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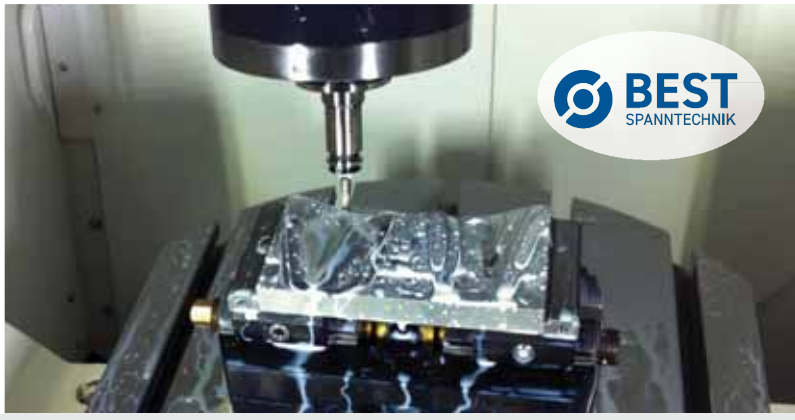

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Published by Roger Barber Publishing

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Design & Production:
Roger Barber Publishing

Print:
Holbrooks Printers Ltd,
Portsmouth, Hampshire

Engineering Subcontractor is published six times a year and mailed to a controlled circulation of readers with a legitimate interest in the content.

Roger Barber Publishing stores all business data securely and does not share with third parties.

Meeting the challenges of workholding for 5-axis machining

As manufacturing industry increasingly has to embrace the complexities of 5-axis CNC machining, whether 3+2, 4+1 or fully interpolative, a critical yet often underestimated aspect of the process is how to secure the workpiece reliably and repeatably. It is especially important when one of the machining centre's rotary degrees of freedom is a swivelling trunnion, as maintaining rigidity and stability is paramount when a component is subject to high kinetic forces.

At the same time, there is a contradictory requirement to hold the workpiece on as little material as possible so that the maximum surface area can be accessed by the cutter. Only in that way can potential collisions be avoided and the component be produced economically in the fewest number of operations, the aim invariably being one-hit completion. It is clear that a single workholding solution cannot optimally suit every application and deliver high dimensional accuracy as well as vibration-free machining to achieve fine surface finishes. So, it is highly advantageous if a supplier of workholding equipment can offer numerous different solutions.

This is where 1st Machine Tool Accessories scores highly. It offers what is probably the most comprehensive variety of 5-axis clamping options on the British and Irish markets, being sole sales agent for no less than four overseas manufacturers of top-quality, high-precision workholding solutions aimed at multi-axis machining.

They are CHICK, which manufactures workholding products of robust construction for precise part location, enhanced accessibility, high accuracy, and with features designed to maximise efficiency and reduce setup times; SINCO whose versatile, modular, MultiZero system provides a dense grid of precise conical slots, making it possible to have hundreds of zero points in one solution; WALMAG, which produces electro-permanent magnetic workholding that delivers a powerful combination of secure and uniform clamping, superior accessibility, elevated levels of accuracy and inherent safety when machining ferrous materials and BEST, renowned for its low-profile, centric vices that have high retention forces, despite requiring as little as 3 mm of material on which to hold a part.

1st MTA provides local consultation and engineering expertise, including the provision of standard and customised manual, hydraulic and pneumatic fixturing arrangements that distribute forces evenly to avoid component distortion, which is particularly important when thin-wall features are involved. All solutions are designed to maximise a manufacturer's component quality and productivity.

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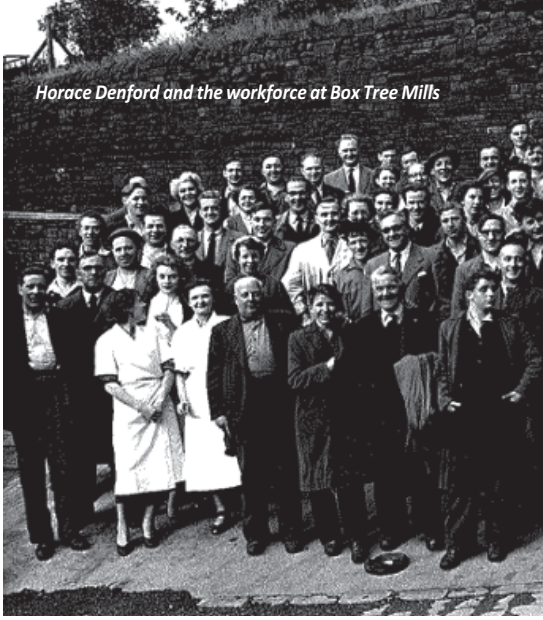
80 years of engineering excellence and innovation


Horace Denford and the workforce at Box Tree Mills

2025 marks a monumental milestone for Denford Ltd, 80 years of proudly British engineering. From its humble roots in Yorkshire to becoming a globally recognised name in educational technology and manufacturing training, Denford's story is one of adaptation, innovation and a relentless commitment to shaping the engineers of tomorrow.

This isn't just a company anniversary, it's a celebration of British ingenuity and Denford's unique journey from machine tool manufacturing to global STEM education leadership.

A Yorkshire beginning: Horace Denford's vision

The Denford story begins in 1945 with one man: Horace Denford a skilled engineer and passionate innovator based in Halifax, West Yorkshire. The company started out as a specialist in precision metalworking machinery. At the time, Britain was emerging from the shadows of World War II and there was a national hunger for rebuilding industries, re-skilling the workforce and equipping technical colleges with reliable engineering tools.

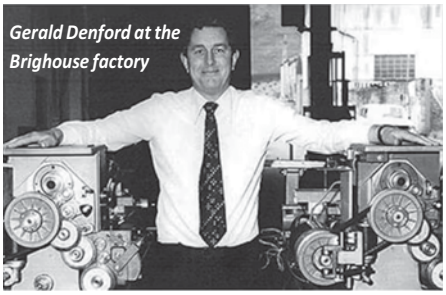
Denford's early years focused on building manual lathes with the iconic Boxford Lathe. The name is a combination of "Box Tree Mills", where the original factory was located and the founder's surname, "Denford". It gained legendary status across technical education institutions. These machines became the bedrock of engineering apprenticeships throughout the UK, known for their robust design, reliability and precision.

For many engineers and machinists, their first hands-on experience came through a Denford lathe, the kind of machine that could take a beating yet deliver precision every time. It wasn't just a tool; it was a rite of passage.

Throughout the 1950s and 60s, Denford built a strong reputation for quality British manufacturing. The company's machines weren't just used in education, they also found their way into small workshops, R&D labs and toolrooms across the country. Denford's success was built on crafts-manship, consistency, quality and a commitment to supporting hands-on learning.

The 1970s–80s: A new era with Gerald Denford

Following Horace Denford's passing in 1963, the company leadership passed to his son, Gerald Denford. With a strong grounding in both engineering and business, Gerald Denford brought a modern vision to the company at a time when the manufacturing world was evolving rapidly.


Gerald Denford at the Brighouse factory

Recognising early signs of digital trans-formation within the industry, he guided Denford through one of its most important transitions, the shift from purely manual machines to incorporating CNC technologies. He understood that to remain relevant, Denford needed to not only adapt to new machinery trends but also anticipate how technical education would need to evolve launching the world's first CNC lathe for technical training. Alongside the hardware, Denford developed its own range of CADCAM software, ensuring a fully integrated solution for learning modern manufacturing techniques.

This was a defining era for Denford. While others struggled to adapt, Denford redefined what it meant to be an engineering company transitioning from simply manufacturing machines, to becoming a leader in technical education and training solutions.

Under Gerald Denfords leadership, Denford began designing bench top CNC machines specifically for use in schools and colleges. A forward-thinking move that would define the company's future. He built a team of forward-looking engineers and software developers, setting the stage for Denford's later success in the educational technology space.

This leadership period laid the groundwork for Denford's identity as not just a machine builder, but an education partner and innovator in manufacturing training.

Pioneers of STEM: A legacy in education and innovation

Following Gerald Denfords death in 1987, two of his children, Andrew and Nicola Denford, stepped up to become the leading force moving the company forward to where it is today.

Andrew Denford became chief executive in 1991 and under his leadership, Denford Ltd intensified its focus on educational technology, developing CNC machines tailored for training purposes. Denford has grown into a global player in the world of STEM education (Science, Technology, Engineering and Maths). Its machines and software are used in classrooms and training centres across more than 80 countries, providing students with real-world skills in design, manufacturing and problem-solving. However, Denford didn't stop at selling


F1 in schools in the early 2000s

machines. The company has always believed that inspiration is just as important as information. That philosophy led to one of its most ambitious ventures, becoming a founding partner of F1 in Schools.

F1 in Schools, now STEM Racing, is a global STEM competition where students use Denford's CNC equipment and design software to create miniature F1-style cars that race down 20-metre tracks at blistering speeds. It's hands-on, high-octane education, combining engineering, aerodynamics, branding, team collaboration and even sponsorship pitching. More than just a competition, it's a launchpad for careers in engineering, design and motorsport.

Over 29,000 schools from 64 countries worldwide, reaching over a million children a year, participate in the STEM Racing programme, many of them using Denford machinery to bring their ideas to life. It's a prime example of how Denford is not only equipping the next generation with tools, but also with purpose and ambition.

New Denford Machines

The impact is real. Alumni of the competition have gone on to work in top engineering firms, Formula 1 teams, and cutting-edge technology companies around the world.

Middle: CEO Andrew Denford (3rd generation) joined by his three children Joseph and Anabelle on the left and Oscar on the right (The 4th generation of the Denford family)

Looking ahead: The next chapter in the Denford story

As it enters its ninth decade, the 4th generation of the Denford family has joined the team with Andrew Denfords three children Joseph, Anabelle and Oscar Denford learning from his experience and becoming directors in April 2025. This new era comes with new investments in new innovative products and expansion of the company into new emerging market in Africa, the company is firmly focused on the future.

There are plans to expand Denford's training solutions into new industries and support emerging markets where access to quality technical education is still limited. Collaborations with Universities, Government bodies and international education ministries are also on the rise.

One thing remains the same: Denford's mission to inspire, educate and empower. In an age where automation is replacing old jobs and the skills gap continues to widen, Denford stands as a beacon for engineering education done right, combining the best of traditional craftsmanship with the innovation of tomorrow's tech.

British to the core: Made in West Yorkshire, built for the world

In a time when offshoring and mass production have become the industry norm, Denford remains proudly British-owned, British-based and British-built. From its headquarters in Brighouse, the company designs, assembles and tests all its machines, ensuring quality control at every stage.

This local focus doesn't limit Denford's reach, quite the opposite. The company's reputation for robust, reliable and education-focused machines has made it a trusted supplier in Europe, the Middle East, Asia and the Americas.

At its core, Denford is still powered by the same values it started with, precision, passion and progress. The team in West Yorkshire includes engineers, designers, software developers and educational consultants all working together to push the boundaries of what's possible in learning and manufacturing.

Whether it's a new CAM software update, a safer school lathe, or a modular CNC trainer for developing nations, Denford continues to innovate with purpose.

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Motorsport specialist brings manufacturing in-house

Located in Dalbeattie, Dunbar Race Engineering was established in 2018 by Duncan Dunbar to design and supply prototype motorcycle parts and small batches of components for the motorsport market. The company also reverse-engineers and remanufactures parts that are no longer available, especially for historic and emerging classic racing motorbikes. Today, the firm provides engineering and manufacturing services to other sectors as well, including parts for internal combustion engines targeting the hydrogen market.

At the outset, production of parts was outsourced to subcontractors. However, Duncan Dunbar realised that to increase flexibility, reduce lead-times and ensure consistent quality, it would be necessary to progress from a home workshop and move to manufacturing in-house. So in the spring of 2022, he moved the company into an industrial unit and purchased a Hurco VM10i 3-axis Vertical Machining Centre (VMC) with a 4th-axis rotary table.

Before deciding on the Hurco VMC, Duncan Dunbar made sure he researched the market thoroughly. Hurco was recommended by a former colleague and a visit to the supplier's High Wycombe facility followed. Being new to machining, he was looking for more than a machine tool provider, but a company with which Dunbar Race Engineering could partner. Especially important was assistance through the early stages of first-time CNC programming, as well as a clear path to more advanced

machining capability in the future. Duncan Dunbar confirmed that Hurco's training was very good and its applications engineers have been very supportive with programming and advising how different jobs should be set up.

Describing his experience of dealing with Hurco, Duncan Dunbar says: “They are nice people to work with and the VM10i is a cracking machine. It has a large working area for its footprint and fitted neatly into the space we had available.”

To make excellent quality parts to fine tolerances, sometimes as tight as ±10 microns, the manufacturer takes full advantage of both the Hurco machine's build quality and the conversational programming power of the WinMax control, which Duncan Dunbar explains is easy and intuitive to use. Most work, including complex jobs requiring 3+1-axis machining, is

programmed directly at the control. Toolpath simulation and verification graphics help to avoid any potential input mistakes. “What you see on the screen is what you get on the part,” Duncan Dunbar confirms.

His career as a mechanical design engineer started with superbikes and MotoGP and continued with Mercedes AMG High Performance Powertrains. He retains an enthusiasm for all things motorsport but is keen to emphasise that Dunbar Race Engineering is not solely a racing company. He believes that the discipline, drive and innovation that forges a career in motorsport can be applied to deliver design projects and manufacture products for a wide range of mechanical systems.

Additional expertise is offered, such as inspection and quality management system services using a Mitutoyo Coordinate Measuring Machine (CMM). Customers also benefit from the experience of time-served manufacturing engineers that can be called upon at any stage of a project to analyse, redesign and improve a process ahead of final sign-off.

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New eco-friendly sliding-head lathes

For machining parts from bar up to 20 mm in diameter, optionally 25 mm, a third generation of the Cincom L20-LFV series of sliding-head lathes with a considerably uprated specification has been launched by Citizen Machinery UK. Now offered in five variants, VIII, IX, X, XII and XIIB5, it is a best-selling model with platen tooling as well as front and rear tool posts, all stations having driven and static positions on the top three models, which also have additional Y-axis movement of the sub spindle.

