type variants can be machined by the cell.

Once the component is clamped, an optimally coordinated sequence of rough and smooth milling, turning and drilling operations are undertaken by machines with 15,000 revs/min and 292 Nm spindles, complemented by fast start-up and deceleration rates and 60-tool magazines.

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Chiron FZ16S delivers maximum efficiency across all sectors

Now available from the Engineering Technology Group (ETG) is the impressive new Chiron FZ16S 5-axis machining centre with an HSK-A100 spindle. With industry-leading dynamics, unsurpassed precision and quality, the Chiron FZ16S allows manufacturers to make more parts with greater precision.

For demanding machining applications across all sectors of industry where components are machined from a solid block, the Chiron FZ16S optimises milling performance with maximum precision. Developed with HSK-A100, this machine is perfectly tailored to the high material removal requirements of industry.

The powerful main spindle achieves a torque level of 400 Nm and is perfect for machining difficult structural components made from titanium or nickel-based alloys like inconel. The particularly large HSK-A100 interface and the proven moving gantry design, which ensures high static and dynamic rigidity, form the basis for particularly high machining rates and machining very deep cavities. The powerful drives of the machining centre provide the

required dynamics. The new FZ16S also impresses in terms of precision thanks to a robust basic design and particularly high thermal stability.

The Chiron FZ16S 5-axis provides a spacious X-, Y- and Z-axis travel of 660 by 660 by 400 mm with a 61 kW spindle motor and of course the HSK-A100 that combine to guarantee a platform for heavy-duty material removal rates. This performance is reinforced by an optional high-speed and high torque 20,000 rpm 200Nm HSKA63 that is supplied by a 162-station tool carousel. As with all of its machines, Chiron has built speed and performance into every element of the FZ16S with an industry-leading chip-to-chip time of 2.5 seconds and rapid feed rates of 75 m/min.

The flexible Chiron FZ16S 5-axis is available with the VariocellPallet. Perfect for processing small batch sizes more dynamically and flexibly, the VariocellPallet enables various raw parts to be clamped on a rotary indexing table with up to ten pallets. The handling system supplies raw parts to the machining centre and removes the workpieces together with the pallet



following the successful machining process. This significantly increases productivity and allows a second pallet to be loaded while another pallet is being processed. Alternately, customers can consider the flexible and cost-effective VariocellUno handling robot, workpiece storage and loading/unloading device.

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"Turning is my life"

The story of a small company in Bavaria is a perfect example of how to turn a hobby into a successful business. As a machining expert for special alloys, Waldemar Maul, together with his wife Anna, has already firmly established himself in Germany through his company Edelstahl WM GmbH. Whether duplex, super duplex or V4A steels, higher alloyed materials are produced here with remarkable precision and quality.

Wiesenfelden is a tranquil municipality in Bavaria and the home of Edelstahl WM GmbH's new production hall, which was built at the beginning of 2020. The range of equipment means a multitude of processes can be covered, from turning, milling, welding and grinding right through to measuring. The new M35 MILLTURN will strengthen the company's focus on complex parts and help them win further orders.

Turning in the garage

It all started in May 2011. As a change from his office job, Waldemar Maul acquired a turning machine and started making turned parts in his own garage in Kelheim. Soon after, Waldemar became a sole trader as a second occupation. His first customers came from his full-time job at the time as an industrial foreman specialising in metals and were founded on his initial training as an industrial mechanic specialising in industrial engineering. Some of the turning and milling work was outsourced by the customer. This enabled him to support customers in this area with the manufacturing of high-quality products made of stainless steel.

The foundation established in 2012 led to increased sales in 2013 and 2014: "We were able to impress our customers very quickly with our high-quality work and by always meeting deadlines. This enabled us to establish strong customer relationships," reports Anna Maul. One year later, the



company finally changed its legal form from a sole trader to a limited liability company.

The year 2015 was a very significant one for Edelstahl WM GmbH. Previously orders had been processed on private premises, where space was very limited but, in December 2014, a production hall was rented in Kelheim. In February 2015, the big move from the Maul's private garage to the large production workshop took place. The managing director also decided to give up his main job and devote himself entirely to Edelstahl WM GmbH.

Over the following years the workshop was equipped with more machines as well as special tools. In September 2016, the first turning-milling centre with a turning length of 1,500 mm was purchased. The main reason behind the investment was to increase the quality and accuracy of the manufactured parts. "We were then able to meet customer requirements to a greater extent as well as to expand the order volume due to the broader production spectrum for turning and milling. Setting up an inspection room allowed us to further increase the accuracy of the manufactured parts," says Waldemar Maul.

Edelstahl WM GmbH moved into the newly built production hall at the end of April 2020. The site in Wiesenfelden became its new home, where the managing director is responsible for the entire technical operation, including production.

Edelstahl WM GmbH has specialised in the production of individual and prototype

parts through to small series runs from the very beginning, using high-quality, select materials. "The parts we produce are characterised by exceedingly high quality and 100 percent precision. We also support our customers with internal problem solving. This could include product or project-related suggestions for solutions and improvements, for example," says Waldemar Maul.

Navigating the crisis with strategic skill

The worldwide coronavirus crisis has had little effect on Edelstahl WM GmbH. Although a number of orders from the automotive sector were cancelled, by contrast volumes increased from the medical technology sector. The machines are very well utilised.

"Often we have orders involving special alloys. These are predestined for the MILLTURN," says Waldemar Maul enthusiastically. "My goal on this machine is to minimise the number of clamping operations so I can do multiple machining steps. This enables us to achieve higher quality as well as narrower component tolerances."

Due to the extensive equipment in the production hall, blanks can be cut to size in Edelstahl WM GmbH's own facility. The parts are then rough-turned or rough-milled and finally welded. Only the pickling of chromium-nickel steels is outsourced. After machining the parts by turning, milling and (flat) grinding, the workpieces are measured



in the inspection room. Order volumes of 100-300 pieces are typical, with parts being delivered in batches of 10 or 20.

The strategy of Edelstahl WM GmbH has proven to be successful so far. The specialisation in small batch sizes and individual parts as well as the complexity and accuracy of the components will be further expanded by the investment in the MILLTURN.

Every part must be a good part

At the moment the team is busily testing and programming the M35 MILLTURN. A SolidCAM solution with a 5-axis program was purchased to assist with the programming. "For some orders, we could have done with having the machine sooner. The decisive factor in our decision to purchase the MILLTURN was investing in a machine that would improve our current production processes and take us forward strategically," says Waldemar Maul.

At Edelstahl WM GmbH, the components are largely manufactured by the managing director himself. However, the goal is to hire staff or train machining technicians from scratch. Due to the special orders and complex workpieces, it is often difficult to



find suitable personnel. "We want to train employees to the point where they can do the work on their own. Unfortunately, applicants are often put off by the complexity of the components and the required precision," explains Anna Maul. "Our philosophy here matches that of WFL: every part must be a good part," says Waldemar Maul unequivocally. "Our parts are incredibly demanding, which is why I have very high expectations of an employee."



Waldemar Maul knows what is important in his business. As a foreman in a gear and pump workshop, he himself disassembled, overhauled and reassembled pumps and gearboxes. This is of particular benefit to him in his work today. He concludes: "If I can see the drawings and know where it's going to be installed, I'm already at a distinct advantage."

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Subcontractor reaps the rewards with Doosan

Mills CNC, the exclusive distributor of Doosan machine tools in the UK and Ireland, has recently supplied leading precision subcontract specialist RPS Precision Engineering Ltd with a new multi-tasking twin-turret, twin-spindle turning centre.

The machine, a Puma TT1800SY, was installed at the company's new 7,250 sq. ft. facility in Rawtenstall, Lancashire in late March 2021.

As part of the investment package, the TT1800SY turning centre was also supplied with a new servo-driven Hydrafeed MSV 110 bar feeder as well as a number of different-sized collet chucks and adaptors. The intention was to make the TT1800SY ready for action and able to swing into full production as soon as its installation and commissioning had been completed and after operator/programmer training had occurred.

Since being installed and becoming fully operational, the TT1800SY has been used to machine a range of complex, high-precision parts, in medium batch sizes, for an equally diverse range of customers.

In just a few short weeks the investment is already paying off with the TT1800SY having a positive impact on RPS' productivity and performance.

Owner and managing director Michael Sirrell says: "The TT1800SY is a productivity powerhouse of a machine. It might appear small from the outside, but its twin-spindle, twin-turret configuration is helping us machine high-precision components quickly and accurately in one hit.



"Furthermore, by integrating the machine with a servo-driven bar feeder, we have created a 'de facto' automated manufacturing cell that is both efficient and reliable and that we are able to run, unattended, during the day. It's a real win-win situation for us.

"In the near future, when we fully embrace lights-out operations and run the machine unattended overnight and over the weekends, the productivity benefits will be even more impressive."

RPS Precision Engineering, previously Rochdale Production Services, was established in 1988 by current owner and managing director, Michael Sirrell and his father Bryan.

The independent, family-owned business specialises in machining complex, high-precision parts, from prototypes and one offs through to small, medium and large batch production and in delivering them to customers on time and in budget.

To add more value and further strengthen its position within customers' supply chains, RPS has augmented its precision machining



services to include TIG welding, fabrication and assembly.

RPS also provides a range of services that includes consultancy, 3D modelling and rapid prototyping.

Michael Sirrell says: "We are a one-stop solutions provider. We pride ourselves on the quality of our services, on our ability to meet the most stringent of deadlines and on our high levels of customer care."

RPS is ISO 9001: 2015 certified and is committed to continuous improvement. As such it regularly invests in its people, its plant and equipment and its processes and systems too.

To maintain its competitive edge and ensure that it is delivering the best possible service to customers, RPS invests in advanced machine tool technologies.

Over recent years, the company has made significant investment in new Doosan lathes and turning centres from Mills CNC. The first of these, made back in 2012, was a Lynx 300 10" chuck/76 mm bar diameter capacity, horizontal single turret lathe.

Michael Sirrell recalls: "It was a watershed moment for us because, up to that point, we had really only invested in good quality used machines when we needed additional machining capacity".

However, such were the performance improvements the company experienced from its first Doosan lathe that 12 months later it invested in a second.

Further investment in Doosan turning technologies followed with the emphasis being more on improving the company's turning capabilities as well as increasing its capacity. It also acquired a Lynx 2100LSYB in 2017 and a Puma 2600SY II acquired in 2019.

Michael Sirrell says: "The Doosan lathes/turning centres we have invested in are all high-performance, sophisticated machines. They have similar capacities and share many of the same features, sub-spindles, live tooling and Y axes. All



have FANUC controls which means that programs can be transferred easily between them, should that be required.

“The lathes have all been supplied by Mills CNC and, over the last nine years, we have developed a good relationship with them. Mills understand our business. We like their approach and we respect their advice.”

RPS’ investment in its new TT1800SY nearly didn’t happen. Despite the impact and effects of the pandemic, the company had been busy throughout 2020 and at the start of 2021. So much so in fact that early in 2021 RPS made the decision to, once more, strengthen its turning capabilities.

Michael Sirrell explains: “A significant percentage of the parts we



turn are small and have short cycle times. They are made from materials that include hardened and mild steel, aluminium, stainless, copper, bronze, brass and plastics. They are machined to tight geometric tolerances, 0.002 mm is custom and high surface finishes, in relatively high volumes.

“The profile and characteristics of parts being machined led us, at the beginning of the year, to consider investing in our first sliding head machine. As Mills CNC supply Doosan Swiss-Turn machines, we naturally approached them for advice.”

An audit into what RPS wanted to achieve from the new investment was undertaken and completed. The results caused a change of direction.

Michael Sirrell says: “On the advice of Mills CNC engineers we changed our investment plans and opted, instead, for a multi-tasking, fixed head, turning centre as opposed to going down the sliding head route.

“We believed that the multi-tasking turning centre integrated with a bar feeder would provide us with more flexibility and, because we were already familiar with fixed head lathes with Y-axes, driven tools and twin spindles we could hit the ground running quickly and that was what transpired.”

He concludes: “It’s been an incredibly busy and important year for RPS. We have changed our company name to better reflect who we are and what we do, we have relocated to new premises over 300 percent bigger than our previous facility and we have invested in a new, state-of-the-art turning centre that is making us more productive, efficient and profitable. These are exciting times.”

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Fast setup and changeovers on a wide range of parts

Three models of new deep hole drilling system deliver tight diameter control, straightness and superior surface finish, signalling the next wave of Sunnen's total-bore solutions

Sunnen Products Company, the global leader in bore sizing and finishing technology since 1924 now offers a cost-effective BTA drilling solution in the shape of the Sunnen SHDD Series Deep Hole Drilling System. Sunnen used voice-of-the-customer input to develop its latest cost-effective deep hole drilling solution, resulting in an array of standard features.

These heavy-duty machines are designed to handle high-capacity production of drill collars, drill pipes, submersible pumps, hydraulic components, ship rotor shafts, landing gear, turbine shafts, cannon barrels and more. The versatile SHDD series achieves tight diameter control, straightness and superior surface finish in workpiece materials ranging from aluminum to super alloys. Three different operation modes accommodate a variety of machining processes including counter boring, pull boring, trepanning, bottom forming and skiving/roller burnishing. Available in 2-, 4- and 6 m part length capacity models, the deep-hole drilling system can handle solid drilling from .8 to 5.0 inches (19–127 mm) and up to 7.0 inches (178 mm) for counterboring or trepanning.