Simultaneous 5-axis control for performing complex machining cycles is supported on the top two models, one of which has a B-axis tool post with optional Automatic Tool Change (ATC) for tools up to 30 mm in diameter, chip-to-chip time being four seconds. Cutters are driven by a 2.2 kW motor at up to 12,000 rpm, so even small diameter mills are capable of productive metal removal rates. The additional programmable B-axis motion raises the total number of CNC axes to seven.

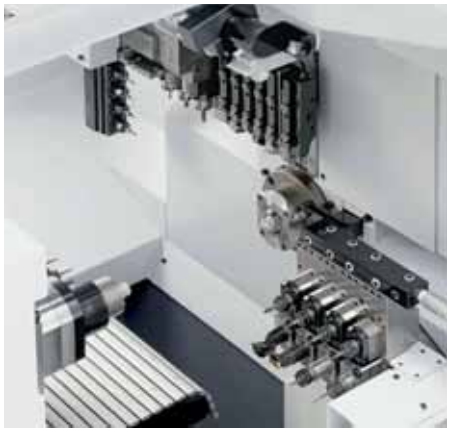
The Japanese manufacturer was the first to offer B-axis ATC on a sliding-head lathe to extend the machine's versatility when executing angled cross working or end facing operations. The magazine accommodates 12 tools, while a 13th is fixed in the upper position on the live tool unit. While cutters are normally rotating for performing drilling, slitting, hobbing or multi-axis milling, either axially, radially or at a compound angle, magazine positions may be occupied by turning tools if expedient.

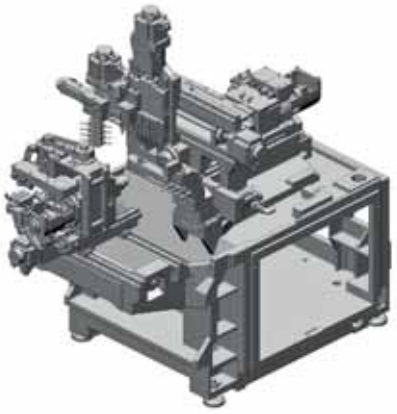
Another feature contributing to the lathe's versatility is the ability to switch over quickly between Swiss-type operation and non-guide bush turning for more economical production of shorter components. This mode results in less bar wastage due to the shorter remnants and is well suited to coping with tight drawing tolerances and close bore-to-OD geometry. Removal of the guide bush also means that the diameter of the stock material does not have to be tightly controlled.

All lathe versions are supplied with the manufacturer's programmable LFV function embedded in the operating system of the Windows-based Mitsubishi control, which is equipped with a 15-inch touch screen for easy visibility and intuitive operation. The three LFV modes of operation work at either spindle by oscillating the X and Z servo axes in synchrony with spindle rotation, breaking stringy swarf into short, manageable chips. It is especially effective when producing parts from malleable materials. The results are higher productivity by avoiding machine stoppages to clear away swarf manually, prevention of damage to the workpiece and/or tool, less tool wear and a better finish on the machined surface.

The number of turning tools that can be mounted on the gang tool post has been increased from five to six, so up to 45 tools may now be held in the machining area for enhanced machining capability. Citizen Machinery's quick-change CIToolingSystem speeds tool exchange and improves repeatability of postioning to ±2 microns radially and longitudinally.

Access to the machining area has been improved, as the front door may now be fully opened and an extra door has been provided at the rear. Internally, units have been made as compact as possible and the coolant nozzles





have been rearranged to improve efficiency during setup. Another improvement has been to upgrade the capability of the sub spindle, which is now rated at 3.7 kW/10,000 rpm. Numerous robotic loading and unloading systems for automated storage and handling of raw material and finished workpieces are available.

Citizen Machinery's Eco II suite of energy-saving features are incorporated, designed to optimise power consumption, reduce compressed air usage, minimise CO_2 emissions and promote environmentally friendly manufacturing practices by allowing operators to monitor and understand energy utilisation patterns.

For example, an idling stop function puts the machine into standby when no programmed operation is in progress. The machine is equipped with intermittent air blow that maintains its effectiveness while reducing compressed air consumption by about 60 percent. Air purge control shuts off the function after a preset time while the machine is on standby to reduce air consumption further. A touchscreen Eco Monitor continuously displays in graphical form the power drawn and regenerated to ensure the lathe always runs at peak efficiency.

Citizen's IoT-ready turning centres are compatible with its 'alkapplysolution' software, allowing them to be networked via a simple LAN connection. It enables users to take advantage of various software packages for tasks like NC program management and machine operation data monitoring.

Specifically, 'alkartlive 2' software enhances production efficiency by visualising machine downtime and automatically aggregating data to reduce manual effort and enable preventive/predictive maintenance planning. The software displays machine status with colour-coded indicators on a timeline, alongside production results and alarm history, providing a clear overview of factory-wide operations.

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New Lynx lathe selected to machine new product series

Mills CNC, the exclusive distributor of DN Solutions' and Zayer machine tools in the UK and Ireland, has recently supplied Alwayse Engineering Ltd., a leading, globally-recognised ball transfer unit design and manufacturing specialist, with a new DN Solutions' 2-axis lathe.

The machine, a FANUC-controlled 8" chuck/65 mm bar diameter Lynx 2100B lathe, was installed at Alwayse Engineering's large, impressive and integrated manufacturing facility in Birmingham in March 2025.

As part of the investment package, the machine was supplied with a HydraFeed MSV65 servo-driven, short magazine bar feeder, to facilitate continuous, unattended production and a HydraFeed ROTA-RACK parts accumulator and handling system with an integrated belt conveyor, for improved machined part storage and protection.

Since being installed, the new Lynx 2100B has been put through its paces machining the new single-piece, carbon steel bodies for the company's re-designed and 'soon-to-be launched' 805 series of low-profile, high-load capacity and heavy-duty ball transfer units, used primarily, in air cargo movement applications.

805 unit bodies are processed from solid mild steel bar stock. They are characterised by their tight, tied up tolerances and exacting surface finish requirements.

805 ball transfer unit steel bodies are 62 mm in diameter and 34.5 mm in length and are machined in one set up on the Lynx 2100B. Machining operations include, front end, rough and finish boring of the bodies' interiors to produce the desired internal 'hemisphere-shape' and back end, burr-free, parting-off operations to cut off the machined parts from the remaining bar stock.

Part cycle times are short, approximately 80 seconds and, once machined on the Lynx 2100B, the bodies are finish machined on one of the company's other Lynx lathes where a series of multi-dirt exit holes are machined on the bottom of every unit.

Following case hardening and zinc-plating operations, the units are then assembled where a number of small diameter stainless steel balls and a larger diameter stainless steel or carbon chrome load ball, 30 mm or 45 mm in diameter, are inserted to each unit's interior before being sealed with a retaining, stamped, outer metal ring.

805 ball transfer units are classified as 'core line' products by Alwayse Engineering, which means that they are held in stock and are always available ready to be supplied to customers quickly and efficiently.

Alwayse works closely with its customers to design highly-customised and modular ball transfer decks which comprise a series of 805 ball transfer units spaced in a grid pattern and mounted into steel top plates that are attached to strong and stable steel-fabricated sections or frames.

The shape of these sections and the number of ball transfer units used, depend on the specifics of each application as well as the type of goods being moved and transported.

Alwayse Engineering can provide customers with complete ball transfer decks, where required and, within its Birmingham facility, has its own in-house fabrication operation to manufacture the top plates and sections.

As well as complete turnkey solutions, Alwayse Engineering supplies the ball transfer units to integrators and resellers who design the units into the final application, they also support with design services.

Alwayse 805 Air Cargo ball transfer units are recognised, internationally, for their reliability and durability and are used extensively within

tough and demanding materials handling environments.

The company first introduced its precision machined 805 series of heavy-duty ball transfer units into the market back in the late 1990s and, with International Air Transport Association (IATA) recognition, rapidly became accepted as the industry standard.

Recent and successful Alwayse 805 ball transfer unit and ball transfer deck installations include those at Bogota Airport, Columbia and at Heathrow Airport (Terminal 5), London.

Committed to continuous improvement and innovation, the company, back in 2023, following extensive research and customer, distributor and end user, feedback, embarked on a major 'root and branch' product redesign and redevelopment programme.

The programme coincided with the company being taken over in March 2023 by Lifco, a Swedish-based investment company specialising in the acquisition and development of market-leading niche businesses.

With prototyping and pre-production development and testing completed, the company is now in full production mode ready to launch its new 805 series of ball transfer units into the market.

Alwayse's new 805 ball transfer units are built to last and can operate, with no reduction in performance, in both wet and dry conditions. Like their predecessors, the new 805 units ensure smooth cargo movement with minimal resistance, but the newly designed units have specific advantages and strengths over their earlier counterparts i.e., they are quieter, noise reduction down to 64dB and lighter.

Alwayse Engineering is no stranger to DN Solutions, previously Doosan, machine tools and its relationship with Mills CNC started back in 2006.

The new Lynx 2100B installed in the company's well-resourced machine shop has been positioned adjacent to five older DN Solutions' and Doosan compact Lynx lathes acquired by Alwayse Engineering over the last 19 years. These machines comprise 2 x Lynx 220LC, 1 x Lynx 220C, 1 x Lynx 2100LMSB and 1 x Lynx 2100A.

Richard Cutler, engineering manager at Alwayse Engineering says: "Mills provided us with a competitive quote for the new compact lathe. Our knowledge of and previous positive experience with DN Solutions' Lynx lathes combined with our established relationships with Mills CNC put them in the driving seat and resulted in us placing the order with them."

DN Solutions' Lynx 2100B is a popular, best-selling compact lathe equipped with a 15 kW/4, 500 rpm spindle and a 12-station, servo-driven turret with fast tool change capabilities.

The machine boasts 30m/min rapids on its X-axis and 36m/min rapids on its Z-axis and features a 350 mm maximum turning diameter and a 330 mm maximum turning length.

In addition to the HydraFeed bar feeder and ROTA-RACK parts accumulator, the machine supplied to Alwayse Engineering was also equipped with the Doosan FANUC iPlus control with 15" touchscreen iHMI, a FilterMist extraction unit and a customised pneumatic arm integrated to the machine's parts catcher that helps remove swarf and coolant from each machined part.

Alwayse Engineering's redesigned 805 ball transfer units are being machined on a new 'dedicated' Lynx 2100B lathe from Mills CNC.

Since being installed, the new machine hasn't missed a beat and is proving, like the other Lynx machines the company has at its disposal, to be a high-accuracy and reliable turning solution.

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TC Industries keeps it in the family with Mazak FJV Vertical Machining Centre

TC Industries, one of the world's leading manufacturers of cutting edges and wear parts for yellow goods vehicles, has installed a new Yamazaki Mazak FJV Vertical Machining Centre (VMC) at its UK facility.

The company manufactures parts for every size of earth-moving equipment, from wear plates, segments and base edges for wheel loaders and excavators through to cutting edges and track shoes for bulldozers, with customers including Caterpillar.

The family-owned organisation has its global headquarters in Crystal Lake near Chicago in the United States, with additional manufacturing sites in Canada and the UK. TC Industries' UK facility is in Skinningrove, near Saltburn-by-the-Sea in North Yorkshire, with 100 percent of the site's production going to export markets.

The highly efficient Mazak FJV machine is designed to accurately machine large workpieces and is being primarily used for drilling operations, replacing two older machines in the facility.

Paul Bird, site manager at Skinningrove, says the US parent company played a key role in convincing the UK management to consider Mazak technology: "Our parent company in United States has a long relationship with Mazak, with multiple machines in operation at our Crystal Lake manufacturing site.

"We visited the Mazak European Manufacturing Plant in Worcester and saw the FJV machine in action on the shop floor during a tour of the facility. The tour confirmed what our owners were saying about Mazak's capabilities, both in terms of the technology and its infrastructure in the UK, specifically its service engineer network."

In addition to drilling, the FJV's milling and shaping capabilities were particularly important for TC Industries, specifically of slots that require a milling operation.

The FJV 60/160 is a high-rigidity, double-column VMC capable of machining all five faces of a workpiece in a single setup, dramatically reducing process times. The machine is ergonomically designed to maximise ease of operation in the machining area and has simplified conversational programming with MAZATROL SmoothG control.

To help integrate the new machine into TC Industries' facility, the company took full advantage of Mazak's training courses.

Paul Bird concludes: "We sent two operators down to Worcester for the Smooth CNC operator and programming training. We then had operator and application training on site at Skinningrove. They're very good courses that helped get our CNC operators up to speed very quickly on the machines and the control.

"Like TC Industries, Mazak is family owned with an emphasis on providing outstanding technology and customer service. That continued back-up in terms of service and support is very important to us."

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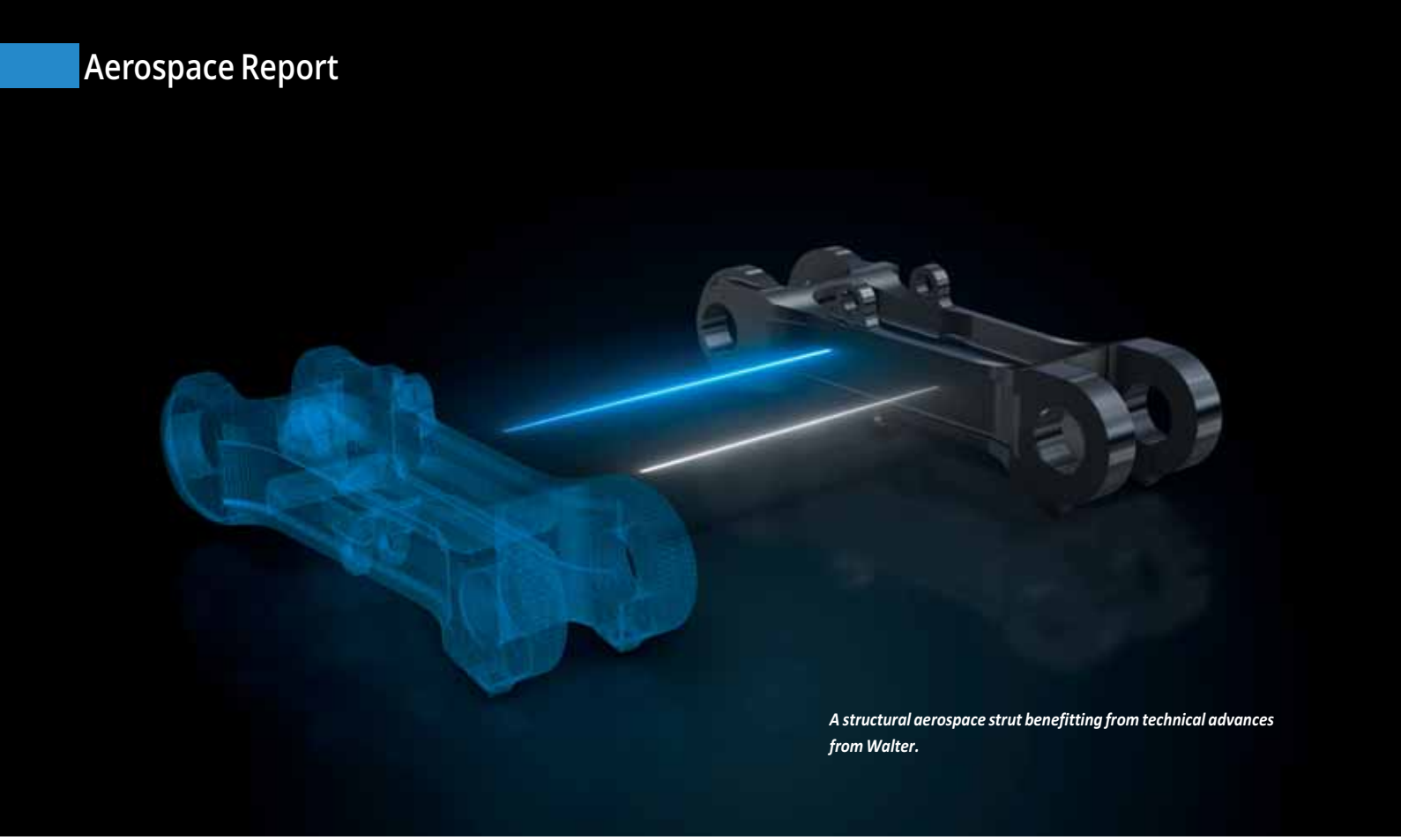


A structural aerospace strut benefitting from technical advances from Walter.

Innovating for aerospace manufacturing

The aerospace industry stands at the intersection of extreme technological demands and cost-efficiency requirements. With aircraft manufacturers like Airbus and Boeing projecting the production of 42,500 new jets over the next 20 years, the need for precision machining tools has never been more critical.

Aircraft construction is an intricate process that involves a complex array of materials, each presenting unique machining challenges. Aluminium alloys dominate the industry, comprising approximately 60 percent of aircraft components, while titanium and advanced composites play critical roles in structural and performance-critical areas.

Aluminium alloys, particularly from the 2xxx, 6xxx and 7xxx series, offer an ideal combination of lightweight properties and structural integrity. These materials require sophisticated machining approaches that balance material removal, surface quality and dimensional precision. High-Speed Cutting (HSC) technologies have emerged as a vital solution, enabling manufacturers to address the demanding requirements of aerospace component production. It is in this area that Walter is a leader in the industry with its cutting tool solutions.

Aircraft construction involves a complex array of materials, each presenting unique machining challenges. As aluminium alloys comprise approximately 60 percent of aircraft components and require sophisticated machining approaches, Walter's high-speed cutting (HSC) tools, such as the M2131 and M2331 milling cutters address the specific challenges the industry faces with these materials. The two insert sizes allow for depths of cut of 15 or 20 mm, achieving chip removal rates of up to 11 litres per minute.

Both milling cutters work almost seamlessly when repositioned, resulting in smooth surfaces even during pre-finishing. The dense, smooth PVD coating of the cutting edges makes them extremely stable and also ensures that there is hardly any cutting-edge build-up. The creative design of the insert seat secures the insert against the high centrifugal forces that occur during high-speed cutting. At the same time, internal cooling channels deliver the coolant directly to the cutting edge to extend tool life and ensure exceptional chip evacuation.

While aluminium alloys are used for fuselages and wings, titanium alloys, such as TiAl6V4 or Ti5553, are employed where an exceptionally high degree of rigidity is required, such as in landing gear components, struts, or flap tracks. The hardness and low thermal conductivity of titanium necessitate high requirements for the cutting tools, particularly regarding process reliability. Rapid cutting-edge wear and low cutting parameters make machining titanium parts very time-consuming.

Companies that succeed in reducing the machining time per component maintain a clear competitive advantage. Here, the Walter BLAXX M3255 helical milling cutter provides breakthrough solutions. The innovative geometry of both the milling body and the indexable inserts ensures that the maximum number of teeth can engage with the material, while the soft-cutting insert geometry results in positive cutting behaviour that consequently reduces machining times and offers higher metal removal rates.

Heat management poses challenges when machining titanium alloys due to their low thermal conductivity; therefore, an optimised coolant supply to the cutting edge is essential. The Walter BLAXX M3255 is designed to create excellent chip clearance space that guarantees reliable chip removal, even at high cutting rates. The tangential positioning of the two or four cutting-edged indexable inserts allows for maximum cutting power and enables the machining of forged components, where the peripheral zone of the forged skin presents extreme challenges for the tool's edge. Ideal for rough machining applications, the Walter BLAXX M3255 helical milling cutter reduces titanium machining time by approximately 22 percent and extends tool life by around 100 percent through its innovative insert geometry and optimised chip clearance, which maximises material engagement and removal.

Correlating with the well-filled order books is

the requirement placed upon engine manufacturers and the supply chain for machining Heat-Resistant Superalloys (HRSA). Here, too, shorter machining times are highly desirable. The cutting speed of carbide milling cutters on HRSA materials is typically around 50 m/min. However, ceramic cutting tools push the boundaries with cutting speeds of up to 1,000 m/min, a 20 times improvement.

The SiAlON ceramics offer excellent possibilities for this, as they are less sensitive to temperature fluctuations than whisker-reinforced ceramics, making them the first choice for milling operations in HRSA. The interrupted cutting during milling causes the temperature at one cutting edge to vary, and the use of coolant can further increase the temperature difference. In the worst-case scenario, the so-called 'thermal shock effect' occurs, leading to cracks and even fractures.

Dry machining is therefore recommended when machining superalloys with ceramic milling cutters. A positive side effect is that the ecological footprint of the milling operation is improved because lubricants are not required.

Blisks are classic components made of nickel-based alloys. These bladed disks are often rough machined using carbide milling cutters. However, the machining time for this can easily exceed 30 minutes with conventional milling cutters. A ceramic milling cutter with a high feed geometry can machine the same features in just ten minutes. Feed rates of up to 9,500 mm/min can be achieved in a heat-resistant nickel-based alloy with a hardness of 44HRc and a tensile strength of 1,400 N/mm², such machining values would be expected in aluminium, not HRSA.

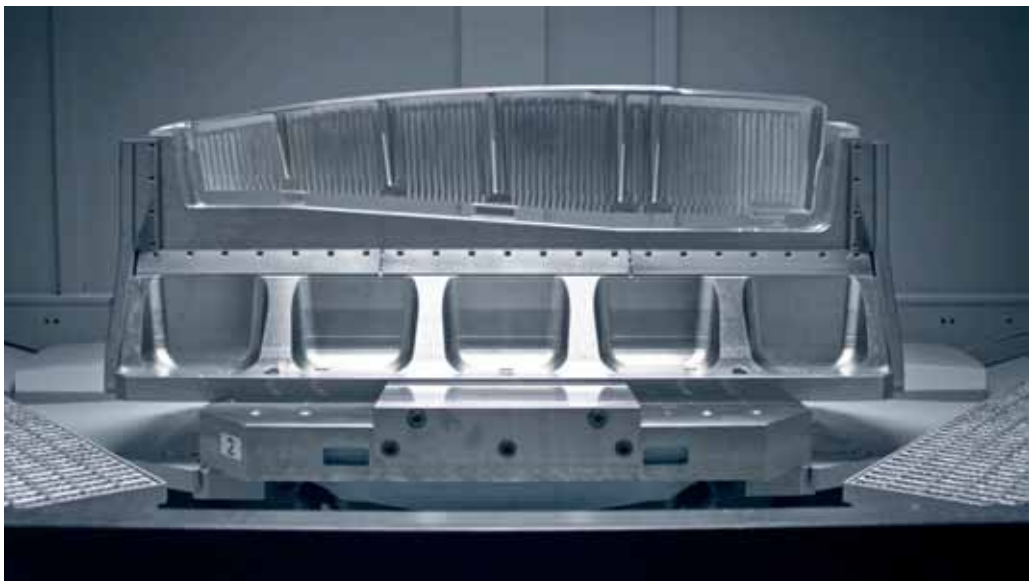
For HRSA machining, Walter introduces revolutionary ceramic milling solutions such as its MC075 high-feed geometry end mills. Available in a range of options including screw-in ConeFit interfaces, the MC075 ceramic end mills can deliver cutting speeds of up to 1,000 m/min utilising advanced SiAlON ceramic technology for superior temperature resistance.

Future-forward strategies: Near-net-shape

Unlike the automotive industry, where mass production dominates, the quantities required in the aerospace industry are comparably small, with the largest manufacturers like Airbus only producing around 750 aircraft a year.

This makes 'tool-free' production of components using 3D printing a feasible alternative, especially as the process enables the production of complex and stable components. Furthermore, it reduces the weight of conventionally manufactured components by up to 55 percent. This subsequently reduces the consumption of raw materials by up to 90 percent. From a machining perspective, there are also developments in this area that significantly optimise component production in terms of technology and costs.

Fuselage sections, wings, tail units, engine components and other complex assemblies are now being forged or 3D printed as close as possible to their 'Near Net Shape'. It means significantly less material has to be removed. This not only saves material and machining time but also reduces waste and thus enables more efficient manufacturing.



A wing rib for a wide body aircraft machined with tools from Walter.

Technological integration

The question of whether machine tools will still be needed in the future could well be asked in view of developments such as 3D printing or contour-based manufacturing. The answer is a resounding yes. Almost all 3D-printed workpieces require subsequent machining because their surface quality is usually insufficient for the components to be fitted directly.

This is caused in no small part by the so-called 'staircase effect' that occurs in the powder bed process typical of 3D printing. Heat treatment of steel components can also result in hardening distortion, which must be eliminated. Furthermore, support structures must be cleanly removed. All of these factors make cutting tools indispensable both now and in the future.

The economic impact of Walter solutions

As an industry leader, Walter has proven the merits of its technical advances in the aerospace sector throughout the manufacturing supply chain. For the production of aluminium structural components, a major aerospace manufacturer implemented Walter's M2131 milling system for producing aluminium wing ribs. The result was a Material Removal Rate (MMR) increase from 5.8 to 11 litres per minute with a 46 percent decrease in total machining time. Furthermore, the groundbreaking tool geometries of the M2131 system improved tool life by 35 percent, resulting in a 28 percent reduction in cost per component.

Similar improvements have been witnessed when machining titanium Ti5553 landing gear components. By adopting the high-feed Walter BLAXX M3255 system, end users have benefitted from cycle time reductions beyond 22 percent when rough machining. Tool life improvements that are double the performance compared to the previous solution have subsequently yielded an overall 31 percent reduction in tooling cost per component.

As the aerospace industry commits to CO_2-neutral operations by 2050, Walter's tooling solutions support this narrative of sustainability and efficiency, contributing significantly with innovations that reduce energy consumption, minimise coolant and lubricant usage, enable more efficient manufacturing processes and support lightweight component design.

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Complete know-how in one part

MAPAL has developed two sample components for the aerospace sector. These so-called “generic components” cover all the demanding machining steps that may be involved in the production of hydraulic valve housings made of aluminum or torsion links for landing legs milled from titanium.

Wherever something needs to be moved on an aircraft, there is a valve housing. Flaps, rudders, landing gear, engines and other components are controlled by hydraulics. Every plane has many valve housings with different designs. They range from small boxes to blocks measuring half a metre. The machining requirements, however, are similar.

The generic component created by MAPAL measures around 30 x 30 x 30 cm and contains all machining steps that may be involved in manufacturing a valve housing, from pre-machining to finishing. It is deliberately not a replica of a customer component but was designed instead based on the machining requirements of various real-life components. Within the group of companies, MAPAL has compiled experience gained worldwide in the machining of such components. All this knowledge has been incorporated into a single sample component.

This involves recommendations from the tool manufacturer for the appropriate machining strategies and cutting data. Several different options are often available to solve a particular problem. Either a PCD tool or a fine boring tool can be used to ream a bore. Or, alternatively, multi-bladed reamers. Each solution has its advantages. The decisive factor is always which advantages suit the customer's situation.

Valve housings for aerospace are more complicated components than those used in other areas, such as hydraulics for construction machinery. MAPAL used over 130 different custom tools for a single housing type in the most complex customer project to date. Manufacturing often involves very thin-walled parts as it is important to minimise weight in the aviation industry. Other challenges include deep bores with cross bores or slots that create interrupted cuts. In addition, the machining of the aluminum used, with its low silicon content, produces very long chips that are difficult to break.

Another generic component that MAPAL has developed for the aerospace market segment is a torsion link for the main landing gear on the aircraft. It connects the two cylindrical parts of the landing leg. This design allows the damper cylinder to retract and extend without twisting. This part is also available in various designs.

MAPAL uses its medium-sized sample part to model all real requirements. Due to the resulting high loads, torsion links are made of titanium. The low thermal conductivity of the material results in high temperatures during machining, which have a negative impact on tool life. In addition to optimised coating and cutting-edge preparation, the right machining strategy is essential here.