As part of the development of the SHDD series, Sunnen partnered with Midwest Precision Manufacturing, renowned experts in deep-hole drilling, gun drilling and honing. The team from Midwest Precision provided up front design input from the customer's viewpoint. A SHDD-4500 installed at the Midwest facility in Fredonia, Wisconsin, USA provides further real-world



Standard heavy-duty 3-jaw chuck



Solid drilling tools

input for refinement of the machine and continued development of drilling applications.

"This design approach demonstrates our commitment to develop the best deep-hole system on the market," says Phil Hanna, machine product manager at Sunnen. "We're unique among deep-hole drilling manufacturers in that we provide a complete solution from machines to tooling, drive bars, cutting inserts, pads, coolant systems and coolant. The primary focus of our design team has been to reduce machine setup and changeover time. Our controls engineering team has worked to develop user friendly intuitive control screens. Our goal is to create an easy-to-use, heavy-duty deep hole drilling solution that will operate reliably for many years."

The SHDD series is a great choice for applications spanning many industries, such as oil & gas, shipbuilding, aerospace, hydraulics/pneumatics, mould & die making and military armaments. Typical applications include: drill collars, drill pipes, submersible

pumps, hydraulic fracturing components, ship rotor shafts, landing gears, turbine shafts, refuelling pipes, large hydraulic cylinders and wind power turbine shafts.

The SHDD series standard configuration includes features such as a 3-jaw chuck, part counter rotation, ballscrew driven tool feed, rack-and-pinion-driven pressure head, Beckhoff PLC control with 394 mm (15 in) color touch screen on a moveable slide, combination light curtain/fencing safety system, and a 1,650-gallon (6,245-litre) coolant system with a chiller and four 10 µm bag filter units.

An automatic chip removal system and heavy-duty tool drive shaft vibration dampeners are also standard on the SHDD systems. Options include: fixed tool/part rotation, pull boring capability with a lantern



Automatic chip removal system



The new Sunnen SHDD series with heavy-duty tool drive shaft vibration dampeners

chuck, front chip exhaust, large bore workpiece pressure head with 7 in (178 mm) capability, 4-jaw chucks, remote process monitoring, part barcode scanning capability and a camera at chip exit to allow for process optimisation from the operator station. A brochure is available at www.sunnen.com, with details on all features and options of the SHDD series machines and accessories.

Sunnen's BTA deep-hole drilling tool and accessories include: solid drilling tools, repanning tools, counter boring/reaming tools, bottom forming tools, deep hole machining oil, cutting inserts; guide pads. SHDD machines are engineered and built in the USA and are covered by Sunnen's 3-year warranty.

An American saga

In 1923, Joe Sunnen knew he was onto something. He was 22 years old and had just patented his first product, a valve lifter tool he designed while working in his brother's auto garage. All he needed was a way to build it and a place to sell it. He would find both in St. Louis, Missouri. Joe moved to the city with his wife, Cornelia, in 1924. Lacking the funds to open a storefront of his own, Joe got creative. He converted his 1916 Hupmobile into a camper and took his business on the road. As he visited garages and job shops across the region, Joe's tool sold itself.



Joe Sunnen

The success of Joe's first tool spurred him to design another and another after that. In 1928, he designed the first manual cylinder hone, firmly planting Sunnen's roots in precision manufacturing. A modern version of the product is still found in tool rooms around the world.

To this day, Joe's story of commitment and resilience reminds us of how far we've come and inspires us to push the boundaries of what's possible. What began in the back of a Hupmobile has grown



into a massive operation bringing innovative machinery and advanced tooling to some of the world's greatest manufacturers. Sunnen is proud to take the legacy forward.

With world headquarters in St. Louis, Missouri, Sunnen is the largest fully integrated company in the world specialising in precision bore creation, sizing and finishing equipment. A Sunnen solution might include honing, lapping, skiving/roller burnishing or deep hole machining...or a combination of those processes.

13 international subsidiaries and over 40 authorised distributors allows it to deliver top quality Sunnen machines, tools, service and training wherever they are needed around the globe.

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New machine builds on successful IMSA-NSK partnership

The new MF1000-3T deep-hole drilling machine from IMSA is taking advantage of the benefits provided by NSK's DIN-standard ball screws for the European machine tool market. The move builds upon a long-standing partnership between IMSA and NSK that dates back many years and involves the development of numerous machine models. IMSA intends to showcase the new MF100-3T at the EMO Milano machine tool exhibition in October 2021.

Established in 1988, IMSA is located in Barzago, northern Italy, from where its core business centres on the design and manufacture of deep-hole drilling and gun-drilling machines. As a leader in its field, there are now more than 500 such IMSA machines operational worldwide.

Applications are wide and varied, but many focus on the gun drilling of mould tools for the automotive industry. Seven IMSA models for this purpose came to market between 2014 and 2019 alone. Thanks to a series of options, each standard base model is custom-built according to the specific requirements of customers although the company can also design and manufacture completely bespoke solutions.

To help maximise machine performance, IMSA has for many years relied upon ball screws and linear guides from its preferred linear motion partner, NSK. The company is now repeating this tried and tested formula for its latest deep-hole drilling machine, the MF1000-3T, which will be able to produce holes up to 1,000 mm deep, depending on tool diameter. Equipped with a tilting head, the machine will also offer the capability to perform milling operations, while an 80-station automatic tool-change magazine and automated pallet changer will facilitate unattended workpiece machining.

NSK's ball screw, which conforms to DIN 69051 (ISO 3408) with regard to both dimensional and tolerance classes, meets IMSA's performance demands in terms of speed, accuracy, load capacity and rigidity. The first NSK DIN-standard ball screw order is due for delivery in May 2021 to meet the requirements of a prototype MF1000-3T. NSK RA65 roller guides will also form part of the order.

Manufactured in shaft diameters from 32



to 63 mm and with leads from 10 to 40 mm, NSK DIN-standard ball screws offer a speed factor of 160,000 dn. This performance level makes them ideal for use without restriction in high-speed machining applications where very accurate positioning is also required. In addition, the smooth-running properties of the ball screws incur the least possible vibration in the linear system while also reducing noise levels.

NSK Europe Ltd is the European organisation of Tokyo-based bearing manufacturer NSK, which was founded in Japan in 1916 and today employs nearly 31,000 people in its worldwide operations. The products and solutions provided by the industrial and automotive supplier can be found wherever things move. In addition to nearly all types of rolling bearings, the company's portfolio includes housed bearings, linear technology, wheel bearing units, transmission and engine bearings and steering systems. The company is oriented to perfection in all of its business activities. Its aim is quality leadership in its industry, which it strives for through a continuous process of improvement, excellent product development, optimised production processes and customer-oriented service processes.

Established in 1988 and located in Barzago, Lecco in northern Italy, IMSA initially manufactured special machines for general mechanical industry. Since 1992, it

has specialised in the design and manufacture of deep hole drilling machines and has become a leading manufacturer of this machine type.

More than 500 IMSA deep drilling machines are currently running worldwide, mostly in the automotive industry, in workshops of small and large size businesses in Italy and in the rest of the European Union, in Canada, USA, Russia, Brasil and Mexico.

Many of the recent innovations applied to gun drilling machines for mouldmakers were developed by IMSA and the efforts of IMSA's design team are still concentrated on this application, with seven new machine models presented between 2014 and 2019.

IMSA machines are made-to-order. The standard models are custom-tailored thanks to a series of options. It also offers complete high-tech solutions to meet the most common needs. Individual solutions can also be designed and manufactured.

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Four benefits of gundrilling and what it is used for

by Andrea Wilson, director of Hone-All Precision

At Hone All, we combine the latest cutting-edge deep hole drilling technology with superior technical knowledge to provide precise machining solutions. Our gundrilling services offer an accurate, cost-effective solution for businesses, matched by rapid response times.

What Is gundrilling used for?

Gundrilling is a form of deep hole drilling that utilises a long, thin cutting tool, to create holes in metal with high depth-to-diameter ratios up to 400:1. Effective in producing holes with diameters between 2 mm and 25 mm, gundrilling is unlike conventional rotational drilling as the tool uses a single cutting edge to remove chips in the material as it advances. During the operation, high-pressure coolant is flushed through the central hole to support the movement of the drill tip and to remove the swarf safely.

Originally developed for the manufacture of gun barrels, gundrilling harnesses the latest technology, including CNC deep hole drilling, to deliver highly precise machining for a wide range of industries. Gundrilling offers important benefits over other types of metal drilling.

Cost efficiency

Gundrills can be reground and re-tipped numerous times by specially trained machinists, offering a long service life that makes the method more cost-effective than conventional twist drilling. The feed rate is also extremely quick and efficient in comparison with traditional drilling.

Superb drilling quality

Whether you need shallow or deep holes, gundrilling can produce outstanding results quickly. Close tolerance holes can be made with excellent surface finishes, free from burrs, consistently over long lengths. Additional machining, such as reaming and honing, is not usually required.

Precise cutting performance

Compared to conventional drilling methods, gundrilling is consistently more accurate, delivering superior accuracy with minimum centreline deviation. Consequently, gundrilling makes it more possible to deliver to exact specifications for a range of projects and industries.

High reliability

Because of the way in which they are formed and the use of a high-pressure coolant, swarf can be continuously removed from the cutting area, improving quality and repeatability and reducing machining time with the process up to six times faster than conventional twist drilling.

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Unique compression geometry enhances CRP machining

The latest solid carbide milling cutter from the innovators at CERATIZIT features patent-pending geometry that gives users of its MonsterMill FRP CR fibre compression across the entire cutting length when machining Carbon Fibre-Reinforced-Plastics (CRP). Thanks to this maximum utilisation of the cutting edge, tooling costs are reduced, less time is spent on programming and tool life is increased. All of which are good reasons to take a closer look at this tool.

Carbon Fibre-Reinforced-Plastics are increasingly finding their way into many branches of technology where they are the preferred choice when high tensile strength and rigidity are required, alongside low weight. However, outstanding material properties pose major challenges for manufacturers of precision cutting tools. These tools must withstand high levels of abrasion and deliver optimum performance when it comes to component quality; with the new MonsterMill FRP CR end mills CERATIZIT has overcome these challenges. With its combination of high-performance carbide and market-leading diamond coating, the solid carbide milling cutter does not only meet demanding requirements in the machining of carbon fibre-reinforced plastics, it marks a step-change in technology. In comparison to conventional routers with a fixed compression zone; the left- and right-hand helix on each cutting edge of the MonsterMill FRP CR form a criss-cross pattern cuts that has a negative effect on the workpiece eliminating any pulling up or pushing down of the



component when under cut, offering further key benefits to users.

Regular left and right-hand cuts on each cutting edge and the accompanying fibre compression across the entire cutting length result in fibres being cut off cleanly in all directions, without damaging the component. This greatly reduces delamination and projecting fibres. Also, depending on the component thickness and the fixture, MonsterMill FRP CR can be used multiple times, as the fibre compression is present across the entire cutting length, maximising the full flute length of the cutter. This gives the customer the opportunity to

lower costs; one tool can be used several times depending on the shape and thickness of the component as well as the clamping fixture.

Other benefits of MonsterMill FRP CR include reduced time and effort spent on programming for shaped components as, when compared to a conventional router with a fixed compression zone, no zone is aligned on the component for

the milling and profiling of shaped components with the MonsterMill FRP CR. This significantly reduces programming time, saving time and money. Using the unique length independent compression zone designed into MonsterMill FRP CR, and dependant on component thickness and shape, it is possible to significantly extend tool life. This is achieved by oscillating the cutter in an axial direction, which assists dust removal and promotes cooling of the cutting edges. This is a major advantage in comparison to standard routers with a defined compression zone.

MonsterMill FRP CR performance milling cutter was added to the CERATIZIT product range at the end of May to enable the highly efficient machining of composite materials in this increasingly demanding market.

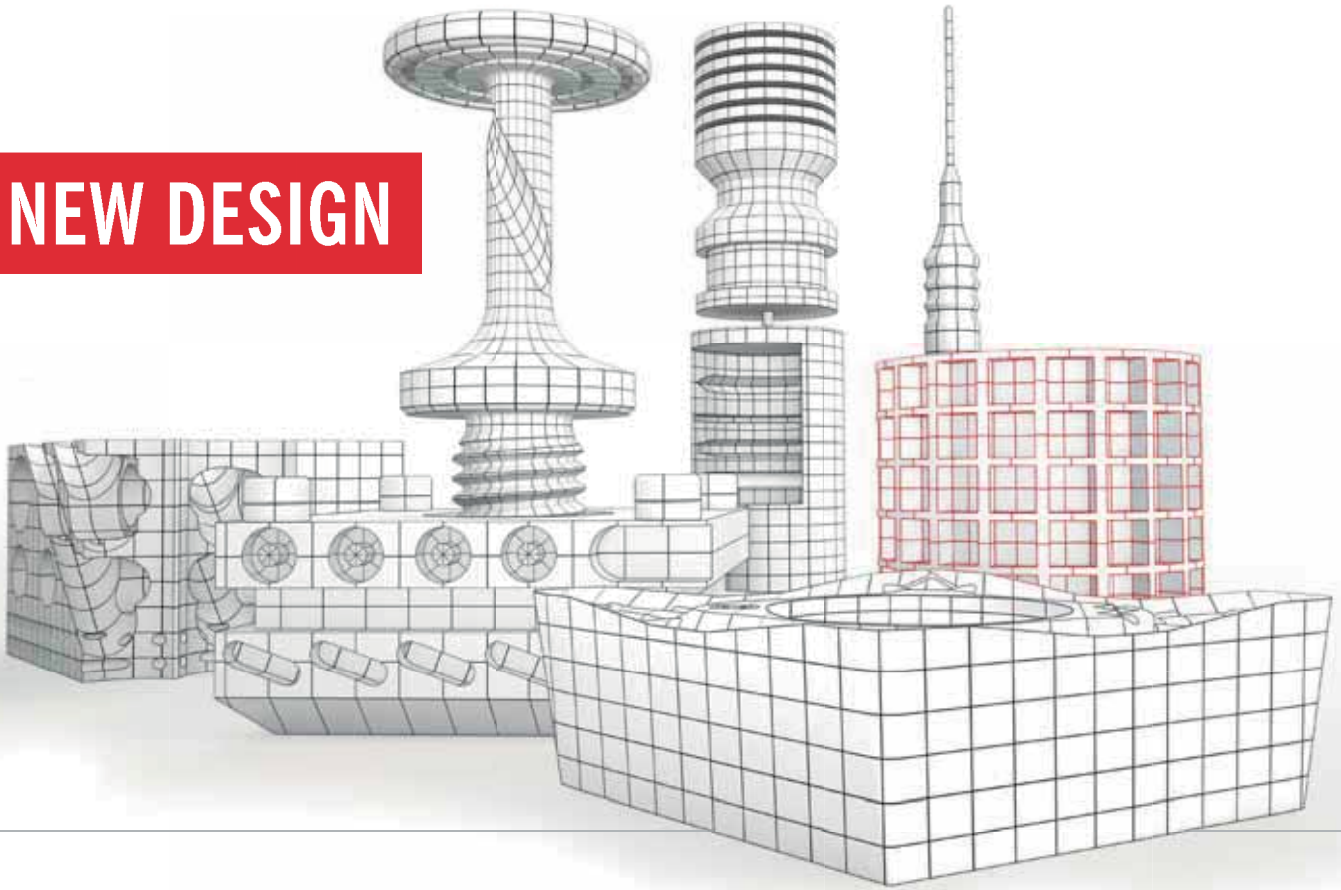
For over 95 years, CERATIZIT has been a pioneer in developing exceptional hard material solutions for machining and wear protection. The private company, with registered offices in Mamer, Luxembourg, develops and produces highly specialised cutting tools, indexable inserts, rods made from hard materials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

With more than 7,000 employees at more than 25 production facilities and a sales network with over 50 branches, CERATIZIT is a global player in the carbide industry. The company's international network includes subsidiary Stadler Metalle and joint venture CB-CERATIZIT.

The company is continually 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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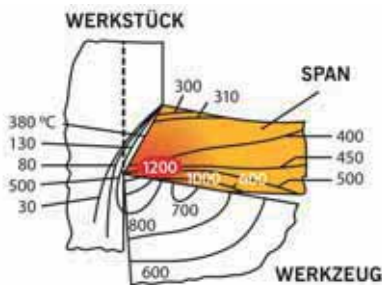


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Efficient cutting tool solutions

One of the main tasks in metal cutting is to extract the enormous heat in the cutting zone efficiently. This is quite a challenge, especially in turning work where there is continuous contact between the cutting edge and the workpiece. If process parameters cannot be sacrificed for the sake of productivity, there is only one solution: cool, cool, cool. The catchphrase with many external coolant supply systems is: "A lot goes a long way." But there are also smarter and more refined solutions. One of them uses state-of-the-art production processes and is so innovative that it also convinced the patent office.

Although a large part of the heat generated by turning is dissipated in the chip, the temperatures prevailing in the cutting zone are enormous and this causes problems for the cutting tool. The heat can reach temperatures in excess of 1,000°C, depending on the material, feed and rpm. This activates thermal processes that cause the cutting tool to wear more quickly. In extreme cases, the tool can even burn out after a short time. A more positive geometry and cutting speed adapted to the process may provide a superficial remedy, but this either causes long-term costs or lowers productivity.



Feeding coolant directly to the cut point

Of course, cooling is necessary. However, the commonly used external cooling method is not precise in application and its true effect is limited. In fact, the relatively imprecise and uncontrolled flooding of coolant or oil into the cutting process cools the chips instead of the cutting edge. In many cases, the high temperature differences at the cut point cause a thermal shock that fatally damages the cutting edge.

On the other hand, through tool cooling acts in a controlled and precise application. There are tool manufacturers who have



succeeded in feeding coolant directly to the cut point, the actual problem zone, via bespoke and dedicated tooling systems. Tool manufacturer ARNO Werkzeuge was awarded the highest honours by the patent office for the ARNO Cooling System® (ACS). It succeeds in feeding coolant directly to the cut point via two channels from the top and from the bottom.

ARNO Werkzeuge has developed the field-proven ACS system in two variants. With the ACS1 variant, the coolant jet is guided along the insert seat in a coolant channel and emerges directly at the cutting zone. The coolant then effectively goes under the chip and optimally flushes it out of the cutting zone. This drastically lowers wear and significantly prolongs the service life of grooving and parting tools. With the ACS2 variant, the coolant channel at the insert seat is coupled with a second flow-optimised coolant jet from the bottom onto the tool flank. The latest developments offer this coolant channel with a triangular outlet which supplies coolant across the full width of the insert right through to the edge.

Tool setup and application is also optimised. Whereas the optimum coolant supply of an external cooling system is manually positioned and often inaccurate in application, the internally guided coolant jet always goes precisely where it has the greatest effect; to the cutting zone and the tool flank. It also minimises the risk of material build-up on the cutting edge and

the associated crumbling of the cutting edge.

Longer tool life due to less stress on the tool

With the ACS2 from ARNO, users feed coolant to places which were previously impossible. As this supplies coolant under the chip, the chip breaks optimally and is flushed more easily out of the cutting zone. Chips are shorter and the tendency for built up edge insert conditions are greatly reduced. Measurements confirm that this coolant method reduces temperature by about half. As a result, the tool is exposed to much less stress and flank wear is

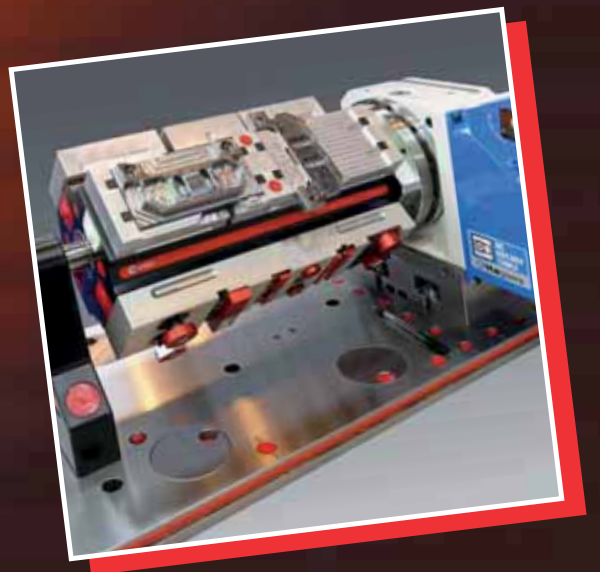


considerably reduced. Instead of having to lower cutting and feed rates to protect the tool, rates can even be increased. Productivity rises since tool life is significantly longer. Users report that their tools last up to three times longer or at least twice as long. Fewer tool changes ultimately relieves the work burden on operating personnel while significantly reducing machine down time

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MRT Castings 'turns the tables' on Brothers

Established in 1947, MRT Castings specialises in the manufacture of high-quality aluminium die castings. In addition to regularly investing in the most up-to-date casting technologies, over the past 70 years the progressive family business has introduced a range of complementary end-to-end services. Along with state-of-the-art high pressure and gravity diecasting, the Andover, Hampshire based company now provides first-class tool making, surface finishing, mechanical assembly and not least a comprehensive CNC Machining provision.

The mainstay of MRT Castings' impressive machining facility is its collection of highly efficient Brother CNC Vertical Machining Centres (VMC) supplied by Whitehouse Machine Tools Ltd. MRT's policy of standardising on machines from a single supplier provides enhanced flexibility as both operators and products are interchangeable between machines. Additional benefits include the use of standardised fixturing, tooling and CNC rotary tables.

Having previously used two well-known brands of CNC rotary tables, following advice from Whitehouse Machine Tools, the company's most recently installed Brother VMCs were specified with the addition of pL LEHMANN CNC rotary tables.

MRT Castings managing director, Phil Rawson explains: "MRT Castings is able to support our customers from initial ideas, through product development and design



for manufacture stages, to full production and logistics. Our extensive in-house CNC machining facilities are at the very core of our operations. To help ensure short lead times and the manufacture of premium quality products, we use a range of Brother machine tools, the fastest machining centres available.

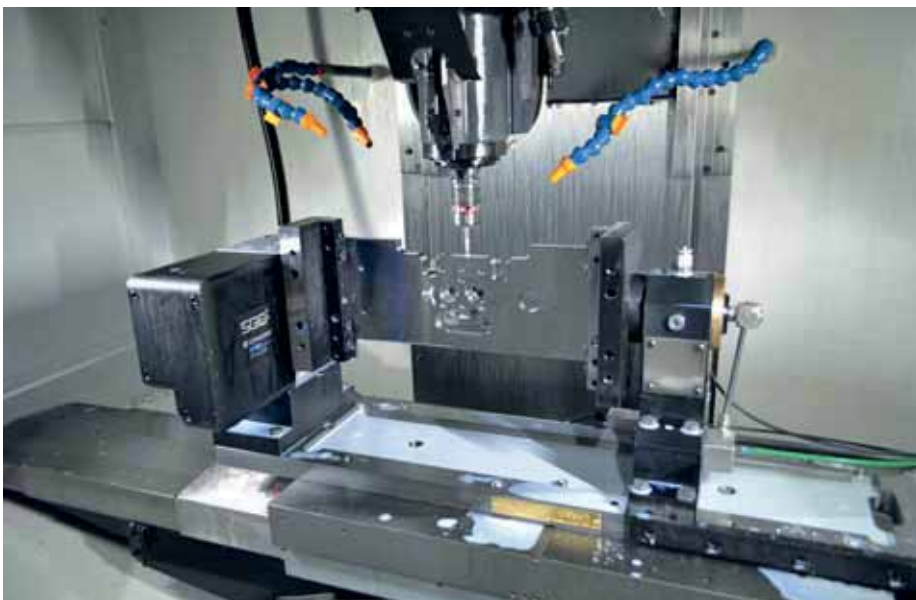
"Such is the quality and cost-effective nature of our CNC machining provision, in addition to machining die castings that are produced in our own foundry, we also machine components cast by other companies. As we usually perform small to medium production runs on a diverse range of products, we need each of our machine tools to deliver the best possible levels of

flexibility, we also strive to maximise machine utilisation times and to minimise setup times. Over several years, our use of rotary tables has made important contributions in these areas.

"As many of the components we manufacture are relatively complex, without the use of rotary tables we would need to perform 2-3 different machining operations on them, rather than the 'one-hit' machining that we carry out. Also, the ability to finish machine parts in a single cycle means that we don't face the issues related to the accurate relocation of workpieces for subsequent machining operations."

Phil Rawson continues: "Over the past 12 months, we have been involved in the casting and machining of critical parts that were urgently needed for medical ventilators. To help enable us to keep-pace with this extremely challenging production schedule we brought the planned purchase of six Brother VMCs forward, bringing our current Brother VMC count up to 25 machines. To provide highly efficient 4-axis capabilities, each of our latest six Brother VMCs were specified with the addition of pL LEHMANN rotary tables.

"As the use of rotary tables and the 4th axis they deliver is central to our machining efficiencies and, having previously used other brands, we were advised by the staff of Whitehouse Machine Tools to use pL LEHMANN CNC rotary tables. Our adoption of pL LEHMANN CNC rotary tables has provided us with a range of advantages.



“Despite our pL LEHMANN CNC rotary tables being extremely robust and able to perform all of the tasks we require, when compared to our previously used rotary tables they are relatively small. Their reduced footprints mean that, when mounted inside our Brother VMCs, they take-up a minimum area. In addition to releasing machine bed space for other workholding, the reduced size of pL LEHMANN CNC rotary tables means that when they are not required, they can often be left inside our VMCs when other machining jobs are being carried out. Additionally, the reduced height of pL LEHMANN CNC rotary tables helps to increase the available working volumes of our machines.

“In addition to benefiting from the quality of pl LEHMANN’s products, we have received excellent installation and interface help from Whitehouse Machine Tools and from pl LEHMANN’s UK service agent. The machining flexibility, precision and speed delivered by our pL LEHMANN CNC rotary tables is now proving invaluable to MRT Castings.”

pL LEHMANN has been involved in the design and manufacture of high-quality rotary tables for over four decades. The in-depth expertise gained throughout this time is reflected in the quality of the company’s advanced products. To help reduce parts and to enable the availability of Swiss Quality at a cost effective price, pL LEHMANN rotary tables are based on an innovative modular design system. This highly efficient arrangement enables a wide range of CNC rotary table options to be made available to meet customers’ diverse needs.