With the generic components for aerospace, MAPAL is pursuing a concept that has already proven its worth in the automotive sector. Here too, demanding components were identified which can be machined using the company’s tools. A large part of automotive technology is now covered by the appropriate generic components. With the help of generic components, MAPAL can also demonstrate what it is technologically capable of in the aerospace sector.

MAPAL Präzisionswerkzeuge Dr. Kress KG is one of the leading international suppliers of precision tools and complete processes for the machining of practically all materials. The company founded in 1950 supplies leading customers from the automotive and aerospace industries, from machine and plant engineering and from the die and mould making industry. With its innovations the family-owned company sets trends and standards in production and machining technology. MAPAL sees itself as a technology partner, supporting its customers with the development of efficient and resource-conserving machining processes using individual tool concepts. The company is represented with production facilities, sales subsidiaries and representatives in 44 ountries worldwide.

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Starrag ensures precision without compromises

Starrag develops and produces manufacturing solutions for many of the leading manufacturers in the aerospace industry. To shorten the measuring times for turbine blades, the Swiss company was the first in the world to work with the ZEISS PRISMO fortis CMM as part of a pilot project.

Customers react with fascination and great amazement when they see how accurately and quickly turbine blades can be measured on a ZEISS PRISMO fortis with ZEISS CMM Acceleration Mode for aerospace applications. Roland Ziltener, plant director at Starrag AG, Rorschacherberg, Switzerland, understands the amazement of his colleagues: "Speed and maximum precision didn't go together for a long time." In the aerospace industry, where components such as turbine blades must be thoroughly inspected after each production step: "Quality assurance, therefore, quickly becomes a bottleneck. To ensure reliable and profitable production, you need speedy and reliable feedback as to whether the components meet the high-quality requirements."

Customer requirements have top priority

Customers from all over the world come to Rorschacherberg with their specific tasks to obtain suitable machining centres to produce turbine blades, blisks, impellers, casings and other aircraft applications. Starrag designs the respective production solution with the appropriate fixtures based on the specified requirements for the number of units or running time of the components. Customers often want a complete solution that ranges from machine and tool to metrology programming. According to Roland Ziltener: "Starrag is not only familiar with the requirements of the industry but is also at the cutting edge of technology in many areas, including measurement technology."

Pilot projects secure market leadership

For Ivan Nytsch, head of global customer segment aerospace at ZEISS, Starrag is 'an ideal pilot customer'. This is also because the provider of complete solutions is very familiar with its customers' manufacturing processes. This is where things come full circle for Nytsch. ZEISS also understands its customers' processes and develops customised solutions. ZEISS has responded to the aerospace industry's challenge of measuring aerospace components with high precision, reliability and speed by expanding the PRISMO family with the ZEISS PRISMO 7/12/7 fortis CMM.

Fascination for a new solution

Roland Ziltener, who was head of quality management at Starrag, remembers the project well. He explains: "We had a look at the machine in Oberkochen and were immediately impressed." To check whether the new development delivers the required precision despite the considerable optimisation of the measuring time, all turbine blades manufactured by Starrag on behalf of partner customers were measured with the ZEISS PRISMO fortis over 18 months. As the size, material and geometry of the turbine blades are different, the machine was 'widely tested', according to Roland Ziltener.

To evaluate the accuracy of the ZEISS PRISMO fortis, the measurement results were compared with reference values from the ZEISS PRISMO navigator. As both CMMs were in the same measuring laboratory, it was possible to rule out external factors influencing the results.

During the pilot phase, Roland Ziltener and Ivan Nytsch agreed that Starrag and ZEISS worked closely together. For example, the measurement data was discussed together in regular meetings. ZEISS used this information to optimise further the start-up and acceleration behaviour of the rotary table and the machine. ZEISS also simplified the usability of the machine and the creation of test plans during the pilot phase. The performance of the ZEISS PRISMO fortis equipped with the ZEISS CMM

Despite the shorter measuring time, the precision is maintained without any compromises.

Starrag has set new standards in quality assurance with this pilot project.

The pilot project showed that productivity in the measurement of turbine blades can be significantly increased with ZEISS PRISMO fortis.

Acceleration Mode for aerospace applications package still impresses Ziltener today.

Turbine blades and blisks are not only subject to stringent requirements but also cost companies a lot of money. Experience has shown that quality assurance accounts for 20 percent of total production costs and 25 percent of total production time.The pilot project showed that productivity in the measurement of turbine blades can be significantly increased with ZEISS PRISMO fortis. The standard measurement, which took four minutes and 30 seconds at Starrag and delivered accurate and reproducible results, was reduced to 70 seconds during the pilot phase.

This saves time: “Which gives us greater flexibility in the selection of parameters and workpieces to be measured and helps us to optimise our production processes,” emphasises Roland Ziltener.

Starrag acquired the measuring machine at the end of the pilot project to measure turbine blades, which are produced as a proof of concept during the acceptance of the machining centres assembled at the site by the customer. The turbine blades, which are machined for a handful of customers at the Aerospace & Turbine Competence Centre, continue to be inspected using the ZEISS PRISMO fortis.

The standard measurement, which took four minutes and 30 seconds was reduced to 70 seconds.

For Roland Ziltener, Starrag has set new standards in quality assurance with this pilot project in an industry that requires the highest precision in production and quality control. For him, having been involved in the measurement of turbine blades since 2008, the collaboration with ZEISS was and is “a real success story”. A view that Ivan Nytsch also shares. Both are, therefore, certain that: “The next pilot project will come.”

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XYZ Machine Tools and CERATIZIT working together to ensure a winning combination

For over 15 years, XYZ Machine Tools and CERATIZIT have had a partnership where they support each other's activities with shared values and vision, long-term thinking and transparent communication. This collaboration, which started with a chance meeting of Glenn Stanton, sales manager CERATIZIT UK and Ireland, Nigel Atherton and Mike Corbett of XYZ Machine Tools at Edinburgh airport, has led to a lasting relationship that has helped customers of both businesses benefit from the work carried out with this joint venture.

When questioned about how the two parties got together, Glenn Stanton states: "Chatting with the guys from XYZ at the airport, we spotted a synergy between the companies in several areas, one of which was the typical customers that purchased from both businesses. Another common theme was the focus and drive we had to help customers become more efficient at a great price point. Over this last 15 years it has proved to be the perfect partnership."

A machine tool is never going to perform without cutting tools or workholding and during its formative years, XYZ had never really aligned with a dedicated tooling supplier. At the start of the relationship CERATIZIT, who were branded as WNT at that point, provided XYZ with some of its standout tooling that allowed XYZ to demonstrate its machines to full capability and show the production gains to customers at the showrooms around the country.

Mike Corbett says: "High feed milling and the development of variable helix/variable pitch solid carbide mills were really starting to make an impression in machine shops around the country when the partnership began. It was perfect that XYZ had access to this latest generation of tools and were able to show customers how to reduce cycle times and, improve machine efficiency with the technical backup from a company that was at the leading edge of cutting tool performance."

The partnership took a giant leap forward very soon after starting with the opening of the CERATIZIT Sheffield Technical Centre. With CERATIZIT's business model changing, space that was once used for holding tooling stock in the Sheffield Airport Business Park facility,

became available for XYZ to install a range of its machines which created a demonstration/ training facility in the northeastern part of England. A by-product of having these machines in Sheffield was it allowed the showroom to become the hub for training of CERATIZIT technical and sales staff from not only the UK but, from other countries around Europe and allowed the customer-facing staff to see how to get the best from their products.

CERATIZIT has subsequently moved its Technical Centre to a dedicated building on the AMRC complex just down the road from its main offices but, still housing XYZ machines including ProtoTRAK controlled mills and lathes along with a 800 HD VMC and the UMC5X simultaneous 5-axis machine. The company continues to use the XYZ machines to deliver technical training to both staff and customers and is also manufacturing bespoke workholding and fixturing which is marketed under the brand "Made In Sheffield".

Both businesses are seeing a change in the landscape of machine shops around the country in getting access to tooling as quickly as possible. This is also being seen at XYZ and one

of the advantages of this association is that they have access to the latest TOM 80 vending machine.

Glenn Stanton states: "As customers adapt to the changes that Brexit has brought, many are now taking advantage of having a vending machine installed on their shopfloors if they meet certain criteria we set."

To highlight the benefits the vending machine brings to the XYZ showroom in Burlescombe, Devon, Mike Corbett explains: "Both our production team and applications department use this machine to dispense CERATIZIT tooling. We have full traceability of who vends the tools and re-stocking is carried out without any intervention from XYZ. This facility ensures tooling is always available to our staff without needing to call upon CERATIZIT's next day delivery service, adding to our efficiency."

When asked the question what does the future hold for this partnership Glenn Stanton confirms: "As we develop new tools, grades of carbide and add to our existing 5-axis vices and zero point workholding systems, XYZ will always be involved in the development of these products allowing customers to see first-hand in any of the XYZ showrooms around the country the latest technology we are offering."

Mike Corbett concludes: "Both CERATIZIT and XYZ feel that everybody is a winner with this arrangement. XYZ get their tooling and workholding provided to show the power and robustness of their products. CERATIZIT win because they can show their cutting tools and workholding in action to prove the performance gains that can be had by investing in their equipment but, as far as both companies are concerned, the main winner has to be the customer who can produce parts as efficiently as possible and reduce the cost per part by tapping into this long-established partnership."

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Heller 5-axis machining centre enhances AMRC's research

The Advanced Manufacturing Research Centre (AMRC) in Rotherham has significantly upgraded its machining capabilities with the installation in early May 2025 of a technologically advanced Heller F6000 5-axis horizontal machining centre. It is situated within the centre's Advanced Manufacturing Park, the hub for the organisation's subtractive machining activities.

As an industrial research and development organisation, on behalf of its extensive membership the AMRC strategically benchmarks the machine tool market to identify the most effective production equipment and techniques for different applications. Currently, over several sites it operates more than 60 CNC machine tools, with approximately half a dozen being horizontal-spindle prismatic machining platforms.

The installation of the Heller machine bolsters the centre's ongoing efforts to secure high-value jobs within the manufacturing sector in the UK, a crucial aspect of its remit for obtaining grant funding. Many of those jobs are in the aerospace industry. An important facet of the Heller acquisition will therefore be to transfer the machine brand's renown for high reliability, availability and uptime for volume production in the automotive sector to aerospace applications.

The mill-turn F6000 will also play a key role in the AMRC's new autonomous toolroom demonstrator it is developing and demonstrating at its Factory of the Future. More generally, the machine will assist in a series of projects across different research themes and programmes focusing on supply chain challenges, skills shortages, integrating digital technologies throughout the manufacturing process, automating production, adapting it to changing demands, real-time process data analysis and ecological sustainability.

In the run-up to the installation of the Heller machine, there was considerable excitement about its imminent arrival among the AMRC's more than 100 members, particularly the major players in the aerospace industry such as Boeing, Rolls-Royce and BAE Systems. The F6000 will serve as a key benchmark for comparing its pivoting spindle head configuration, which among other benefits converts it within a machining cycle into a flexible, universal machining centre, against other types of 5-axis machine, such as those with a swivelling trunnion.

Demonstrating the immediate impact of this additional resource, projects had already been lined up for the Heller machine over the six months prior to its arrival. Machine tool equipment suppliers, manufacturers within their supply chains and OEMs from various industries had all put forward detailed requests.

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Time to automate: Shifting the manufacturing narrative towards productivity

By Oliver Selby, head of sales for FANUC UK and Chair of the British Automation and Robotics Association (BARA)

Oliver Selby, head of sales for FANUC UK and Chair of BARA.

The latest IFR figures show just how far British manufacturing has to climb in terms of automation adoption. Now down to 23rd in the global robot density league table, the UK has just 119 robots per 10,000 workers, against a global average of 162. If we remove the automotive sector from these statistics, the picture is worse still, with just 69 robots per 10,000 workers. The UK has also dropped out of the top 10 world manufacturing rankings for the first time, falling to 12th place.

Despite our proud history as a strong manufacturing nation, UK productivity rates have to rise if we are to remain a force on the international stage. In Q4 2024, productivity was estimated to be 0.8 percent lower compared with a year ago and 19 percent lower than the US. With a clear correlation between automation adoption and higher productivity rates, why aren't more UK manufacturers investing in robots?

Where are the workers?

One often overlooked reason is a focus on job creation over productivity. It has been well documented that the UK manufacturing industry is in the grip of both a labour crisis and a skills shortage. According to a recent report by The Manufacturer, 97 percent of manufacturers say that hiring and retaining staff presents a challenge to the growth of their business, with 36 percent of manufacturing vacancies proving hard to fill, compared to an average rate of 24 percent across all industries.

Despite this, we regularly see news stories of how government funding towards large manufacturing projects for companies such as Nissan, Rolls Royce or BAE will create 'thousands of new jobs' for the industry with no mention of where these workers will come from or what this funding will deliver in terms of output. A shift in government and media focus towards increasing productivity levels among manufacturing firms of all sizes rather than job creation via large corporations would be far more useful for boosting overall manufacturing output. Support for investment in automation projects would be a sure-fire way to do this.

Attracting new talent

Exacerbating the labour crisis is the fact that young people are not currently entering the sector in sufficient numbers to replace workers leaving the industry. Working culture has changed hugely over recent years and digitally native Gen Zs are looking for stimulating roles that offer career progression, instead of a steady but low skilled 'job for life'.

Investing in automation to replace the dull, dirty and dangerous roles that are now so hard to fill has numerous benefits for business owners, existing workers and new entrants alike. Robots don't get sick or tired, can work 24/7 even in the dark and carry out tasks to a consistently high level, improving product quality and increasing output for manufacturing firms. At the same time, existing workers can be upskilled and redeployed to higher value tasks, increasing job satisfaction and improving retention rates. Furthermore, a company employing advanced manufacturing capabilities such as robotics, automation, vision technology and AI will find it far easier to attract new talent to help futureproof its business.