Four basic sizes pL LEHMANN CNC rotary tables are available - 507, 510, 520 and 530 mm, with centre heights from 110 to 240 mm. Due to the company’s modular design approach, from these size options it is possible to offer more than 170 different rotary table variants. Models are available from basic single-spindle 4th axis units to 4-spindle tilting rotary tables with 4th and 5th axis capabilities. Now, rather than compromise and obtain a rotary table that represents a close-match to a machining requirement, pl LEHMANN customers are able to take delivery of a high-quality CNC rotary table that exactly correspond to their specific needs.

In addition, the company’s modular design system means that the purchase of a well-engineered pL LEHMANN CNC rotary table represents a safe, future-proof investment. For example, if a customer’s manufacturing requirements change, instead of investing in a new rotary table, their existing pL LEHMANN CNC unit can be easily modified and adapt to changes

of use. pL LEHMANNs standardised spindle arrangement allows the use of an extremely wide range of workpiece clamping systems. As a result, in addition to standard workholding being set up for an initial workpiece range, the system can be quickly converted to accommodate other workpieces.

pL LEHMANN CNC heavy-duty CNC rotary tables have earned a global reputation for their outstanding performance, quality and longevity. Further aiding efficient, precision machining, the company’s robust products benefit from excellent clamping torque, load weight capabilities and accuracy specifications.

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Increased reliability grooving

Walter has now expanded its range of parting-off and grooving systems with the arrival of the new G4011-P toolholder and the DX18 grooving inserts. The new G4011-P monoblock shank tool is designed as a universal tool for all common grooving operations and the DX18 inserts provide a double-edged design with a second prism.

With a reinforced shank, the G4041-P parting-off tool has been optimised for deep grooving and parting off operations. Walter has introduced the G4014-P system with the 'SmartLock' insert clamp that facilitates easy insert changes from inside the machine, even where space is limited. This makes the G4014-P perfect for use in machine tools where space is limited, such as Swiss-type sliding head lathes and multi-spindle machines. The insert change is simplified by an easy access Torx Plus clamping screw that can be operated from each side of the tool. This results in a time saving of up to 70 percent during an insert change.

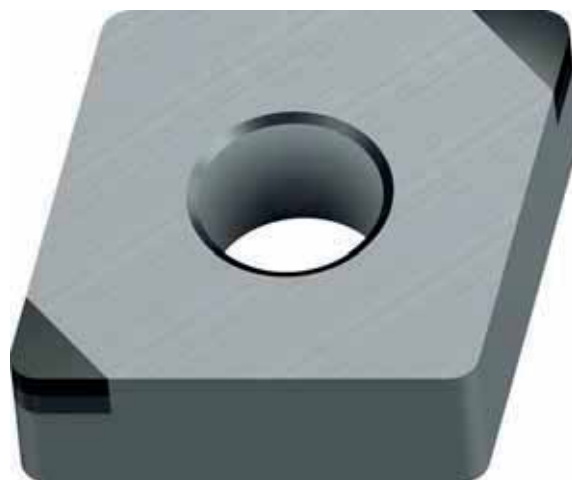
The G4011-P universal monoblock shank tool is available with shank sizes of 10 by 10mm, 12 by 12 mm, 16 by 16 mm, 20 by 20 mm and 25 by 25 mm, which makes this exceptional new addition perfect for small compact turning centres as well as larger more robust machine tools. Furthermore, the new clamping design generates 30 percent higher clamping forces compared to conventional tools while the innovative new positive engagement and form-fit design at the rear of the insert improves the precision location of the insert in the tool body. The cutting insert is

centred in the seat by a V-guide and this form fit prevents incorrect mounting, reduces vibration and helps to achieve high indexing accuracy.

Perfect for recessing, grooving and parting off, the new G4011-P is available for cutting widths up to 3 mm and cutting depths of 10 mm and 17.5 mm with a maximum grooving diameter of up to 35 mm. The reinforced shank parting blades are available as right-hand, left-hand and contra versions with blade heights of 26 mm and 32 mm, with a choice of no internal cooling or with precision cooling on the rake and flank face. Walter is offering the G4014-P system with 'SmartLock' in shank sizes 10-20 mm. Its qualities make it the current benchmark when it comes to the mass production of small parts.

Concerning the new DX18 grooving insert system, the new inserts are available in widths of 1.5, 2, 2.5 and 3 mm and Walter has introduced these insert ranges in its WSM23S, WSM33S, WSM43S and WKP23S grades. This selection of Tiger·tec® Silver PVD grade inserts can maximise productivity and extend tool life on a vast array of material types in the ISO P, M and S ranges, providing complete flexibility for end-users. To further enhance productivity levels, the DX18 is offered in the CE4, CF5, CF6 and GD6 chip formation geometries.

The DX18 can reduce tool change times



by 70 percent, increase clamping forces by 40 percent, improve chip control through its higher insert profile and the patented form fit groove enhances process security and reliability. When combined with the Tiger.tec Silver insert grades, the DX18 will undoubtedly improve productivity and reduce costs for end-users.

Walter presents new CBN grades

Walter has now launched two new indexable insert grades for turning ISO K materials. The new WBK20 and WBK30 CBN grades have been developed specifically for the finishing of cast iron and heavy interrupted cutting.

The impressive new WBK20 grade has a grain size of just 3.0 µm, which makes it perfect for the high-performance finishing of cast iron whereas the new WBK30, with a grain size of 10.0µm, makes it the perfect choice for productive turning in ISO H designated materials, especially when finishing with a heavily interrupted cut.

The two new CBN grades have been manufactured from a next-generation substrate with a high CBN content that has the flexibility and durability that makes the grades suitable for rough and finish turning of sintered steels. The WBK20 indexable inserts are 'tipped' and this 'CBN tip' is securely applied to the corners of the indexable insert employing modern vacuum brazing methods.

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Hexagon solves complex issues for specialist packaging solution provider

A company that specialises in producing bespoke complex, high-end mould tools for injection and stretch-blown plastic bottles is moving forward through 2021 with a highly automated workflow that integrates three design and CAM solutions from Hexagon's Manufacturing Intelligence division with its preferred design software to increase efficiency by up to 40 percent and meet demanding lead times for customers.

"While the COVID-19 pandemic made 2020 the worst year for the world, continuing to automate as much of our manufacturing process as we could allowed us to generate the manufacturing capacity to support record revenues," says Andy Phillips, manufacturing manager for R&D Leverage.

R&D Leverage is the world's largest independent solution provider to the single-stage Injection Stretch Blow Moulding (ISBM) packaging market sector, offering the global plastic convertors and consumer product brand owners what Andy Phillips calls a "complete solution" for a range of ISBM machines. Its tools are designed and manufactured using the highest quality materials. All tools are made in-house, on a vast array of the highest quality CNC machines: "The tools then go into our dedicated Product Solutions Laboratory (PSL) for testing, before we release them to customers."

With the consumer market evolving, R&D Leverage's high-end customers were requesting more complex geometries for end-users, incorporating significant undercuts, honeycombs and freeform surfaces. Those evolving requirements and the need to produce more complex 5-axis tooling in addition to its long-standing 2D milling and turning, meant it needed to invest in the latest technology to provide the necessary capability and cost reduction with confidence that its high-quality standards would be maintained.

After a lengthy trawl through the marketplace to ensure it was investing in the best possible solution for its specific requirements, it now has a highly integrated workflow comprising DESIGNER, EDGE/CAM and WORKNC from Hexagon and an automated pallet system feeding the



machines so operators can be more productive.

The company had already been using EDGE/CAM to program its machine tools for 2D milling and turning for eight years and Andy Phillips says when they were looking to upgrade software to program complex 3D geometries, it quickly saw WORKNC's potential. As Hexagon's CAM solution is for complex models in the mould, die and tooling industries for 2- to 5-axis CNC programming, the software was ideal for these specific needs.

Andy Phillips explains: "Many of the bottles for which we produce moulds are extremely complicated. Some have engravings all the way down the sides and the honey bottles have a lot of honeycombs in the form. With our old software, all angles and anything complex, had to be programmed manually and there was no 5-axis capability. This meant we had to carry out a number of twists on the machine, which gave scope for error." This was not acceptable for R&D Leverage.

R&D Leverage's CNC milling programmer, Robert Dods, takes up the story: "When we create our toolpaths now, we can do the whole program in one action with WORKNC. Then I check everything out to ensure there are no collisions, or any

holder collisions and that the machine is capable of performing all of the manoeuvres that we're asking of it."

"This means that when we send the program to the shop floor, the operators can run it with full confidence knowing it's going to be 100 percent accurate."

The Hexagon team also gave the company additional peace of mind by building a virtual replica of the machine and its internal kinematics inside WORKNC, so the outputted programme can be fully visualised in a digital environment. "We didn't have anything like that with our previous software," says Andy Phillips. "We were simply relying on the programmer's knowledge and experience. But now, with this extra failsafe in WORKNC, we can check there are no collisions in the program before we start machining."

To enable greater automation, he says the digital workflow begins with importing PTC Creo design files that conform to the templates from the American owners and R&D Leverage standards, so that the digital workflow can progress seamlessly through the entire manufacturing workflow to cutting metal on the machines.

This includes the automation tools to utilise 2D information and vastly reduce programming time in EDGE/CAM and

CAD/CAM

WORKNC. Occasionally, there is the requirement with the 3D work to modify a model for manufacture, such as capping holes and removing faces. This is carried out in Hexagon's specialist CAD-for-CAM product, Designer, which provides one agnostic platform to exchange files with both EDGE CAM and WORKNC without any translation or data loss, ensuring the data is accurate and the program is right the first time.

In a nutshell, the workflow begins with designing the preform around the original 2D drawing. This has to be completely accurate as this is later "blown" to create the bottle. The tooling is designed



around that in PTC Creo and the data is exported to the CNC programming team. The .prt files are then run through EDGE CAM for plateline work utilising a complex and customised algorithmic ruleset in EDGE CAM Strategy Manager, defined by R & D Leverage, to ensure the right tooling and cutting strategies are utilised depending on the 2D featuring, improving standardisation, reducing programming time and improving quality. For any complex 3D moulds, the .prt is pulled into Designer for model preparation before one-click integration into WORKNC, where the expert programming team undertake complex 5-axis work, utilising their pre-determined templates. These templates sit within WORKNC and use previously approved and proven strategies and tooling, that are dynamically adapted to the new subject model. Finished programmes are then output in either Heidenhain or FANUC NC code through proven post processors, depending on which machine will be carrying out the subtractive manufacturing.

The team has also built an accurate tool library inside both WORKNC and EDGE CAM, detailing a variety of information including feeds, speeds and depth of cut. Everything is fully collision-checked with the cutter holder, shank, machine table, column, and the fixture.

As well as the technical capabilities of the products, the key factor in R&D Leverage's successful deployment has been the human factor, as Andy Phillips concludes: "With our changing requirements in recent years, we once again surveyed our options to understand the best provider. The real differentiator for Hexagon has been the expertise and commitment of the people.

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For pre-engineered buildings, accuracy is critical from start to finish

The geometrical precision, quantity of parts and sheer size of a large pre-engineered building is impressive. Row after row of support beams, girders, fasteners, exterior panels, internal structures, cranes and more are painstakingly engineered and manufactured far offsite. The demands on design precision, execution and project management are paramount to ensure each component is accurately manufactured, tracked, and shipped.

The same geometrical repetition multiplies a single tolerance error on each repeating part and a single missing or miscut part can weaken the structure or cause costly delays with construction crews onsite.

“So many elements come together when engineering steel structures on such a massive scale. Each new variable or detail introduces the potential for error and, at our scale, the errors can multiply,” comments Dhaval Seler, senior draftsman at Phenix Construction Technologies. “For Phenix, SigmaNEST takes care of the CAD/CAM part of the process and significantly reduces that potential for error.”

Phenix Construction Technologies is a next-gen steel infrastructure company that caters to the global need of Pre-Engineered Buildings (PEBs) and structural steel. With a customer base that spans from aviation and automotive to retail and textile production, Phenix is a worldwide resource for pre-engineered buildings, bridges, and steel structures for Fortune 500 companies

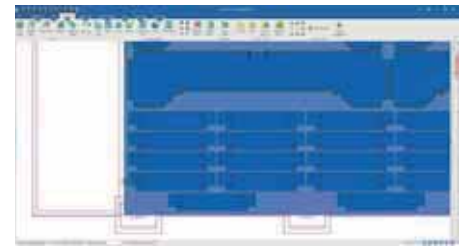
and public government works alike. Phenix offers the total solution including engineering and design, production, logistics, installation, and maintenance.

The search for a total nesting and manufacturing solution for its own workflow prompted Phenix to purchase SigmaNEST. Dhaval Seler continues: “We’ve seen great improvement in our processes since adopting SigmaNEST. We used to use Excel to track part quantities, but now the program automatically keeps track of how many parts are actually cut so that each work order is 100 percent perfect.”

Phenix uses SAP to manage production. After downloading the job specifications, engineers commonly use the SigmaNEST shape library in addition to importing custom DWG or DXF parts. A new task is created for each material thickness and Auto Nest and Auto NC are applied for optimum material use, followed by easy posting and reporting.

“We’ve been using SigmaNEST for a year and a half now and right away we noticed an improvement in our nesting time and material savings,” claims Dhaval Seler. “The ‘Best Sheet Mixed’ feature in SigmaNEST makes it easy to nest on the right inventory for each project. Being able to update or change a program without disturbing other parts helps to eliminate potential errors for projects with so many moving pieces.”

Phenix Construction Technologies uses a combination of Messer and Boda plasma and oxyfuel CNC machines, multiple



shearing machines, plus a recently installed HGG MPC 350 Multiple Profile Cutter. Finding a software solution that could program all of them was an important factor to reduce the amount of training for the team and future-proof any new machine purchases. Dhaval Seler adds: “SigmaNEST has also reduced the amount of time needed for nesting as well as the amount of material used, especially with remnant nesting. In our business, the amount of material saved translates into a lot of money.”

A future-forward innovation hub, Phenix is among the top three steel construction companies in India for light to heavy and complex steel structures. The production facility, located in Gujarat, has a capacity of 72,000 metric tons annually. With a workforce of more than 700, Phenix has completed more than 2,500 building projects worldwide.

In addition to contracted projects, Phenix is a steel service centre for structural steel, H-beam, I-beam, plate-fabricated, and trusses engineered for strength and light weight.

Dhaval Seler notes a shared persistence and focus on technology: “The SigmaNEST team would not hear the word ‘impossible’. They worked diligently with our engineering team to optimise our CAD/CAM workflow. It was clear they would not stop until it was perfect.”

He concludes: “SigmaNEST allows us to manage complex projects much more smoothly. With the excellent success of the software so far, we hope to extend our integration with other SigmaNEST products in the future.”

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TTL is lightening the load on orthopaedic implants

As the global economy begins to emerge from the effects of a pandemic that has negatively impacted many industries, recovery and growth through efficiency should be the focus for all. In response to the economic shock of Covid-19, many companies have seen enforced headcount reductions, whether through the furlough scheme or redundancies, to survive and then thrive in this new age, manufacturing businesses must transform their traditional processes.

TTL specialises in customised manufacturing software applications and is a 'Smart Expert' Siemens NX CAD/CAM partner. When faced with operating restrictions due to lockdown, we turned to investigating ways in which significant improvements can be achieved in the manufacturing of medical orthopaedic implants, or indeed any similar "family of parts" scenario.

An underutilised and or much unknown piece of capability within Siemens NX is "Product Template Studio (PTS)". The PTS

author application enables creation of a product template from an NX parametric part or assembly. These templates can then be used for iterations of new designs required to develop variants of the product within a part family.

By employing TTL's customisation, the Part Family functionality in NX enables the user to quickly, reliably and consistently create multiple variants of a part. Using Product Template Studio parameter changes are made easily and intuitively without the need for manual re-modelling. This method can automatically regenerate 3D CAD models, 2D drawings, CAM programs, shop floor manufacturing and quality management documentation. It reduces engineering costs and provides cycle time savings through predefined strategies.

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TTL has been one of the leading industry names for CAD/CAM and CNC machining since 1987. As part of the global Starrag



group and the UK's ONLY Smart Expert for Siemens NX CAM, it provides turnkey software solutions with an emphasis on manufacturing for international businesses in the aerospace, power generation, marine, motorsport and medical sectors. TTL Solutions, based in Buckinghamshire, is Siemens NX CAM specialist and adaptive technology expert, providing solutions with an emphasis on manufacturing.

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Tebis releases version 4.1

Tebis has released the latest version of CAD/CAM system 4.1. One of the major additions of the functionalities of Tebis 4.1 is parametric-associative modelling, which further supports highly automated processing, in a single complete CAD/CAM system, for design, manufacturing preparation and CAM programming. Tebis 4.1 platform provides all the necessary prerequisites for safe, fast and reduced-personnel production and supports the automation of all manufacturing processes.



The proven manufacturing database libraries, in which all of the manufacturing components and experience data are stored, have been supplemented with a clamping device library in the form of digital twins. This can be used to conveniently create and manage clamping elements and clamping device groups and to set up the machine in the virtual environment.

Tebis 4.1 also supports measurement cycles, which can be fully integrated in CNC machining processes. This allows users of Tebis CAM system to check if the component is correctly clamped and the blank is correctly dimensioned and oriented. It ensures shorter setup and machining time, higher component quality and fewer correction iterations.

For even greater safety, machine tool heads are fully accounted for in collision checking during NC calculation.

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Bespoke Mitutoyo solution aids Tecomet inspection efficiency

Mitutoyo Coordinate Measuring Machines (CMMs) cover practically all precision 3D measuring applications and are available in a wide range of sizes and accuracy classes. Further improving their effectiveness in more specialised areas, Mitutoyo is able to offer complete turnkey CMM systems, including programming and bespoke fixturing.

The recent installation of a comprehensive turnkey CMM solution at Tecomet Sheffield, illustrates the advanced design and build capabilities of Mitutoyo Gauging Technology (MGT), a specialist division of Mitutoyo. Throughout this project, MGT worked closely with Mitutoyo's dedicated subcontract measurement department Measurement Services. Based on an advanced Mitutoyo MiSTAR Shopfloor CMM, the resulting ingenious inspection system allows the rapid, accurate and automated dimensional inspection of a range of femoral knee joints. Using custom-built, multi-station fixtures to enable the loading of batches of multiple parts, the highly efficient solution features a dedicated user interface for ease-of-use, while a tailored reporting output aids part sentencing and quality control.

Founded in 1963, Tecomet is a leading provider of manufacturing solutions for complex, high-precision products and services for the medical device and defence markets. Headquartered in Wilmington, Massachusetts, USA, Tecomet operates 17 global manufacturing facilities in five countries around the world and employs over 2,500 people. Tecomet's global quality and regulatory systems comply with ISO 13485, ISO 9001 and AS9100 requirements and meet the highest International standards for product quality.

Tecomet's busy Sheffield division boasts a comprehensive range of end-to-end manufacturing resources, including casting, forging, heat treatment, finishing, CNC machining and EDM capabilities. As with all other Tecomet sites, the Sheffield facility administers a comprehensive quality management system that integrates the control, monitoring and management of quality at the source of production.

Explaining the reasons behind the



recently installed Mitutoyo inspection system, Tecomet Sheffield product engineer, Nigel Smith says: "Tecomet operates as a contract manufacturer and full service provider of implant products and services to original equipment manufacturers throughout the world. Having won a large, long term contract to produce femoral knee joints, we took the opportunity to carefully consider all of our related production and inspection options and to develop a range of effective new methodologies that would further increase our efficiency levels.

"Where our proposals involved purchasing new equipment, we were able to calculate the potential returns on our investments and work out what proportion of the costs involved could be amortised over the life of the contract. We also evaluated the potential continuing advantages to the business of any equipment that we purchased on completion of the contract.

"The quality of Tecomet Sheffield's output is of paramount importance and we use a range of advanced quality related tools, including Six Sigma and Statistical

Process Control, in addition to Lean Methodologies. As we regard inspection as an integral and vital part of our femoral knee joints production processes, we investigated ways of gaining additional efficiencies in this important area while also seeking to improve our precision standards. The answer to our search was found in a custom-designed, highly-efficient inspection system from MGT."

After liaising with Tecomet personnel to ensure all of the business's requirements were fully understood, the staff of MGT put together a comprehensive proposal based on an advanced, shop-floor proof Mitutoyo MiSTAR CMM. The suggested automated solution was designed to satisfy Tecomet Sheffield's need for a highly efficient precision inspection system that could process large volumes of the company's manufactured femoral knee joints close to their source of production.

As the bespoke measuring station was to be sited close to machine tools, the proposal included the provision of a transparent protective enclosure to help shield the CMM from potential contaminants. In addition, the scheme included tailored software written by

Mitutoyo's measurement services department, a barcode scanner for ease of operator use and the supply of multi-station fixtures to enable the easy and quick loading of batches of knee joints onto the CMM.

As the recently launched Mitutoyo's MiSTAR 555 was designed to provide high levels of inspection speed and accuracy in less than perfect environments, it was the ideal CMM to base Tecomet's bespoke system on. The MiSTAR 555 boasts a maximum permissible length measurement error specification of $2.2 + 3.0L/1,000 \mu\text{m}$ and an XYZ measuring range of 570 mm x 500 mm x 500 mm. The advanced CMM benefits from Mitutoyo's recently developed smart factory functionality that allows real-time monitoring of machine performance data as well as measurement data. Further aiding its performance in shop-floor situations, the MiSTAR 555 combines technologies such as symmetric structure, uniform material and temperature compensation to provide guaranteed temperature accuracy in a range of 10 to 40°C.

Nigel Smith concludes: "The results of our cooperation with MGT and the system they designed has proved extremely successful.

Our bespoke inspection system is now fully operational and delivering the levels of precision and efficiency that we were looking for.

"Now, after one of our Mitutoyo designed fixtures is loaded with multiple femoral knee joints and mounted onto the bed of the CMM, the operator is only required to instigate a measurement program for a rapid, fully automated, mass measuring routine to take place on completion, as each position on each fixture has an 'address' the system then quickly delivers in-depth dimensional analysis related to each individual femoral knee joint. When required, this rapid data feed-back enables corrective actions to be quickly taken. As our new inspection station is located close to our production cell, it further speeds-up the flow of this important information. On completion of an inspection routine, all inspection data is automatically archived to allow traceability."

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Bowers Group launches BAQ alphaDUR mini portable UCI hardness testers in the UK

Bowers Group has introduced two innovative portable UCI hardness testers to the UK market. The BAQ alphaDUR II and alphaDUR mini both offer fast and reliable hardness testing and are ideal for use on the shop floor.

UK sales manager, Ryan Kingswell says: "The alphaDUR range offers fast and accurate hardness testing that is truly flexible. The portability of these hand-held devices provides fantastic usability for a wide range of applications, making it ideal for shop-floor environments. We're delighted to be able to offer these impressive BAQ products through the Bowers Group and I'm sure they will prove to be incredibly popular with our customers."

With a wide application range, from incoming goods inspection to testing weld seams and coatings, the alphaDUR II is a reliable and versatile hardness tester that has stood the test of time for many years.

Its functionality extends through a range

of test probes which can cover a wide selection of materials. Test loads between one and 10 kg are available dependant on the application and surface. After a manual measurement is taken with the probe, a fast and accurate reading is displayed on the screen. The measuring method of the alphaDUR is in accordance with DIN 50159 and ASTM A1038, as well as conversion according to EN ISO 18265 and ASTM E140.

Featuring a robust metal casing, as well as a large, clear display, the operation of the hardness tester is simple and effective, with the material and scale easily navigated by context-sensitive function keys and offers extensive storage and statistical functions.

With USB connectivity, 7-hour battery life and optional accessories available including probe support for flat and curved surfaces, high-precision stand, probe handle and portable mini printer, the alphaDUR II is a truly versatile tool.

The alphaDUR mini is the small and handy variant of the alphaDUR II, with identical



technology and accessories, at a fraction of the size. It has been successfully used in UCI hardness testing for many years and still benefits from a large, easy-to-read display that stores and shows up to 100,000 data records with date, time and GOOD / BAD rating.

Bowers Group
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“The future is bright for British manufacturing”

Confident words from FC Laser managing director Danny Fantom, backed up by the investment the company is making into its production facility, machinery and Team FC

In this article, Daryl Lowe and Danny Fantom discuss the exciting new developments at FC Laser



Operations manager Daryl Lowe



FC Laser managing director Danny Fantom

Why has FC Laser decided now is the right time to invest in expanding its production facilities?

DF: The company has been growing organically for the past nine years, we currently operate over three sites, so it makes sense to invest now to bring all of our divisions together to maximise efficiencies enhancing the future growth of our business.

DL: Our operating capacity has had to grow in line with customer demand. We invested

in a second 12 Kw Bystar Laser cutter, our fourth Bystar in total in January to keep up with demand. With business operating 24/7 since the Summer of 2019, the further investment in the tower racking system and addition of a second tube laser is essential to manage and exceed our customers' expectations.

As we move out of COVID restrictions, how do you both see the next 12 months for British manufacturing?

DL: With businesses looking to source

relationships within the UK, I can only look forward to the new opportunity this brings for Team FC.

DF: The future is bright for British manufacturing and FC Laser want to be ready for the potential benefits this creates within our industry.

FC LASER HAS EXPANDED ITS DERBYSHIRE FACILITY

FC Laser has invested heavily in an additional 20,000 sq ft of manufacturing space to accommodate its forecasted growth. The current head office of FC Laser, based in Ilkeston, has begun site clearing and the foundations of a second building running parallel to the M1 motorway are underway. With the tube division currently operating just over a mile away at the Quarry Hill industrial estate and a temporary site created for its ongoing project with Sapphire Balconies, the plan was made in 2020 to bring all operations to one site,

further enhancing the production synergy throughout the business.

This expanded production facility will provide the capacity to accommodate all of its ambitious expansion plans and provide a permanent home for FC Laser, who has already outgrown two previous sites in its 10 year history.

The existing main site will see the factory floor redesigned to allow the tube division to move in and the available space will allow for a second tube laser machine with ample accommodation for the rapidly expanding



R&D department. The sales, accounts, CAD and project review teams will remain at the main site while the fibre laser division,

second operations, despatch and quality teams will move into the new facility.

In addition to the second tube laser, FC Laser has further invested in Bystronic hardware with the bespoke By Tower system. The final piece of the planned investment will be an automated paint line with the estimated completion date in Q4/Q1 2021-22.

Why has FC Laser invested in this production capacity and plant and equipment?