TCO over purchase price

Another potential barrier is the perceived cost of robotics, combined with an unrealistic attitude towards payback. In the UK, the typical expectation is that payback on an automation project will be under two years. Yet the value that the right automation solution can deliver to a manufacturing business will last far longer than that. Focusing on an unrealistic sub-two-year payback can lead to businesses making compromises when developing their manufacturing strategy and getting a solution which is not fit for purpose or choosing not to invest at all.

By contrast, prioritising total cost of ownership over initial purchase price gives a far truer representation of the real cost, and value, to a business of an automation solution. This is reflected in Europe where companies typically expect payback in three to five years and may help to account for their higher levels of both automation and productivity.

Aside from this, it's also worth mentioning that the price of robots has barely increased in the last 15 years, rising at near and at times slightly under, inflation levels. Compare this to price rises in the automotive sector over a similar period and it's clear that in 2025, robots represent good value for money. In addition, opportunities for financing automation projects have improved greatly in recent years, with

options including hire purchase and robots-to-rent making solutions accessible to manufacturers of all sizes.

Leveraging automation expertise

A final barrier to consider is a perceived lack of automation expertise. Outdated perceptions of robots as complicated, difficult to programme and inflexible have prevented some manufacturers from taking the plunge, potentially impacting their ability to be competitive on both the domestic and international stage. In fact, today's industrial and collaborative robots are user-friendly, easy to configure and simple to operate, with many plug-and-play options now available.

What's more, robot suppliers such as FANUC, as well as our system integrator partners, can help to further reduce the risk of investing in automation and make a project more attractive to potential funders. Using our automation experience and expertise, we work with manufacturers across all sectors to understand the problems they need solving, ensuring they get the right solution, at the right price, at the first time of asking.

In conclusion, today's automation solutions are flexible, affordable and easy to use. They can help to solve labour challenges, improve product quality and consistency, increase output and ultimately boost the UK's overall productivity. The time for manufacturers to invest is now.

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Stratasys launches North American Tooling Centre of Excellence with Automation Intelligence, LLC

New Centre of Excellence to serve as a catalyst for global expansion of advanced additive tooling solutions for automotive and industrial manufacturers

Stratasys Ltd has announced the launch of the North American Stratasys Tooling Centre (NASTC), a new collaboration with Automation Intelligence, LLC (AI), at AI's manufacturing site in Flint, Michigan. This dedicated tooling hub is designed to assist manufacturers validate and scale practical applications for additive manufacturing in production environments.

The NASTC operates both the Stratasys F3300® and F900® 3D printers, providing hands-on access to engineering resources and create applications focused on critical tooling solutions such as jigs, fixtures, end-of-arm tooling and North American Automotive Metric Standards (NAAMS) blocks. Automotive and industrial customers can now explore how additive can streamline operations, reduce cost and respond faster to manufacturing challenges.

"This Centre of Excellence will have a significant impact for manufacturers showing how additive fits into their production environment," says Fadi Abro, director of global automotive & mobility at Stratasys. "With the launch of the NASTC, we are addressing real-world challenges at this new center. This incubator for advanced manufacturing is designed to enable teams to iterate, validate and scale tooling applications rapidly. It sets the stage designing solutions to meet the growing demand for localised, on-demand production solutions worldwide."

Tooling often determines how quickly and cost-effectively products get to market. The NASTC will give manufacturers validated proof that additive polymer tooling is both viable and an ideal choice for production. With manufacturers and suppliers under constant pressure to become more efficient, the NASTC is structured to deliver speed, flexibility and confidence, combining additive manufacturing technologies with traditional capabilities. Key capabilities include:

- Demonstrations of how AM works within a manufacturing ecosystem using the Stratasys F3300 and F900 printers.
- Additive tooling applications, including jigs, fixtures, end-of-arm tooling and NAAMS components.
- Evaluate use cases with Automation Intelligence.
- Support for customer tours, validation work and application-focused events.
- A curated display of sample parts to spark new ideas and projects.

"Tooling is the heartbeat of manufacturing," says Jeff McGarry, managing partner at Automation Intelligence. "The NASTC offers an environment where manufacturers can see for themselves how additive tools can address today's challenges with faster turnaround times, digital flexibility, and lower costs. We believe this partnership will demonstrate the positive impact additive can have across production."

Automation Intelligence helps manufacturers accelerate their adoption of advanced technologies. Currently working with several large manufacturers, AI helps bring focus on practical implementation and production experience to customers navigating digital transformation. Additionally, the NASTC will also serve as a blueprint for similar tooling hubs worldwide.

Stratasys is leading the global shift to additive manufacturing with innovative 3D printing solutions for industries such as aerospace, automotive, consumer products and healthcare. Through smart and connected 3D printers, polymer materials, a software ecosystem and parts on demand, Stratasys solutions deliver competitive advantages at every stage in the product value chain. The world's leading organisations turn to Stratasys to transform product design, bring agility to manufacturing and supply chains and improve patient care.

The company develops industrial-grade additive solutions to help customers to solve critical design and manufacturing challenges, right along their production cycle. It works with them to push the boundaries of what's possible in order to thrive in a changing world.

Stratasys
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RoboTrex Compact

Reduced size, increased efficiency

LANG Technik UK has announced the launch of the RoboTrex Compact Automation System. Currently available in two larger capacities, the RoboTrex Compact launch was prompted by high customer demand for a smaller option.

The popular RoboTrex systems are able to load and unload unmanned machine tools and to provide highly efficient lights-out production. Ever increasing competition, rising cost pressures, the desire to increase machine tool utilisation and the shortage of skilled labour are amongst the reasons existing users cite to justify their purchases of RoboTrex Automation Systems.

The new RoboTrex Compact was specifically designed for the unmanned production of workpieces within the size envelope of 65 x 50 x 95 mm, with a maximum weight of 7 kg. The system's storage rack provides space for up to 100 Makro•Grip® Micro vices, while its footprint of just two square meters delivers an excellent ratio of storage capacity to space requirements.

By changing grippers manually, the flexible RoboTrex Compact can be used to hold larger vices from the Makro•Grip 77 series. The use of these vices means the RoboTrex Compact's maximum storage capacity is 50 vices.

Thanks to various loading options the cost-effective system can be easily connected to almost any machine tool. The RoboTrex Compact is characterised by user-friendly operation that requires no specialist knowledge and minimum training requirements. Just as the larger capacity RoboTrex systems, the RoboTrex Compact is also a simple plug-and-play solution that ensures a quick installation. In addition, the new system delivers a rapid ROI.

LANG Technik UK has been established to provide sales and application support for new and existing customers of the its leading 5-axis workholding and automation systems.

Its goal is to increase customer productivity by perfecting manufacturing processes. The company offers a complete and proven package of workholding, Zero Point clamping and automation for machine tools. LANG's Pre-Stamping technology is considered a 'benchmark' in workholding making the 'all in one' solution truly unique.

All of its products are beneficial to machining processes which maximise manufacturing capacity. Simple operation and great versitility make the daily work of customers easy and maximise their profits.

While the automation systems are a distinct feature in many production facilities, it is primarily the items that are inside the machine tool which often make the biggest difference.

Its influence may not always be immediately apparent but wherever parts are being clamped and milled at the highest level, LANG are there, contributing to a more efficient manufacturing process.

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New end mill line is a star performer

TaeguTec has now expanded its renowned StarMill SED 7 range of solid carbide end mills with the introduction of two advanced variants designed to enhance machining performance. The 4XD long type and the chip splitter type have been introduced to provide unparalleled efficiency when machining difficult-to-cut materials such as titanium alloys and stainless steel, offering increased productivity, improved surface finishes and longer tool life.

The TaeguTec StarMill SED 7 solid carbide end mills have already established a strong reputation in the industry due to their innovative 7-flute design, unequal spacing of cutting edges, and optimised helix angle. This combination delivers outstanding surface quality and higher material removal rates. The introduction of the 4XD long type and the chip splitter type further broadens the operational capabilities of the SED 7 line, allowing manufacturers to tackle more complex machining requirements with greater ease.

The 4XD long type end mill has been engineered to handle greater depths of cut, making it ideal for operations requiring extended axial engagement. Its enhanced design ensures stability and precision even in demanding applications, delivering consistent results across a wide range of machining tasks. The StarMill 4XD long series is available in diameters ranging from 6 to 20 mm, featuring a 0.5 mm corner radius to maintain durability during heavy-duty machining. With flute lengths ranging from 15 to 80 mm and an overall length of 57 to 150 mm, the robust end mills can reach the deepest cavities while retaining optimal machining parameters.

Similarly, the StarMill chip splitter type end mills are available with diameters from 6 to 20 mm and a flute length from 15 to 80 mm. Optimised for rough machining and high-feed applications, the StarMill chip splitter features an overall length ranging from 57 to 150 mm, with a particularly thick core that ensures remarkably low cutting forces and exceptional chip evacuation. This combination reduces heat buildup and minimises tool wear with swarf removal enhanced by a 38-degree high-helix flute angle. By minimising chip volume and effectively controlling chip formation, the chip splitter series ensures smoother operation and longer tool life.

One of the most distinctive features of the two new additions to the StarMill SED 7 line is the 7-flute design with unequal cutting edge spacing that significantly reduces vibration and noise. The optimised helix angle, calibrated explicitly for titanium alloys and stainless steel, further boosts the line's performance, enabling higher feed rates with minimal deflection. The result is a substantial increase in productivity while maintaining precision and quality.

Field tests and case studies have demonstrated the superiority of the expanded SED 7 line over its competitors. In a recent study conducted on titanium alloy, Ti-6Al-4V, the TaeguTec TT5515 grade SED 7120-4D-N achieved remarkable results, delivering an 82 percent increase in productivity by enabling higher Material Removal Rates (MRR) while extending tool life by 50 percent. The field test also highlighted reduced noise levels and significantly better surface finishes when compared to rival product lines.

The use of TT5515 grade further ensures superior wear resistance and effective heat management, contributing to extended tool longevity and reliable performance under demanding conditions.

The expanded StarMill SED 7 line is ideally suited for applications across multiple industries. Aerospace and automotive manufacturers can leverage their capabilities to machine titanium and stainless-steel components with reduced cycle times. Medical device manufacturers, on the other hand, will benefit from the high-accuracy performance delivered by the new variants, especially when working with difficult-to-machine alloys. General engineering applications also benefit from the versatility and precision, making it an ideal choice for slotting, trochoidal machining and high-feed milling operations.

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New specialists for the standard programme

Walter is enhancing its expertise in the machining of non-ferrous metals with its new range of PCD milling cutters. As most PCD tools are often customised solutions, Walter is also expanding its standard ISO N range with the solid MP271 and MP470 milling cutters.

The three-edged MP271 drill slot cutter, available in 16 to 25 mm diameter, features a segmented cutting edge length of 30 mm and a centre cutting edge, making it ideal for deep depths of cut. This makes the MP271 the ideal choice for operations such as trimming, as its differential pitch geometry minimises vibration.

Complementing the MP271 is the double-edged MP470 spherical cutter, available in diameters of 4, 6, 8, 10, 12 and 16 mm. This two-flute ball-nosed end mill is designed for creating and finishing free-form surfaces. Depending upon the diameter selected, the MP470 ball-nosed end mill has a cutting length from 4 to 14 mm with an overall length of 55 to 80 mm.

Both PCD milling cutters have been specifically developed for ISO N materials such as aluminium, Al-Si alloys, magnesium alloys, copper alloys and fibre composites. Utilising Walter's WDN20 PCD grade, the new arrivals can significantly extend the tool life and machining performance.

The brazed PCD cutting edges are also suitable for reconditioning. Combining this opportunity to recondition with the substantial extension of tool life significantly enhances the tools' sustainability. Furthermore, this reduces the costs of cutting tools to further increase the cost-effectiveness. The specific properties make these exciting new PCD milling cutters particularly appealing for manufacturers machining aluminium in general mechanical engineering as well as in the automotive and aviation industries.

Walter AG was founded in 1919 and is now one of the world's leading metalworking companies. As a provider of specialised machining solutions, Walter offers a wide range of precision tools for milling, turning, drilling and threading applications. The company works together with its customers to develop custom solutions for fully machining components for use in the aviation and aerospace industries, as well as automotive, energy and general engineering.

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Tangential indexable insert milling cutter shows its teeth

MaxiMill - Tangent from CERATIZIT picks up the pace with turbo feed rates

What happens if a machinist is unable to effectively monitor the process with a slew of interfering contours? Face milling cutters are out of the question and those pesky long overhang lengths render stable, low-vibration machining impossible. It may sound hopeless, but in fact it just requires the right tool. Meet the new MaxiMill - Tangent from CERATIZIT, a tangential indexable insert milling cutter that makes the impossible possible thanks to its enhanced durability when machining steel and cast-iron components.

The MaxiMill - Tangent simultaneously enables stable and soft-cutting machining. Developers at CERATIZIT have long prioritised a uniform chamfer profile across the entire cutting edge length of the precision-ground indexable inserts. With a wide range of carriers and inserts with four usable cutting edges in sizes -09 and -13, the tool manufacturer offers a versatile selection for different applications.

Ground inserts with stable cutting edges

The MaxiMill - Tangent has indexable inserts optimised for machining ISO P and ISO K materials. Moreover, it features a maximum infeed depth of 8 mm for the -09 insert, while the larger model goes even further to 12 mm. MaxiMill – Tangent also has universal -M50 and F50 chip grooves are available, while delivering increased cutting-edge stability thanks to a smaller radial clearance angle.

Furthermore, there is an integrated face-cutting edge, which offers numerous advantages, including uniform material removal that results in a smoother component surface. In addition, the cutting forces are distributed more evenly, which reduces the load on both the tool and the machine.

The MaxiMill - Tangent is available on the market in three carrier variants, a shell-type milling cutter, screw-in milling cutter and with a straight shank, and range from 25 mm to 125 mm. The large and stable contact surfaces in the integrated carrier inserts carrier provide additional stability and reliability. But the advantages of tangential clamping don't stop there. Compared to radial systems, tangential clamping provides extra space for significantly more indexable inserts on the milling cutter body, thus guaranteeing maximum cutting-edge density and efficiency. To prevent any drop-offs in efficiency during tool changes, inserts can be rotated, turned and replaced quickly and easily. "Thanks to the MaxiMill – Tangent's exceptionally stable design, its high-performance four-edged indexable inserts and tangential clamping, even components with interfering contours can now be machined easily and cost efficiently, including a built-in feed turbo," says product manager Robert Frei from CERATIZIT.