The investment is based on forecasted growth together with attainable efficiency savings. This will ensure FC Laser will be among the fastest growing laser cutters in the UK.

Bespoke By Tower machine loading system

Continuing its relationship with Bystronic, FC Laser has ordered a custom By Tower Machine Loading system. The Tower loading system will continuously feed the two 12 Kw Bystar lasers that FC Laser currently run. The time efficiency gained should result in a 30 percent improvement in operating capacity, this is due to the reduction in manual handling associated with loading materials onto the laser beds.

A second tube laser for the tube division

The tube division is the fastest growing

division in the business, with operating capacity already running 24/7 and with forecasted orders set to increase, it is important for FC Laser to keep pace with demand and continually exceed customer expectations. With the appointment of additional sales staff, the expertise of technical sales manager Daniel Wellings and the promotion of Greg Kirkby to divisional GM, the tube team is well placed to achieve future operating growth.

Fully automated paint line

With a growing R&D division and constant demand for further part finishing, FC Laser has allocated space within its new site to house an automated paint line.

Danny Fantom concludes: This investment will allow us to become more efficient which in turn will create a valuable window of opportunity to focus on the FC Laser "Ideal Team Player" philosophy. Additional staff training and development will further enhance our already skilled, talented and dedicated workforce. We will also continue our focus on talented people by inducting more apprentices on our successful apprenticeship scheme.

We have always strived to give our customers' the best possible service. By



continuing to invest in our people, as well as the best available technology and software, we will ensure this continues."

For more information on this project visit the blog section of the FC Laser website:

www.fclaser.co.uk/blog

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Investing in a complete fabrication service

In the period since June 2019, Worcestershire-based MJH Fabrications Ltd has invested in two ENSIS-3015AJ 9 kW fibre laser cutters with MPF load/unload automation systems and two HFE3i series press brakes. This significant capital investment is helping the company to better serve its UK-wide customer base in sectors that include shop-fitting, agriculture, yellow goods and factory automation.

Mike Hemming formed MJH Fabrications in 1990 with little more than a MIG welding set. However, it was not long before his reputation for reliability, quality and service in the provision of metal fabrications and components began to spread. By the time the Pershore-based business was incorporated as a limited company in 2002, it had further refined its expertise in producing finished products, on time, every time, meeting all of its customers' quality requirements.

Driven by its success, MJH Fabrications has grown to become a progressive subcontract fabrication specialist with £2.5 million annual turnover, 20,000 ft² premises and 18 employees. And, as the company's recent investment programme indicates, Mike Hemming has no plans on stopping there.

He explains: "Our investments with AMADA reflect my determination to continue increasing capacity and moving forward. The most recent ENSIS arrived in spring 2020, just when the COVID-19 pandemic forced the UK into its first national lockdown. It was a worrying time but we opted to press ahead. As things turned out, it was the best decision as our workload just



seemed to get busier and busier from there on."

Such is the current situation, that MJH Fabrications is shortly looking to introduce a new shift pattern, reverting to 06:00-14:00, 14:00-22:00 operations.

"We've never been very good at promoting ourselves, so the growth that we've achieved is down to little more than word-of-mouth recommendations," says Mike Hemming. "However, with growth comes the necessity to ramp up capacity, which is why we turned to AMADA."

The company's entry into laser cutting arrived a number of years ago when it acquired a second-hand machine. A number of other preowned laser cutters followed before MJH Fabrications purchased its first new model: an AMADA F1 with automation tower. The company retained this "excellent and reliable" 4 kW CO₂ machine for eight years before deciding to enquire about an upgrade.

"With the industry transitioning from CO₂

to fibre laser technology, it made sense to think about new investment," explains Mike Hemming. Thanks to the experience we'd had with the F1, a machine that was nothing short of bulletproof, we had no hesitation in returning to AMADA. With our F1 we never once had a requirement to call AMADA out. The only visit was for annual servicing."

An ENSIS-3015AJ 9 kW fibre laser with MPF load/unload automation provided the perfect solution for MJH Fabrications. The machine arrived for installation and commissioning in June 2019.

"To be competitive we knew that adopting fibre technology was the only option and, sure enough, we immediately noticed a difference in speed capability with the new ENSIS; it's unbelievably fast," says Mike Hemming.

MJH also takes advantage of the AMADA Variable Beam Control technology, whereby the laser beam is automatically adapted to deliver stable cutting across all material types and thicknesses. Like most subcontract fabricators, MJH can never be certain what jobs will arrive tomorrow, with the company processing everything from 0.5 mm mild steel, stainless steel and aluminium, up to 25 mm mild steel and everything between. Importantly, only a single lens is required to process thin-to-thick materials on ENSIS laser cutters, helping MJH Fabrications to maximise machine uptime and eliminate costly operator errors. Typical steels held in stock at Pershore include CR4, S275 and S355, while batch sizes extend from 1-offs to thousands.

In December 2019, the company decided to boost its bending capacity and help keep pace with the new laser cutter. As a result,



MJH added HFE3i-1003 and HFE3i- 5020 press brakes to its existing HD-1003 and HFE-1704 machines. The company also leverages the benefits of AMADA software for both its press brakes and laser cutters.

Despite all of these investments, the ISO9001-accredited business continued experiencing such an influx of orders that it decided to enquire about a further AMADA laser cutter.

"We quickly reached our threshold with the first ENSIS and found ourselves running flat-out day and night," explains Mike Hemming. "We were constantly under pressure, so it was time to take action and acquire a second ENSIS machine, an identical 3015AJ 9 kW model."

An ongoing programme of investment is necessary at MJH as the company describes itself as the complete fabrication service, offering capabilities that extend beyond laser cutting and bending to punching, tube laser cutting, welding, insertion, machining and finishing. By using the advantages of the latest machinery and software, the company is able to handle jobs more efficiently, saving time and money for its customers.

"Big investment decisions are never easy but, aside from the technical capabilities of machines such as the ENSIS, AMADA's finance package is a real help and it makes the investment process easy," says Mike Hemming. "In addition, AMADA's service function is second-to-none, which brings peace-of-mind."

Importantly, the operators at MJH have quickly taken to the new AMADA machines.

Mike Hemming says: "Our staff love the laser cutters and press brakes because they make life easy. For example, the ENSIS has a 16-station automatic nozzle changer with auto cleaning and



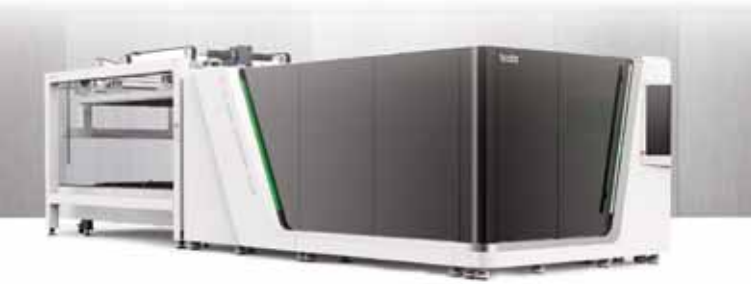
calibration unit, an air-blow system that prevents dust from adhering to the underside of the sheet and a monitoring system which checks piercing is complete before cutting begins. Literally, our operators press 'go' and that's about it."

Quality, reliability and delivery are the cornerstones of business at MJH Fabrications and investment in the new AMADA machines will only further cement this ethos into place.

Mike Hemmings concludes: "We work closely with customers to make sure their components and our manufacturing operations are optimised in line with demand. Essentially, we want to offer the most cost-effective way of achieving customer requirements. Having the capabilities of the AMADA ENSIS laser cutters and HFE3i press brakes makes this process all that bit easier."





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Fit for the future with laser cut weights

Proform Laser, situated on the Wirral, started out in business as a laser cutting subcontractor in 2016 when it purchased a laser cutting system and a press brake from Bystronic. With a successful and growing business, the company was confident to buy two more laser cutting machines, the most recent being installed in January. As a fully functioning laser job shop, certified for aerospace to AS9100, Proform was also working on automotive parts for JLR and other industries at the time of the first coronavirus lockdown in March 2020.

As the lockdown started to bite, there was disruption to the normal level of incoming orders at Proform for a few weeks, owing to the shutdowns at various manufacturing sites especially in automotive and aerospace sectors which responded to the travel bans and furloughed most of their employees.

The Proform Group is run by the Canner family, father Russ, daughter Laura and son Mike, who are all keen gym members and like to keep in shape. Seeing an opportunity with gyms closed and people unable to access the equipment needed to work out, they decided to make some standard products for weightlifting. To make these plates is a very simple and rapid operation using laser cutting, no bending or welding is required, only some minor finishing when they come off the laser cutter. In contrast a typical automotive chassis consists of 200 parts which need cutting, forming, welding and finishing. Plates are made from mild steel sheet of a thickness of 20 mm and have a central hole and some optional features like handles easily produced on the laser cutters.

Initial production started in a low-key way with sales mainly to family, friends and by word of mouth. Realising the market demand for home equipment during lockdown the company re-arranged itself and launched the Pro Plates brand with a



dedicated website for online ordering and started building a large following on Instagram and Facebook.

Growth has been outstanding and the idea that they might make £10,000 out of the idea is now a family anecdote. During the past year, the company has employed an additional 50 staff and is finding that keeping pace with the order intake is a challenge. By January 2021, 6,000 orders had been received via the website and five staff are employed to look after the social media content, advertising and marketing. Another five staff are employed for customer service and two 40 tonne articulated lorries arrive daily to dispatch completed orders.

The numbers are staggering and is a true success story for UK manufacturing. Since May 2020, the business has quadrupled in turnover where many other subcontractors have struggled to keep busy. In one month recently, Pro Plates turned over more than a full year of revenue in 2019 for Proform Group. Each week the company turns 70-80 tonnes of steel plate into steel weights. The

product portfolio continues to grow with the addition of powder coating, customised designs and accessories like bars, racks and powercages allowing the home user to kit out their garage or garden shed with everything they need to pump iron.

Plans to expand into shipping weights to Europe are on the back burner until they can keep pace with the UK demand. The added bonus of "buying British" is an added attraction to set Pro Plates apart from other suppliers.

The whole factory layout has been modified to suit the workflow of Pro Plates and plans for a factory extension into the



yard of the current facility are in hand. At present the factory is running at full capacity, including a night shift.

When asked about why she chose Bystronic for the equipment, Laura Canner said: "We went on the UK study tour to the manufacturing site of Bystronic at Niederörs in Switzerland and were impressed by the Swiss expertise, the price point for the equipment and the smart red colour of the machines."

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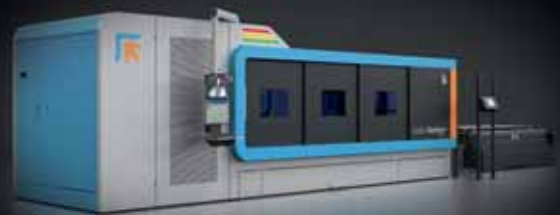


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New Laser Genius+ 2D machine from Prima Power shapes the new era of laser cutting

The Prima Power range of 2D machines has been further enriched with the addition of the new Laser Genius+, which has been designed and developed to meet the needs of a constantly evolving market, setting new standards in speed, reliability and precision.

The new Laser Genius+ 2D fibre laser machine, completely designed and built in Italy, has been developed using Prima Power's experience of over 40 years in the industry and an extremely pragmatic approach, aimed at satisfying real market expectations. This requires greater performance, efficiency, quality, ease-of-use, automation and intelligence.

With a trajectory speed of 180 m/min, the Laser Genius+ is one of the fastest and most productive machines on the market. Most importantly, the machine has been designed to make the very most of its available laser power.

The Laser Genius+ machine family includes 1530, 2040 and 2060 size models and can be equipped with a wide range of fiber laser power options, from 2 kW up to 15 kW. The machine is designed to have total control over the laser process and to obtain maximum reliability and quality with all of the power available. To take advantage of the high-power capability, a fast, rigid and light machine is needed. In the same way that a vehicle is designed, pure power alone is not sufficient to gain high performance, other elements such as the suspension, structural rigidity and light weight are all significant factors. This same principle applies to laser machinery to reduce cycle times, an excellent relationship between the rigidity of the frame and the

weight of the moving masses is highly important. It is precisely these features that allow the Laser Genius+ to squeeze out every ounce of power at all times.

The new laser head on the machine has been designed to optimally manage the heat required to melt thick materials while staying cool and clean. This is achieved thanks to sensors that actively control the cutting process in real time, hermetically isolated optics, simplified mechanics and a high efficiency fume extraction system.

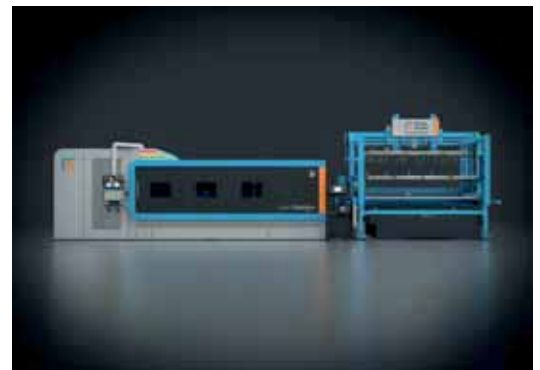
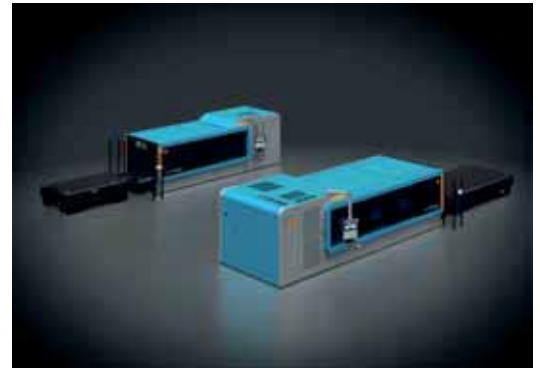
A further important bonus of the machine is its unique layout, which has been designed to ensure superior ergonomics and ease-of-use, as well as to make the most of the space that the machine occupies.