Tangential to the feed turbo

So, how does the MaxiMill - Tangent compare to a conventional corner and face milling system? When preforming GGG-50 machining, it shows off just what it can do. With a 63 mm beam diameter, six cutting edges in simultaneous use, a 2 mm infeed depth and an insert width of 35 mm, it showed the competition that it was a cut above - or 15. While the competition managed to complete 12 components, the MaxiMill - Tangent produced a whopping 27.

Internal cooling channels prevent chip jamming

One key to the MaxiMill – Tangent's success lies in its optimum chip control on shoulder, corner and face milling, something attributed its design and cooling channels. This prevents devastating chip jams, improves the surface quality of the component and significantly extends the service life of the tools.

For over 100 years, CERATIZIT, a member of the Plansee Group, 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 and wear parts from hard materials.

The CERATIZIT Group is a global market leader in several industrial sectors and successfully develops new carbide and cermet grades for wood, metal and stone working and other applications.

With over 7,000 employees at more than 30 production facilities around the world and a sales network comprising over 50 branches, CERATIZIT is a global player in the carbide industry. The company's international network includes the subsidiaries AgriCarb, Stadler Metalle, Xceliron and the joint venture CB-CERATIZIT.

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Interchangeable-head milling system

Cutting tool manufacturer Horn has introduced a new, modular, interchangeable-head milling system. The DG range has a stable interface between the solid carbide, monobloc cutting head and the shank, allowing accurate changeover to within microns. The shank is either solid carbide or steel and has an internal coolant supply.

The economical, resource-saving tool solution achieves high precision through the use of a guide pin, a trapezoidal thread and a face-and-taper contact. The design reduces the cost of manufacture and shortens setup times for the user. Modularity ensures rapid changeover to a different cutting head, either standard or custom.

Horn stocks the milling system in standard diameters of 10, 12, 16, 20 and 25 mm. Numerous cutter shapes for the most common machining tasks are also available from stock. The user can choose an interchangeable head with a cutting-edge length of either 0.5 x diameter or 1 x diameter to suit the application. Horn offers the cutting heads in new carbide grade, RC4P, for productively and economically machining material groups P (steels) and K (cast irons).

Horn Technology Days 2025 "A complete success"

From 14th to 16th May 2025, tooling manufacturer Paul Horn held its ninth biennial Technology Days open house at its Tübingen headquarters in southern Germany, which was attended by around 3,300 visitors from 33 countries. A total of 50 partner companies also took part in the event.

Visitors were able to expand their knowledge during six specialist presentations entitled 'Mastering processes in theory and practice', which were combined with live machining demonstrations. Topics included machining of aluminium with PCD tools, machining small bores, grooving, parting off, form grooving and turn-milling.

Those who wanted to explore subjects in more detail were able to take part in moderated demonstrations in three live production areas. In addition, two presentations focused on Horn's internal product configuration and the integration of AI. Visitors were able to see and test these on-site.

Markus Horn, managing director of Paul Horn GmbH, said: “The Horn Technology Days 2025 were a complete success. The feedback from our guests not only confirmed this, but more than exceeded our expectations. We are already looking forward to 2027, when it will be time to welcome visitors again.”

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Eight decades of expertise and an entire world of solutions

As Thame Workholding approaches its 80th anniversary in 2026, the company continues to stand as the UK's most experienced and trusted names in the field of workholding. What began as a specialist provider of chuck jaws has evolved into a dynamic, solutions-driven partner for manufacturers across all sectors. Its recent advertising campaign compared its offering to Mary Poppins' famously bottomless bag and the comparison holds up. From off-the-shelf chuck jaws to advanced fixturing, automation, vacuum systems and bespoke design services, Thame Workholding delivers exactly what customers need, often before they know they need it.

Vacuum workholding by WITTE: QuadroVac and beyond

Thame Workholding offers a full suite of vacuum workholding solutions by WITTE, including the popular and powerful QuadroVac modular system, the Vac-Mat and the trusty Grid Vac system. These systems provide secure, distortion-free clamping for delicate or thin-walled workpieces. Both Modular and liquid ring vacuum pumps support all the vacuum systems allowing cutting fluids to be used during machining.

QuadroVac's ability to segment vacuum zones enables multiple parts or operations to be handled on a single table, thereby improving flexibility. Vacuum setups are clean and fast, dramatically reducing downtime between jobs. Benefits in handling complex shapes without mechanical distortion are also considerable.

Precision centres by ROTOR: Reliable turning support

For turning centres, Thame supplies the full ROTOR range of high-precision live and dead centres, including heavy-duty and high-speed variants such as the HD 160 live centre and the K60 dead centre. These Swiss made centres offer dependable support, concentricity, and surface finish integrity, even under harsh conditions.

ROTOR centres are particularly valued for their durability and long-term accuracy, making them ideal for continuous operations in industries where quality cannot be compromised.

WITTE ALUFIX modular fixturing: Versatile and scalable

Thame's supply of ALUFIX modular fixturing by WITTE supports customers in both metrology and light machining. The system includes comprehensive kits, such as the ALUFIX Basic Kit 25, as well as individually configurable elements for complex workpiece holding. Used widely on CMM machines and in laser scanning applications, ALUFIX systems offer repeatability, flexibility and expandability as production demands evolve.

For heavy-duty or high-force machining, alternative fixturing systems are available and Thame's team can advise on the best fit.

Samchully chucks and cylinders: Precision and power

As the UK distributor for Samchully, Thame offers everything from standard 3-jaw power chucks to specialist systems like the JB Chuck, which includes an integrated boring ring to ensure optimal jaw concentricity. Samchully's hydraulic and pneumatic rotary cylinders are also available to complement chuck systems.

These components deliver exceptional holding force, quick changeover and long-term durability, making them suitable for everything from general turning to highly specialised CNC processes.

HWR Zero Point, vices and chucks: Intelligent clamping

HWR's popular self-centring concentric INOFlex® 4-jaw compensating chucks, available through Thame, are designed for distortion-free clamping of round, square and irregular components. Paired with INOZet® add-on jaws these systems provide high-precision workholding that adapts to the most complex geometries.

The HWR zero-point clamping system significantly reduces machine idle time, providing repeatable and high-accuracy positioning with 0.005 mm repeatability. These features make HWR's offering invaluable in reducing setup time and increasing machining flexibility across all production volumes.

Flaig magnetic workholding: Clean, efficient and secure

Thame's magnetic workholding solutions from Flaig include both electro-permanent magnetic plates and manual magnetic chucks, such as the versatile FLAIG FXL. Ideal for grinding, milling and EDM operations, these solutions offer firm, uniform clamping without mechanical deformation.

Quick setup and five-face access result in reduced tool wear and increased flexibility. Although limited to magnetic materials, the system is exceptionally effective in boosting efficiency in the right applications.

Automation from LightsOut, VersaBuilt and AirVise

Thame is a growing force in practical, scalable automation. For manufacturers exploring lights-out or semi-automated production, Thame supplies:

- AirVise pneumatic self-adjusting vices, allowing easy part variance handling.
- LightsOut RoboWrench™ and QuickChange pallets, perfect for high-mix, low-volume environments where flexibility is key.
- VersaBuilt automation solutions are a full suite of components ranging right through to a turnkey and add on to most Machine tools allowing ease of operation and programming.

These automation-ready solutions are designed to reduce operator input, increase uptime, and make factory floors more productive, without demanding complex overhauls.

TEC accessories: Small components with big impact

A standout feature of Thame's in-house offering is its TEC accessory range, designed to fine-tune performance and improve day-to-day productivity.

- The TurboClear fan is a spindle-driven air-clearing device that removes swarf and coolant between operations, eliminating the need for manual air blasts and reducing operator intervention.
- The TrueBorer, a workholding innovation by Thame, allows customers to bore soft jaws with remarkable accuracy, even after installation on the machine, saving setup time and improving repeatability.
- A wide variety of grip inserts can be added to jaws to suit different materials and grip strength requirements.
- T-nuts, height pins and other jaw accessories ensure compatibility and setup accuracy across machines and workpieces.

These accessories exemplify Thame's commitment to practical, usable engineering products that reduce hassle, save time and help customers get it right the first time.

Bespoke workholding: Tailored for your operation

Not every workholding need can be met with an off-the-shelf solution. Thame's experienced design team works closely with customers to create bespoke soft jaws, fixtures, magnetic and vacuum plates, and more, all tailored to unique part geometries or operational constraints.

These custom solutions enable clients to improve cycle times, reduce scrap rates and consistently deliver high-quality parts.

Why engineers trust Thame Workholding

With eight decades of experience, Thame Workholding has earned the trust of countless UK manufacturers. The team is recognised not only for its technical expertise and extensive product range but also for the way it supports customers, from initial consultation to post-sales service.

Whether a client needs an express set of soft jaws, a zero-point solution to shave minutes off each cycle, or a fully integrated vacuum fixture for a lightweight composite part, Thame Workholding brings clarity, capability and confidence to the table.

As the company moves towards its 80th year, one thing remains unchanged: Its commitment to helping manufacturers run more efficiently, win more work and grow stronger in a competitive marketplace.

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Maximum productivity and flexibility in every automation solution

At automatica 2025, SCHUNK presented its comprehensive portfolio for smart automation from standardised components and complete solutions to customised engineering. The focus was on maximum productivity and flexibility in industrial manufacturing.

Rising demands for efficiency, quality and sustainability are driving companies to seek future-ready manufacturing solutions. This year's automatica is dedicated to exploring how smart automation and robotics are shaping the future. SCHUNK's trade show appearance ties in directly with this theme: As a reliable partner, the company supports its customers with a broad, intelligently connected portfolio. With a clear technology strategy, SCHUNK aims to make flexible and sustainable automation possible, at every level and in any production environment, both, today and in the future.

Versatility for robot applications

SCHUNK is continuously advancing its range of robotic components. With perfectly coordinated products, the company addresses the key challenges of automation and enables more efficient, flexible and productive processes. A fitting example is the modular compensation unit AGM, one of the versatile solutions for optimising process reliability and protecting robots and workpieces from wear. It compensates for inaccuracies ranging from just a few grams to 400 kgs in all directions.

Boosting productivity in three steps

Whether companies are just starting with automation or already looking for tailored solutions, SCHUNK provides the right support for every requirement. With a three-step approach, the automation expert guides its customers throughout the entire process: from needs analysis to validation, including in its own CoLabs and all the way to installation and commissioning. SCHUNK supports the implementation of standard components and assemblies as well as comprehensive complete solutions. The goal is to sustainably increase productivity and make automation easily accessible.

Optimised engineering across all industries

For more complex requirements, SCHUNK draws on its proven engineering expertise to develop customised component solutions in close collaboration with customers across various industries going beyond the standard portfolio. One example is the aseptic quick-change system, developed for applications in the pharmaceutical and food industries. It features pneumatic, electric and mechanical feed-throughs, a hygienic design with durable surfaces and meets GMP Class A requirements. In addition, it is equipped with integrated sensors and requires no additional energy for locking.

In the field of E-Mobility, SCHUNK develops tailor-made automation solutions for battery cell handling from the handling of cells in the composition of battery packs to the final assembly in the vehicle. The RCG round cell gripper, for example, is specifically designed for handling 46 mm round cells, both individual battery cells and the precise assembly of complete cell clusters.

SCHUNK's engineering offering is complemented by digital tools such as the Digital Twin for planning and simulation. Customers can virtually plan, simulate and optimise their automation tasks. Partnerships with technology companies like NVIDIA support the simulation and design of complex automation projects.

Strong partners for humanoid robotics

Industrial robots and cobots, in particular, are indispensable for future-oriented automation of production processes. For these systems, as well as for the next generation of robotic systems such as humanoid robots, SCHUNK offers suitable end-of-arm components with open digital modules. The anthropomorphic SVH 5-finger gripping hand, for example, is available with open-source software and as a Digital Twin. Thanks to decades of expertise in flexible gripping technology and strong partnerships with industrial companies, startups and research institutions, the company is opening up new fields of application that go beyond the scientific environment.

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Six benefits of transitioning from a fixed jaw vice

With a fixed jaw vice, using the fixed jaw as the reference point in the CNC program is common. Doing so allows the workpiece datum to match the fixture reference point. Since the fixed jaw doesn't move, you don't need to worry about repeatability.

On a zero-point system and a self-centring vice, the fixture reference point cannot be on the vice jaw because the jaws will be in different locations for each workpiece. So, we must set the fixture reference point to something else, typically the centre of the zero-point base. Since the workpiece datum is different from the vice jaws, repeatability is now critical. Thanks to Mate DynoGrip vices and DynoLock bases offering best-in-class repeatability at 0.0004", 0.010 mm and 0.0002", 0.005 mm, respectively, you won't need to worry about probing your workpieces unless your tolerances are below 0.0004."

Machining process updates

Understanding this different approach is critical to your success when making the transition. It also provides insight into these necessary updates to your machining processes:

Update your CNC programmes.

- Update offsets.
- Check tool paths for improved efficiency.
- Check tool paths for clearance issues or collisions.
- Add workpiece probing if required.

Review your cutting tools

- Check all tool lengths and toolholder clearances.
- When possible, use shorter tools for less chatter and improved surface finishes.
- Review dimensioned drawings and tolerances.

Review your workholding options

- Zero-point bases offer a wider variety of top tool options. Don't limit yourself to just self-centring vices. See if other options provide efficiencies.
- Get the most out of quick-change jaws and review where you may use machinable jaws.

Benefits of transitioning from a fixed jaw vice

Changing from fixed jaw vices to zero-point bases and self-centring vices is an achievable goal and can benefit your operations tremendously. When done right, you can expect to see a quick return on investment in the following ways:

- Quicker setup and changeover times.
- Shorter cycle times.
- Improved cutting tool life.
- Improved surface finishes.
- Reduced scrap and rework.
- Improved productivity.