Accessibility has always been a distinctive feature of Prima Power machines and this is even more so for the Laser Genius+. The cabin is available with large sliding doors that can be placed on the right, left, or even on both sides of the machine, for maximum ergonomics.

Its footprint, one of the smallest on the market and the simplicity of the layout, which integrates all of the services into one dedicated module separated from the working area, make the machine an extremely compact, plug & play system with very quick installation times as the Laser Genius+ only takes two days to be installed and start work. Additionally, the symmetrical and reversible layout means

that the machine can be placed in any production context without limiting process flow.

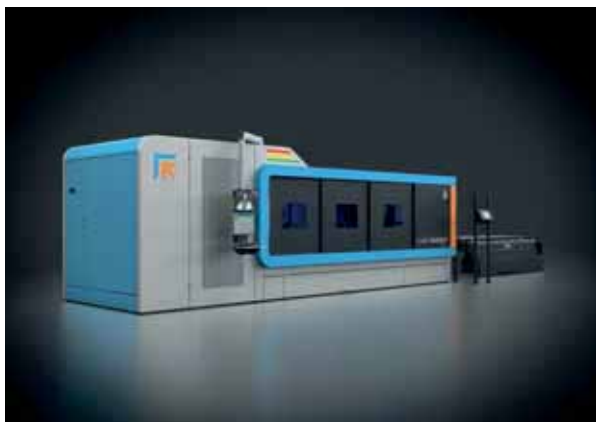
Despite its compact layout, the Laser Genius+ has the largest working area when compared to alternative machines that are available. X-, Y- and Z-axis strokes are 3,150 x 1,600 x 150 mm respectively for the 1530 model and 4,320 x 2,200 x 150 mm, for the 2040.



The Laser Genius+ is the smartest and most interconnected machine that Prima Power has ever produced, with a very high degree of connectivity, new laser head sensors and artificial intelligence algorithms for advanced process monitoring and control features. It is designed for continuous, 24/7 production and included as standard is an automatic, fully electric pallet changer with up to 30 percent reduced cycle times compared to previous versions.

The Laser Genius+ has all the winning elements of Prima Power machines but perfects them and brings them even closer to the customer needs, offering excellent levels of productivity, quality and efficiency, while also guaranteeing maximum ergonomics and ease-of-use for the operator.

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Automation for regaining efficiency

Automation plays an increasingly key role in laser cutting systems. On the one hand, the cutting speeds achieved today have shifted the attention of many companies in the sheet metal sector to the operations immediately up- and downstream of the actual cutting: unloading and loading often risk becoming dangerous bottlenecks. On the other hand, automation can help reduce the impact of labour costs.

The Salvagnini laser automation range has always been extremely vast and modular and each system can be configured differently to meet various production needs. Such a wide range of solutions satisfies practically all layout and configuration requirements and, above all, helps to reduce loading/unloading times. While faster cutting speeds have reduced cutting times, Salvagnini automation has naturally evolved as a consequence.

"The ADLU connection automates sheet metal loading and machined sheet unloading, with a cycle time of less than one minute," Pierandrea Bello, Salvagnini product manager for laser technologies, explains. ADLU is a flexible solution in terms of layout, because its floor-based structure is modular and can be adapted to the space available in the workshop. The performance of the ADLL is similar to that of the ADLU, but its longitudinal configuration is particularly suited to situations where depth is a constraint. The LTWS store-tower comes in single- or double-tower versions, for from 6 to 38 trays, either with or without wooden pallets, or mixed: its ultra-rapid cycles and high autonomy make it an extremely compact high-end solution. Finally, for workshops requiring flexible yet extremely compact machines, the LTWS Compact is the ideal small solution."

What is really decisive in Salvagnini's vision, however, is the positive impact that automation has on the efficiency of both the single machining operations and the entire production process.



"With LINKS, our IoT solution that continuously monitors the data from systems connected all around the world, we have assessed the efficiency of the different 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 increases the autonomy of the cutting system, as it makes different materials and thicknesses available continuously for just-in-time machining, reducing the waiting times for sourcing the sheet metal. 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.

The MCU automatic sorting device fully responds to the ideal sorting identikit as it ensures rapid stacking of parts with different shapes, sizes and weights. In addition to the

standard sorting strategy, MCU can also work in multigripping mode, picking up several parts in sequence with the same gripping device, or in double picking mode, where two gripping devices descend at the same time to pick up two independent parts, reducing the part pick-up time by over 25 percent.

The MCU has very few limits. It can pick up thicknesses of between 0.5 and 12 mm and weights of up to 65 kg for each manipulator, or 130 kg when the two gripping devices work together. The flexibility and extreme mobility of the manipulators, which can rotate a full 360°, removes all geometric constraints: the gripping devices can pick up any part, whatever its maximum size or shape. The minimum dimensions, on the other hand, are 100 x 200 mm. To overcome the dimensional threshold when unloading parts below the official limits and to prevent automatic sorting from reducing the sheet metal yield, Salvagnini now offers the new smart cluster function. Smart cluster is used to micro-joint parts together quickly and easily, without using a cutting frame and without making programming more complicated in the office.

The MCU integrates perfectly with the whole range of Salvagnini automations, making the operators' work easier, drastically reducing waiting times between the end of the cutting and the start of the next processing.

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Graphtec GB 'makes the cut'

As the recently appointed exclusive UK and Ireland distributor of WID laser engraving/cutting machines, Graphtec GB is now offering the latest C Series in a choice of four different-sized models: the 500, 700, 900 and 1000. These have been developed to accommodate the total requirements of digital engraving/cutting specialist companies. All of the machines are robustly constructed and of a compact design to facilitate installation in small work shops where space is invariably at a premium.

The C Series provides respective processing areas of 700 x 500, 1,000 x 700, 1,300 x 900 and 1,600 x 1,000 mm, with variable cutting speeds of up to 90,000 mm/min on the 500 model and 72,000 mm/min on the 700, 900 and 1,000 models. The machines incorporate CO₂ tube and on selective models RF (Radio Frequency) lasers, sourced through partnerships forged with leading specialist laser manufacturers, with power ratings ranging from 60 W on the 500 and 700

models and incrementally up to 120 W on the 900 and 1000 models. All of the machines are supplied with dedicated user-friendly multi-tool software compatible with AI, DST, PLT, BMP and DXF graphic file formats and provide USB and Network connectivity.

Key design features include a 150 mm adjustable machine height facility, automatic temperature and air control systems and smoke/dust extraction and waste retrieval units. These are supplemented with an optional autofocus-empowered CCD camera that ensures precise material and object recognition, adjustment and alignment to accommodate even the most complex applications likely to be encountered. Collectively, these contribute to much higher productivity levels and processing speeds said to be five times faster than any other similarly positioned engraving/cutting machine currently available.

Developed to complement the varying



skill levels of both entry-level and seasoned professional operatives and for use in applications not suited to conventional CNC routing/cutting/engraving systems, the WID C Series of machines will laser cut and/or engrave a wide range of disparate materials including, for example, acrylic and various plastics, hard surfaces such as marble, glass and slate, solid woods and laminates, stainless steel and other non-ferrous metals and various alloys like brass and copper.

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The evolution of the plasma cutting process

Plasma cutting has long proven to be a flexible and cost-effective method of processing parts. The plasma process can cut aluminium, mild steel, stainless steel and the toughest wear-resistant materials from as little as 1 mm thick, right through to 60 mm.

While there is an abundance of manufacturers staking claims as 'market leading', there are many issues that prevent validity to such claims. While the plasma unit is central to the cutting process, it's the sum of the complementary parts that control, hold and move the plasma cutting torch that will ultimately define cut quality.

Early CNC profiling machines were fitted with single or multiple oxy-fuel cutting heads. These were built using large heavy castings and/or structural beams and driven around at relatively slow speeds using gearboxes with large motors and such machine designs are still available today.

Modern high-speed precision plasma cutting machines need to be able to accelerate, decelerate and change direction in a smooth controlled and vibration-free manner. This requires a more refined machine design that includes a collective of features.

The key components to form the 'ultimate' plasma machine design

A rigid bridge assembly that is strong but not excessively heavy, as the task of the bridge is to move the torch assembly around the cutting table by precisely following a predefined NC toolpath.

A reliable and predictable CNC control and motion system that can position the cutting torch exactly where it needs to be in a smooth and controlled manner. The controller must provide feedback to the user and communicate with the plasma unit to set power settings, speeds feeds and gas pressures where appropriate.

Precision electronic torch height control



that can maintain the exact pierce and cut height for the process. This needs to be vibration-free, as any movement or vibration in the torch will transmit to the cut profile.

Safety breakaway device for the torch. This needs to be 'rigid' but also able to protect the torch over the life of the machine. These are typically either magnetic or maintenance-free pneumatic systems. Whichever style is selected, the torch needs to maintain rigidity throughout the cutting process.

Independent downdraft cutting tables that are not connected in any way to the motion system. By remaining stand-alone, the table ensures vibration is not introduced into the motion control system while cutting.

Advanced CAM software that can take base CAD geometry and apply appropriate technology to the part to ensure consistent high-quality cutting. This should include an intelligent selection of cutting speeds for holes, slots and other internal features together with intelligent strategies to pierce and lead in and lead out of the profile. Failure to do so will impact consumable life and cut quality.

As the saying goes, 'a chain is only as strong as its weakest link' and that is very much the case with a plasma cutting machine installation. Now, all you need do is find a manufacturer to deliver a solution that incorporates all of the above.

Kerf is the key to the success

Kerf Developments have developed a wide range of profile cutting machines that include solutions for oxy-fuel, plasma and waterjet cutting applications. The key to success has been the belief that equipment

should be selected on merit. Kerf believes that all of its machines utilise best in class elements that offer excellent performance and reliability.

Being independent brings significant benefits as the team can evaluate new products and establish if they are suitable, reliable and cost-effective for the industry. Kerf offers new products when its engineers are completely satisfied that they meet in-house standards. When applying these standards to the specification for the 'ultimate' plasma machine, Kerf has highlighted the reasons for recommending a specific solution.

The key components

A rigid bridge assembly that is strong but not overweight. The bridge on Kerf plasma machines is strong portal frames manufactured from steel that is fully welded, stress relieved and machined. The bridge provides an excellent solid base for mounting the drive systems. The design of the RUR and RUM machines are such that other aspects can be replaced or upgraded if required to support new technology as and when it is available. A good example of this being the development of the UltraSharp precision plasma cutting technology.

A reliable and predictable CNC control and motion system that can position the cutting torch exactly where it needs to be in a smooth and controlled manner. Kerf has supplied a range of BURNY controller and drive systems. It was clear that the BURNY units were very reliable even in the most hostile of environments.

The modern BURNY systems provide



reliable control and drive systems that feature ease-of-use and reliability. There are lower-cost options out there in the market; however, for the new Kerf oxy-fuel, plasma and waterjet machines, BURNY control systems lead the way.



The spring-loaded EasyGlide drive system used in conjunction with the Burny system eliminates backlash and reduces power consumption throughout the motion control system while the precision electronic torch height control can maintain the exact pierce and cut height for the plasma process.

The Kerf choice of electronic torch height control is the INOVA. The unit is extremely stable and provides precision height control. The unit lowers the torch assembly down to the workpiece and sets the initial pierce height. Having pierced the material, the INOVA unit then maintains the correct cut height above the plate and is constantly being adjusted as the head moves over the plate.

Safety breakaway device for the torch. This needs to be "rigid" but also able to protect the torch over the life of the machine.



Kerf offers both a magnetic or pneumatic torch protection system. Given the environment in which plasma machines operate, a maintenance-free sealed pneumatic type is advised. The unit is linked to the e-stop system and once activated stops the machine immediately should the torch come into contact with anything on the machine cutting bed.

The heavy-duty Kerf tables have been designed to efficiently collect dross in bins and at the same time extract the fumes generated by the cutting process. The bins are approximately 500 mm wide and controlled by pneumatic rams that open and shut baffle plates. By extracting fumes from the area immediately under the cutting torch and surrounding area, the tables are highly efficient.

Advanced CAM software can take base CAD geometry and apply appropriate technology to the part to ensure consistent high-quality profiles are cut.

Kerf works with leading independent global suppliers whose systems are not tied to any particular process or machine type. This allows customers the freedom to invest in new equipment at a later date without having to compromise on selecting a specific machine manufacturer or scrap their previous investment in CAD and CAM databases. The value of your production database should not be underestimated.

Kerf has worked with several independent CAD/CAM suppliers over the years. There are systems on the market that offer differing levels of user control and automation. For installations where customers already have a CAM installation, Kerf works with customers and their suppliers to create a machine efficient post-processor.

For new installations or where UltraSharp cut quality is required, the most popular system is the Lantek Expert system.

Plasma units

Kerf has installed over five hundred machines with a range of different plasma units. Early high-definition systems included systems from Hypertherm, Inner Logic and Kaliburn.

More recently, the leading system for high-performance plasma cutting machines to Kerf Developments has been Lincoln Electric. These are our system of choice. As the World's largest supplier of welding and cutting systems, Lincoln Electric has delivered excellent products and support to Kerf and its customers.

Summary

When investing in this type of CNC technology you are doing so to decrease your costs and increase your profits. A high-performance plasma cutting machine can reward you with returns of over a hundred pounds an hour if you can produce high-quality parts. To counter that, a machine that lays idle waiting for spare parts, an engineer to arrive or simply for a call back from the supplier to resolve an issue will be costing you a similar figure plus the additional costs that downstream disruption causes. Furthermore, the knock-on effect with customers and the supply chain can be even more costly to your business.

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Use of pulsed fibre lasers for surface cleaning, texturing, and functionalisation

Needham Laser Technologies, a subsidiary of The Needham Group Ltd, is a leading manufacturer of industrial laser systems, with decades of experience in the development and manufacturing of laser marking solutions. A family-run business based in Whitchurch, Shropshire, Needham Laser has embraced the advances in power, efficiency, reliability and flexibility of pulsed fibre laser systems over the last 20 years which has provided a cost-effective replacement for traditional surface preparation methods and has enabled the production of surfaces previously unachievable.

Needham Laser's flagship range of laser systems, the N-Lase series, can be found across the UK with a variety of customers, including engineers, knife makers, jewellers, manufacturers and many more. In addition to its standard range, custom solutions can be developed and constructed to meet a variety of customer needs.

It is proud to display the 'Made in Britain' mark on all its laser machines, which are manufactured at its HQ in Shropshire. Alongside its emphasis on product quality, it also places vital importance on service and after-sales support to ensure that each of its customers get the maximum value from using its laser systems. Needham Laser's team of friendly customer service representatives and network of nationwide engineers are always on-hand to support customers.

While many of its customers are investing in laser systems as a solution to their engraving/marking needs, some are also embracing capacity to efficiently and safely clean surfaces. Laser cleaning is the process by which contaminants, debris, or impurities are removed from the surface of a material by using laser irradiation. This is a low-cost and environmentally friendly laser application technique. But how does it all work?

Surface colouration and creating a thin hardened skin can be achieved by using the laser to heat the surface to a temperature below its boiling point, commonly using a Continuous Wave (CW) laser but the majority of laser surface modifications are the result of using a pulsed laser to either melt or vapourise the surface of the material.

There are numerous reasons why you may want to modify the surface of a material. Examples include: cleaning the surface prior to another process such as welding, braising soldering or coating; cleaning a surface after another process which has heated it and caused oxide formation or contaminated it with by-products of the process; increasing the surface area of the part, so increasing its reactive surface area; increasing friction between two parts; decreasing friction between two surfaces; re-activating the surface prior to another process; creating or removing a pattern on the surface; roughing a surface to allow a better keying of coating.

Surfacing cleaning

The most common industrial use of laser cleaning is rust removal from steel parts prior to painting or welding.

Rust is friable oxide of iron that forms naturally on the surface of iron-based alloys when they are exposed to oxygen and water. Rust also corrodes the parent metal and can cause pitting and

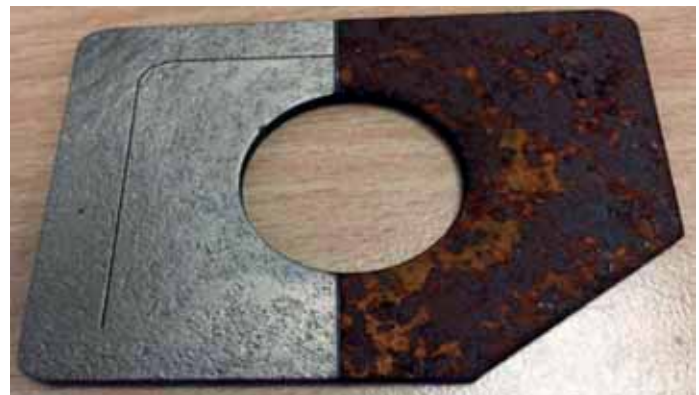


Image courtesy of TRUMPF

penetration into the metal of depths greater than 250 μm . Rust can form rapidly and must be removed to ensure good paint adherence and allow joining processes to be conducted.

Rust is commonly removed using abrasive wheels and brushes or using strong acid or alkaline solutions. Abrasive removal is a cumbersome process and is difficult on complex shapes, especially concave surfaces and chemical removal has operator health and safety issues and environment pollution concerns.

Pulsed fibre laser systems, such as the N-Lase series, offer a cost effective, environmentally friendly method of rust removal and surface preparation. Two types of laser rust removal can be used depending on the level of surface corrosion and the quality of the final surface required. For thin layers of rust with only light parent metal corrosion, a large laser spot size and high frequency laser can be used to simply remove the friable rust from the surface of the material. However, any pitting in the parent material caused by the rust will now be visible. For thick layers of rust and sub-surface corrosion and, when a good cosmetic finish is required, smaller laser spots sizes and high energy, lower frequency, laser pulses are required to both remove the surface rust and to also engrave the exposed surface of the material to below the rust penetration depth, thus removing the pitting caused by the rust's corrosion.

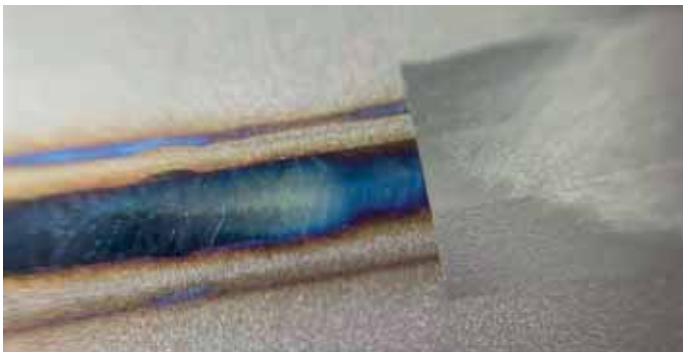
Typical rust removal rates are 500-850 mm^2 per second for thin rust removal and no surface reconditioning and 35-90 mm^2 per

second for thick rust removal where the laser has also been used to engrave the surface of the material to remove pitting.

Post weld/thermal treatment cleaning

Welding and after heat treatments of metals can leave oxides and weld spatter on the surface of the metal which are not only visually undesirable but can become initiation sites for corrosion, cause problems with subsequent manufacturing processes and reduce adherence of paints and lacquers.

A high frequency pulsed fibre laser can be used to remove oxides and weld spatter from the surface, as shown here on this seam weld on titanium pipe, leaving a clean smooth surface.



Wire/busbar stripping

Removing insulation lacquer from copper conductor is a common but difficult process by conventional processes. The insulator can be PAI, PI, PEEK or similar highly resistant materials which adhere strongly to the conductor.

On larger conductors, such as hairpins, the insulator must be manually scraped from the surface or machined away which is an awkward and time-consuming process. On ultra-fine transformer wires, such as shown here, it is not possible to perform mechanical scraping or machining without breaking the wire so chemical stripping using hot caustic soda solution is required which is hazardous to health and the environment.



Laser stripping produces a clean oxide free surface on the conductor in a non-contact process and does not require any chemical treatments. Removal rates of up to 250 mm² per second are achievable with the correct laser system.

Rubber mould tool cleaning

Mould tools for rubber, injection moulding plastics and GRP require regular cleaning to prevent the part sticking in the mould and to ensure consistent part geometry.

This is sometimes done manually using scrapping tools on larger parts but must be done using chemical solvents on smaller and

more complicated tools which have health and environmental concerns. Laser cleaning provides a rapid, cost-effective technique to clean the mould without damaging the tools and without the use of any chemicals. The laser required for rubber mould tools is a cost-efficient lower power pulse fibre laser.



Image courtesy of TRUMPF

Selective laser paint and powder coat removal

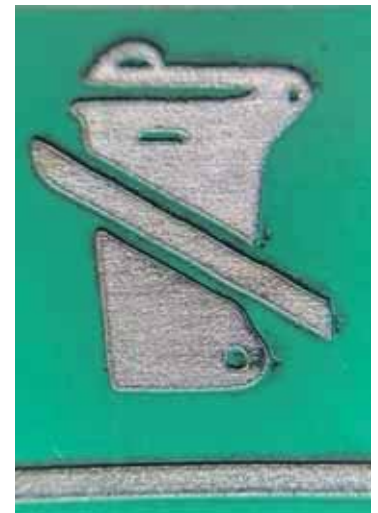
Removing the paint from metal and plastic substrates is often required for both decorative and functional purposes. Information and logos can be placed onto pre-painted panels and electrical contact with panels can be made to allow the panel to be earthed. The texture and colour of the bare material can then be modified as required to produce the desired effect.

Layers of different colours can also be applied to both metals and plastics, using the laser to selectively remove one or more of the layers to provide colour details as required.

Paint removal rates of 100-400 mm² per second of thin paint and 25-100 mm² per second of powder coat and thick paints are achievable on metal substrates.

Paint removal from translucent plastics is used extensively to produce backlit display panels and switches. A high degree of control is required of the laser parameters to obtain clean paint removal without damaging the plastic substrate, but high-quality laser systems produce high quality results and provide a fast, flexible manufacturing system.

If you would like to learn more about how a Needham's N-Lase laser systems could provide an efficient and safe surface cleaning solution for you or your business please get in touch and Needham would be more than happy to assist. Alternatively, if you would like to see the capability of its lasers first-hand, Needham Laser provide demonstrations of its machines at its Shropshire HQ, virtually via Zoom or Microsoft teams, or the company can arrange to travel to your location.



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Weldcloud Fleet helps service managers improve welding equipment

ESAB Welding & Cutting Products has introduced WeldCloud Fleet, a cloud-based application designed to manage a fleet of welding equipment across one or multiple locations. Ideal for service and maintenance managers with larger fleets of welding equipment, WeldCloud Fleet keeps the fleet working at optimal productivity levels by enabling users to: manage welding jobs across a fleet of equipment; deliver support for planning, documenting and providing reminders for service, maintenance and calibration activities; view arc time per welding station; provide remote software upgrades to a welding fleet instead of manually configuring them; include GPS locations for welding equipment; prepare event logs for early detection and notification of equipment issues.

“Industries like shipbuilding, fabrication and manufacturing, rental companies, mobile machinery or any company that maintains a large fleet of welders can save hundreds of hours of maintenance time using WeldCloud Fleet,” says Jon Hofmann, global product director for digital solutions at ESAB.

WeldCloud Fleet sends immediate notifications from each individual machine to the user, alerting them instantly of issues and service needed. This application also provides a complete machine event log and service log, import and export of welding jobs, and location tracking of each connected machine.

Jon Hofmann continues: “An alert, such as that the service interval is exceeded, or that the gas or water flow is hindered, can both improve your uptime, but also make sure you do not get bad weld quality.

To gain WeldCloud capabilities, users need a WeldCloud enabled power source. For ESAB’s Aristo® series, including for the new Aristo 500ix, users can order WeldCloud as a factory installed application. For Aristo and select Origo power sources, ESAB offers retrofit packages. For any brand of welding equipment, the ESAB Universal Connector connects to the positive and negative terminals to capture basic data such as arc on/off time, weld session duration and welding voltage and amperage.

To develop the backbone for WeldCloud, ESAB collaborated with Microsoft because its Azure cloud computing platform allows for a reliable and secure architecture that sends data from a digitally connected-system directly to the cloud. WeldCloud applications are as easy to install and use Office 365. It only requires a reliable wireless internet connection.

“WeldCloud appeals to operations of all sizes and complexity, including those without sophisticated IT departments,” explains Jon Hofmann. “Users can be up and running with the intuitive applications after about an hour of training.”

All user data is securely stored in the cloud, eliminating the worry about lost data if a computer system breaks down. If the wireless connection is interrupted, the power source’s WeldCloud module, including the Universal Connector, will continue to save machine data and can store up to a week’s worth of information. The data will automatically update to the user’s account as soon as the wireless connection is restored.



WeldCloud Suite

WeldCloud Fleet can be used as a stand-alone service application or as a bundle with ESAB’s other products, WeldCloud Productivity and WeldCloud Notes, for a complete welding data analytics system. ESAB’s WeldCloud Suite addresses and remedies the key issues affecting the welding industry through digitisation: productivity bottlenecks; high costs of poor quality, rework and scrap; high costs incurred for administration of regulatory compliance and documentation; equipment failures and downtime; difficulty in finding and retaining skilled welders; challenges associated with managing large fleets of welding equipment.

WeldCloud Productivity, created for production managers, improves welding productivity and traceability. It can improve arc-on time factor by 10 to 50 percent during the first year, track arc-on time, monitor net deposition rate and travel speeds on each weld strike and session for each machine in a fleet, generate reports and analytic functionality.

WeldCloud Notes, created for welding engineers and management, saves time and reduces human error related to document generation and administrative management. WeldCloud Notes enables users to: maintain quality and compliance while managing Procedure Qualification Records (PQR) and Welding Procedure Specifications (WPS) documents in one place; efficiently review all of its PQR, WPS and Weld Procedure Qualifications (WPQ) information with a quick and easy search feature; generate a PQR or WPQ with all essential variables.

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