When you are ready to make the transition Mate can help, from the best-in-class performance of all Mate workholding products to its expert application specialists here to answer your questions. With its 100 percent customer satisfaction guarantee, Mate workholding will solve your problems.

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Hexagon unveils Autonomous Metrology Suite to deliver manufacturing quality at speed

Hexagon's Manufacturing Intelligence division has announced the launch of Autonomous Metrology Suite, software developed on its Cloud-based Nexus platform that is designed to transform quality control across manufacturing industries worldwide. By removing all coding from Coordinate Measuring Machine (CMM) workflows, it helps manufacturers speed up critical R&D and manufacturing processes as experienced metrologists become harder to find.

Manufacturers across automotive, aerospace and general engineering report the same pressures: shorter product lifecycles and frequent design revisions have increased the need for high-accuracy measurement, but there are fewer skilled CMM programmers and quality data is scattered and underutilised. These issues slow new-part introduction and make it difficult to repeat good results shift after shift.

Hexagon's Autonomous Metrology Suite tackles the problem head-on. A digital twin of every connected CMM synchronises seamlessly with its physical counterpart, so the correct inspection programme always reaches the right machine, helping to eliminate possible human error. All quality, utilisation and environmental information flows straight to a cloud dashboard, creating a continuous digital thread supporting data-driven decisions on the shop floor.

All applications in the suite share a consistent modern and intuitive web interface that guides both new and expert users through the process, helping to democratise the creation of CMM programmes and reduce the level of skills required to interact with the solution. Depending on complexity, programming could be reduced from days to hours, following which the programme deployment to one or more CMMs, execution and reporting can be fully automated from a single interface.

These efficiency gains are driven by a set of tightly integrated applications built on Hexagon's Nexus platform, automating and streamlining the entire metrology workflow. Metrology Mentor guarantees consistent inspection methods from plant to plant, eliminating a risk that two operators measure the same part in different ways. The suite enables Hexagon's existing Global S, Tigo and MAESTRO CMMs to join the same digital workflow, meaning existing investments continue to pay dividends, with support planned for 3rd party hardware.

The Metrology Mentor app automatically generates ISO- and ASME-compliant inspection programmes directly from CAD. By standardising measurement techniques through the Metrology Mentor application, the platform ensures that regardless of operator skill level, measurement programmes consistently adhere to Geometric Dimensioning and Tolerancing (GD&T) standards.

Metrology Reporting consolidates data from Hexagon and third-party dimensional metrology and tomography systems, providing live batch quality analytics, statistical insight and full part histories with an accessible and high productivity web-based user interface.

Finally, Metrology Asset Manager keeps watch over calibration status, machine operation and errors and environmental factors such as temperature, humidity and vibration, ensuring machines stay healthy and measurements remain trustworthy. It also delivers utilisation data to help users understand and improve Overall Equipment Effectiveness (OEE).

Because every app shares the same intuitive interface, users can drag and drop files, follow on-screen prompts and see updates propagate instantly across the suite. The intuitive design of the shared user interface means that if users learn how to use one app, they can more easily learn how to use the whole suite.

Gary Peacock, general manager metrology software at Hexagon, says: "Autonomous Metrology Suite addresses skills shortages by revolutionising measurement programming with a no-code environment and user experiences that dramatically reduce operator training time.

"With more pressure on experienced metrologists, Autonomous Metrology Suite amplifies their efforts by automating processes from programming to multiple CMM execution and reporting, removing quality control bottlenecks with consistent measurements."

Paragon Medical, an early adopter of the technology, has been instrumental in validating the suite's capabilities. The manufacturer started its continuous improvement journey addressing OEE visibility with Metrology Asset Manager, democratised quality data with Metrology Reporting and is now rolling out a standardised inspection processes while accelerating new staff onboarding with Metrology Mentor.

The Autonomous Metrology Suite is available to pilot customers in June, with full commercial availability this year that includes on-premise software to synchronise programmes, CMM digital twins and reports with Nexus and execute CMM programmes without the explicit requirement for metrology software as PC-DMIS. Future suite developments will further simply the rapid acquisition, analysis and application of metrology data within manufacturing processes utilising the Nexus platform's open connectivity, automation and collaboration capabilities.

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Tebis 4.1 release 9 provides improved user experience

For over 40 years, Tebis has provided CADCAM and MES software solutions and related services to a wide range of manufacturing sectors. Its unique knowledge-based machining technology supports database libraries of machine tools, clamping devises, cutting tools with machining parameters, machining features, advanced CNC toolpath templates and machining process templates. This allows customers' best machining practices to be built into Tebis database and shared among CAM engineers, which reduces the work pressure on CAM engineers whilst ensuring the best results.

The Tebis unique automation combined with Tebis Virtual Machine technology supports machining setup and planning, collision-free CNC toolpath calculation, simulation and verification. This is especially beneficial to customers for 2.5D to 5-axis milling, trimming, laser cutting, mill-turn as well as robotic machining.

With the latest release, Tebis has taken a significant step forward in improving user experience. The software is now more intuitive and accessible than ever before, thanks to thoughtful improvements across its interface and functionality.

Improved usability

A key highlight is the new WebHelp feature, which allows users to access Tebis Help instantly through any internet browser. This means that whether you're at your workstation or working remotely, help is always just a click away.

In addition, the development team has carried out extensive optimisation of the software base and quality management and the processes are now more efficient than ever.

CAM – Turning

High-efficiency adaptive roughing

Cavities can now be machined more cost-effectively with an adaptive path layout without full-cut machining. This ensures constant material contact, resulting in shorter machine run times and longer tool life.

Tebis is a privately-owned company headquartered in Planegg near Munich, Germany, with locations in 17 countries. Its 400 employees around the world support its customers in the automotive, aerospace and industrial industries. For 40 years, Tebis has delivered process efficiency and technological advantages to die, mould, model, machine and aerospace manufacturers worldwide. The company conducts business responsibly and follows clear principles that are entirely in the best interest of its customers.

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Measurement cycles carved in stone with precision

Reitz Natursteintechnik KG, based in Germany, is an expert in the planning, design and manufacturing of highly precise machine components made from granite. To ensure efficient and above all safe processing, the simulation software Vericut is used with the benefit of process-reliable production and reduced workload for employees.

The origins of the company Reitz go back to 1946, when Herrmann Reitz began extracting raw stone from his own quarry in Asslar. With the entry of his son Friedel Reitz, gravestones were produced starting in 1958. The third generation, Egbert Reitz, continued gravestone production from 1984 to 1987 before the first granite surface plates fundamentally changed the business model and led to the founding of E. Reitz Natursteintechnik e.K. in 1986. Today, Christopher Reitz, the fourth generation and current managing director, is writing the next chapters of the company's story. His mission is to place modern customer needs even more at the centre of the company.

"Today's machine components from Reitz combine the million-year-old material stone with cutting-edge technology. For over 35 years, we've been manufacturing precision components from granite and offering not only system assembly but also custom solutions and complete systems all from a single source, from idea to commissioning," says Christopher Reitz.

The company, based in Asslar, Hesse, currently employs around 140 people. Its clients mainly come from the semiconductor, optics, general mechanical engineering, automation, metrology, printing and medical technology sectors.

Competitive edge with granite in mechanical engineering

"We've been experts in processing natural hard stone for over 60 years, a tradition we're proud of and also feel committed to," adds Christopher Reitz.

In mechanical engineering, especially in machine tool construction, achieving top precision and performance is essential for staying competitive. The machine bed plays a key role. That's why more and more manufacturers are literally building on granite.

"Due to its physical properties, granite offers clear advantages that neither steel nor mineral casting can match: intrinsic stability, temperature resistance, vibration damping and guidance accuracy make granite the ideal material for precision machines," explains Christopher Reitz.

It's no surprise, then, that granite is widely used in measuring and test stands as well as coordinate measuring machines for components like surface plates, tables and machine frames.

In-house built gantry milling machines

"Our granite comes mostly from South Africa, Spain, France, and Austria. It's either delivered in pre-cut slabs or as raw blocks that we cut in-house. The workpieces vary in size, from 250 x 250 mm to up to 13 m. The largest we've ever made was 13 x 1.5 x 1 m and weighed about 65 tonnes," states Christopher Reitz.

To process such blocks precisely, Reitz relies almost exclusively on machines developed and built in-house, four gantry-type milling machines and two 5-axis gantry machines, all controlled by Siemens 840D.

To ensure safe, fast, and precise granite machining, the company uses Vericut simulation software.

"Granite is a natural product, so the surface is never perfectly flat. To prevent tool collisions during processing, we developed a process with Vericut that virtually eliminates this risk," Christopher Reitz explains.

Stephan Meurisse, marketing manager at Vericut, Deutschland, adds: "Downtime, damaged tools, costly collisions, unusable parts, long setup times and wasted materials, all of that costs time and money. Vericut helps our customers avoid these time and cost traps."

Collision avoidance as a top priority

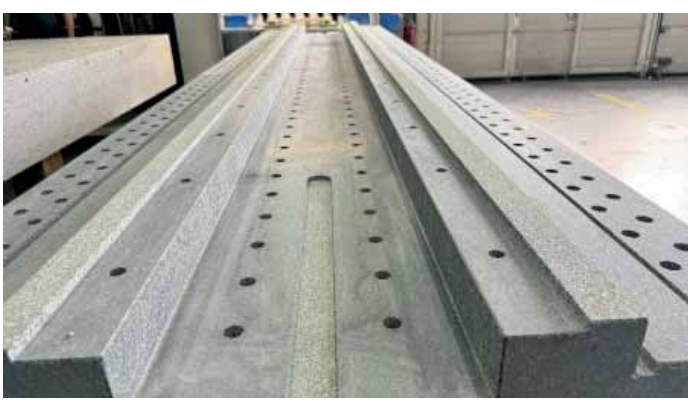
Vericut has been a leader in NC simulation, verification and optimisation for all types of CNC machining, as well as additive and hybrid manufacturing, since 1988.

"Vericut eliminates the need for manual setup, saves valuable operator time and protects our machines," says René Maschlanka, responsible for sales and project management at Reitz.

Intelligent process flow

Granite blocks up to 13 m long are typically delivered with +3 to 5 mm oversize. They are then machined to a flatness of 20 to 5 µm. Since granite is very hard, Mohs hardness 6-8, only 0.1 mm of material can be removed per cut.

"After visual inspection, the operator selects a measurement point pattern, generating two automatic measurement programs in the CAM system. The first determines the block's position and the second maps its surface, both via probing cycles," says René Maschlanka.



Each probing cycle consumes valuable machine time, so it's done as little as necessary, but as much as required. The resulting programs are converted into NC code and simulated in Vericut. Once verified, the programs are run on the machine.

"The returned measurement points describe the actual surface condition and from that data, a machining program for a precise cuboid is automatically derived, then simulated in Vericut before execution," explains Stephan Meurisse.

The finished cuboid is then drilled for guide rails, drives, spindles, sensors and attachments. After stainless steel thread inserts are glued in, the component is sent to the climate-controlled precision lab for final machining.

"Naturally, these final programs are also validated with Vericut," René Maschlanka emphasises.

Stress-free work thanks to the Digital Twin

"We use a special CAM system for granite processing. We built the interface to Vericut ourselves. It lets us precisely capture the position and shape of the workpiece and simulate automated steps without manual setup," says René Maschlanka.

The simulation helps detect unnecessary movements, clamping errors and wrong tool usage before they happen.

"Now our programmers and operators are far more relaxed, they know their programs will run safely, with no crashes."

Some machining processes at Reitz can take over 40 hours. Previously, the operator had to stand by the entire time. Now, they run the simulation on a PC, press start and only check in occasionally.

"The integrated Vericut Reviewer shows us when that approach makes sense," concludes Christopher Reitz.

Vericut UK Tel: 01273 773538
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Understanding material streng

Material strength is an important concept when it comes to engineering applications. When choosing materials and components, it's vital to understand how they can withstand applied forces without failure, ensuring safety and reliability.

Here, Patrick Faulkner, lead engineer at Accu, explores the meaning of material strength and factors affecting it, looking at how it is measured and its crucial applications in engineering, particularly when it comes to fasteners and components.

What is material strength?

"Material strength can be defined as a materials ability to resist stress while being subjected to external forces. This property is crucial in determining how materials perform under various loading conditions, ensuring that they can endure the stresses they encounter during their service life. Understanding material strength enables engineers to select appropriate materials for specific applications, ultimately leading to the design of safe and reliable structures.

There are many factors affecting material strength:

Stress and strain

Stress is the internal resistance of a material to an applied force, expressed as force per unit area (N/m^2).

Strain is the deformation or elongation that occurs in a material as a result of applied stress.

The relationship between stress and strain is often visualised through stress-strain curves, which provide insights into a material's behaviour under different loading conditions.

Elastic limit

Every material has an elastic limit, which is the maximum stress it can endure before undergoing plastic deformation. Below this limit, materials return to their original shape once the applied force is removed.

Ultimate strength

Ultimate strength refers to the maximum stress a material can withstand before failure. It is vital for determining whether a material is suitable for high-stress applications, such as those found in aerospace and automotive engineering.

Material strength is not a singular property; it covers various forms, each of which is relevant to different engineering applications. The most common types include:

1. Tensile strength

Tensile strength describes a material's ability to resist breaking under tension. This property is particularly important for materials used in cables, beams and other components that experience pulling forces. High tensile strength materials, such as steel and carbon fibre, are essential for applications where stretching forces are prevalent.

2. Compressive strength

Compressive strength measures a material's capacity to withstand compressive forces. For instance, a concrete pillar must endure the weight of the structure above it. Materials like concrete and ceramics exhibit high compressive strength, making them ideal for load-bearing applications.

3. Shear strength

Shear strength comes into play when materials are subjected to forces that act parallel to their surface, such as in the case of bolts holding two plates together. This property is critical for components like rivets and fasteners, where failure could occur due to sliding stresses.

4. Yield strength

Yield strength is the stress level at which a material transitions from elastic behaviour to plastic deformation. Beyond the yield point the material enters the plastic region, at which properties such as stiffness deteriorate. As a result, yield strength is crucial in applications ensuring safe and reliable design.

Measuring material strength

Measuring material strength is essential to ensure that components can withstand expected loads without failure. Various testing and analysis methods can be used to assess different types of strength. These include:

Tensile testing

Tensile testing involves stretching a material sample until it breaks. This process provides valuable data on tensile yield strength, ultimate tensile strength and elongation. In industries such as automotive manufacturing, tensile testing is vital for ensuring that materials used in vehicle frames can endure the forces experienced during collisions.

Compression testing

Compression testing evaluates how materials perform under compressive forces. By applying increasing pressure to a sample until it deforms or fails, engineers can determine its compressive strength.

Shear testing

Shear testing assesses a material's response to forces that cause layers to slide against one another. In this test, a sample is subjected to parallel forces until it shears. Engineers use the resulting data to evaluate the material's capacity to resist sliding failure, a critical factor in components like bolts and welded joints.

gth in engineering applications

Stress-strain analysis

Stress-strain curves plot the relationship between stress and strain, providing insights into how a material deforms under load. This analysis is critical for understanding a material's performance limits and is frequently used in the aerospace sector to test lightweight alloys.

Selecting the right materials

Selecting a material with the right inherent strength is vital to ensure that products can endure expected stresses without failure. This is particularly true for fasteners, which are integral components in various engineering applications. Choosing the right fasteners ensures that structures maintain their integrity and functionality over time.

Fasteners, such as bolts and screws, must possess sufficient tensile and shear strength to withstand the forces they encounter. For example, high-tensile strength steel fasteners are commonly used in construction and automotive applications to ensure safety and reliability.

The choice of material significantly affects the performance of fasteners. For instance, materials with high yield strength are preferred for applications where fasteners must endure dynamic loads, while those with high compressive strength are suited for load-bearing applications.

Accurate knowledge of material strength is essential for meeting safety standards and ensuring the reliability of products. For example, in critical applications, such as medical devices or aerospace components, selecting materials with appropriate strength properties can prevent catastrophic failures.

Strength vs. rigidity

While strength is a measure of a material's resistance to forces, it is often confused with other properties such as rigidity, stiffness and hardness. Understanding these differences is crucial for selecting the right materials for specific engineering applications.

Rigidity refers to a material's resistance to bending when shear forces are applied. A material may be strong yet flexible, making it suitable for applications requiring both strength and adaptability.

Stiffness measures a material's resistance to deformation under load. It is often quantified as the ratio of stress to strain within the elastic limit.

Finally, hardness is the measure of a material's resistance to indentation or abrasion. While a material may be hard, it may not necessarily exhibit high tensile strength.

Understanding material strength

Understanding strength is fundamental to the correct selection of materials, including fixings, in engineering applications. As outlined, strength comes in various forms and by accurately measuring strength and selecting appropriate materials, engineers can design components that ensure safety, reliability and optimal performance for a wide range of engineering applications."

For further insights into material selection and engineering techniques, explore Accu's extensive range of fasteners and components designed to meet the demands of modern engineering challenges.

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Prima Power unveils Giga Laser Next and redefines 3D laser cutting for the automotive industry

Prima Power, a pioneer of 3D laser cutting since the 1970s, has launched its Giga Laser Next, a revolutionary leap in 3D laser cutting designed for the high-output demands of the automotive industry.

A new machine for a new paradigm

With four synchronised laser heads cutting the same part and a dual-station layout that enables parallel loading and unloading, Giga Laser Next multiplies productivity while shrinking occupied space, unlocking new benchmarks in space-time efficiency. Designed for giga-factories and the high-output production of High-Strength Steel (HSS) automotive components, Giga Laser Next is a response to the most urgent demands in the industry.

Why Go Giga Now?

Since the 1990s, High-Strength Steel (HSS) has revolutionised vehicle manufacturing by offering unmatched strength-to-weight ratios, enabling safer, lighter and more sustainable vehicles. However, the very strength of HSS makes it unsuitable for conventional processes, creating a natural synergy with 3D laser cutting.

As automotive OEMs scale up to meet giga-factory throughput and EV demand, previous generation laser systems, while still effective in less intensive applications, struggle to keep up with the most demanding productivity requirements. Giga Laser Next is a Prima Power proprietary solution engineered to address directly the industry's most pressing needs: maximising both floor space utilisation and machine uptime for optimal production efficiency, minimising direct labour, managing market volatility and multiple vehicle models and ensuring short lead times.

The Prima Power legacy of leadership

From the trailblazing Optimo and Rapido to the renowned, ultra-fast Laser Next, Prima Power has continuously led innovation in 3D laser systems for the automotive industry. With nearly 50 years of experience and a global installation base, Prima Power shaped the standard and is now redefining it.

Giovanni Negri, CEO of Prima Power and Prima Industrie Group, comments: “A new chapter in 3D laser processing begins today. Giga Laser Next embodies the essence of our strategy: Evolve by integration. We’ve integrated the productivity of four machines into a single compact unit, achieving what was previously thought impossible. This is not just a technological achievement, it’s a result of listening to our customers and translating their gigascale ambitions into a tangible solution. I want to thank the Prima Power team for their dedication and incredible innovation capacity, as well as our partners and customers whose insights have been invaluable in shaping and optimising this game-changing solution to meet their real production challenges.”

What makes Giga Laser Next a game changer

Giga Laser Next stands out for three powerful reasons that directly address the demands of high-volume automotive production, typically >200,000 parts/year, while maintaining the flexibility to handle multiple part codes:

- +280 percent higher productivity per m^2
- -75 percent average cutting stations required and production changeover time
- One piece flow, fully unmanned automation, complete integration into the production line

These benefits are made possible by a series of groundbreaking technical innovations. At the heart of Giga Laser Next is a unique configuration of four synchronised laser heads working simultaneously on the same part, enabled by advanced anti-collision system and a robust cartesian structure with high-performance retractable arms. The machine operates with typical idle time of around two seconds, thanks to parallel loading/unloading on one station, while the process is performed on the other. Its compact 10×10 m footprint is achieved by integrating ancillaries like laser sources and chillers on a mezzanine level, maximising floor space efficiency.

Designed for full automation, Giga Laser Next supports embedded solutions for loading, unloading, quality checks and marking, with the flexibility to connect directly to stamping or assembly lines. It also features an easy fixture change system, digital twin validation and a machine architecture optimised for long-term reliability and minimal maintenance, making it ideal for high-volume production of automotive stamped and cast parts.

Don’t believe it? Just watch

See the Giga Laser Next in action and experience this breakthrough technology. No AI tricks, just engineering magic and giga-productivity in real life.

Watch the video and Go Giga Now: ***https://youtu.be/oeqvdP_4sEg***

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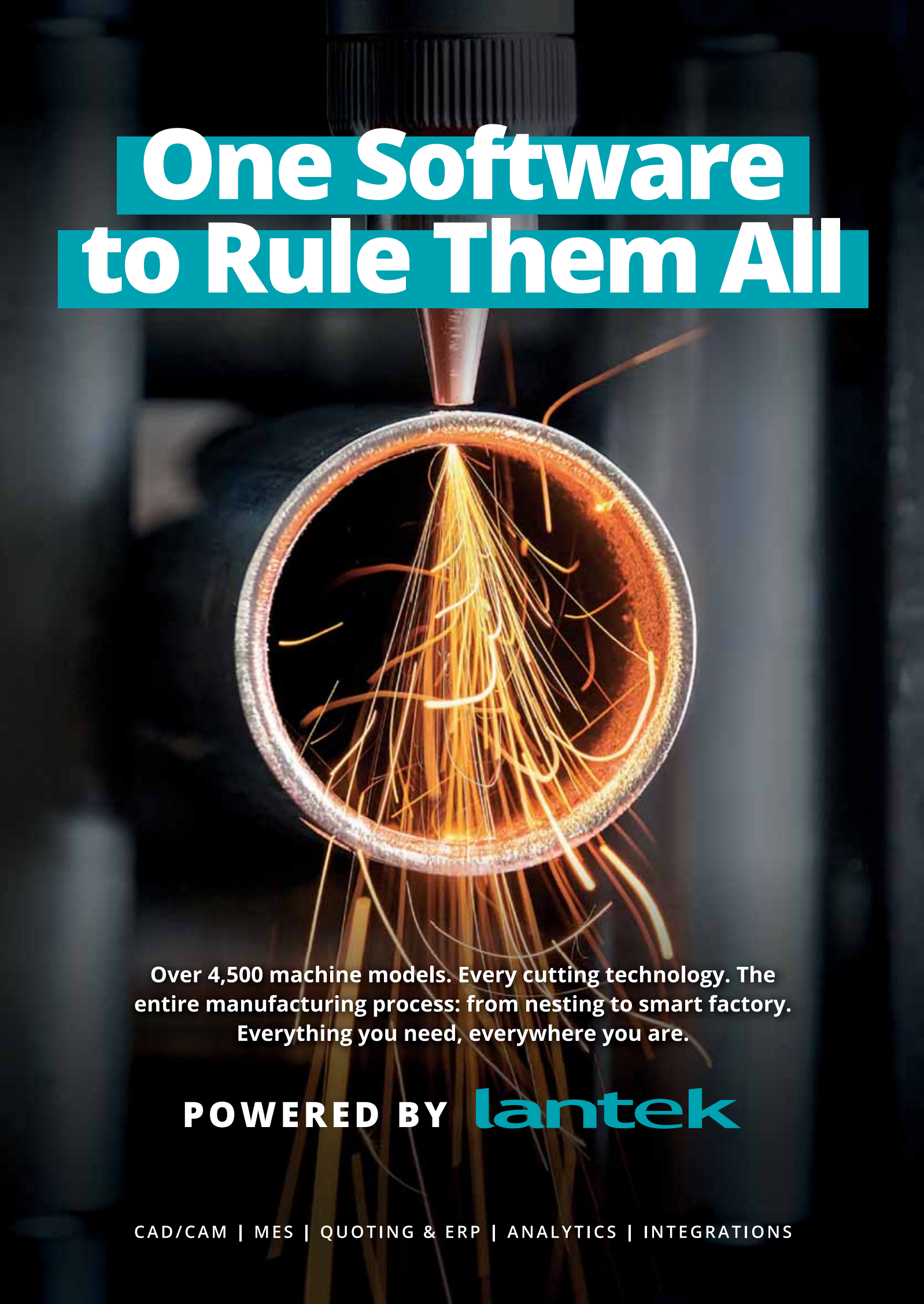
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Transforming quoting workflows with integrated digital software systems

Adam Ball, UK operations director at Lantek, explores the challenges with traditional quoting workflows and shares how advanced software systems are solving inefficiencies in production. Overlooked or missing information can be the deciding factor between profit and loss in sheet metal fabrication. Even the most streamlined shop floor with efficient cutting, bending and assembling can face challenges if production is incomplete or has inaccurate job details. When essential data is missing or unclear, mistakes, delays and wasted materials are almost guaranteed.

The solution lies in modernising the quoting process with intelligent and digital systems that ensure clarity and accuracy from the very start, leaving little margin for error.

Challenges with traditional quoting

Many of the challenges seen in production today originate long before a part is put into the production process. The challenges begin during the quoting phase when customers submit a design and specific instructions. Many shops still rely on outdated and manual methods with 2D drawings, handwritten notes or inconsistent DXF files.

This traditional approach often depends on the experience of a small number of experienced engineers, limiting scalability and increasing the risk of errors from misinterpretation.

The quoting process becomes even more challenging when the sales and production team operate in isolation, with little or no system integration. As a result, important details about materials, tolerances or manufacturing limitations can be lost or distorted as jobs move between departments. This leads to avoidable errors, wasted resources and delayed delivery times.

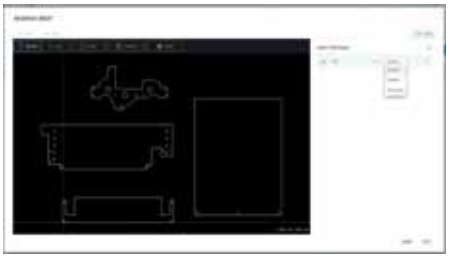
Transforming quoting workflows

Quoting is no longer just about estimating costs, it is becoming a strategic process reshaped by innovation and technologies. As fabrication shops utilise smarter tools and integrated platforms, the quoting workflow is becoming more precise, efficient and streamlined.

One major change is the growing use of digital portals and online ordering systems that improve how job information is submitted and processed. This means customers are now able to share precise specifications and the quoting

system has the capacity to ensure accurate data before the production work begins. This clarity reduces the risk of miscommunication and minimises the need for follow ups.

The industry is also moving away from static 2D drawings and embracing 3D CAD models. These models offer a more comprehensive understanding of part geometry, materials and



specifications, resulting in a quoting process that's far less prone to ambiguity and better aligned with real-world production constraints.

Quoting systems themselves are also becoming more intelligent as they include built-in capabilities to automatically assess the manufacturability of a part. These tools can automatically identify design flaws, flag impractical specifications and propose adjustments to improve manufacturability and reduce cost using AI.

Artificial intelligence plays an important role, helping to guide both the fabricator and the customer toward smarter design decisions.

Another significant development lies in the use of 3D unfolding and advanced nesting technologies. These tools digitally simulate how parts will be flattened and laid out for cutting, ensuring that the correct material sizes are used from the start. Nesting technologies also help to optimise material usage and provide accurate cost estimates. When used in combination, these systems enhances both shop performance and customer satisfaction.

Benefits of digital quoting

One of the most impactful developments in digital quoting is the ability to connect quoting processes with core production systems such as

Manufacturing Execution Systems (MES) and Enterprise Resource Planning (ERP) software, creating a unified data flow from initial estimate to final production.

By minimising the need for manual data entry with integrated software, shops can generate accurate quotes much faster, enabling quicker responses to customer inquiries with accuracy and improve on timed deliveries.

With this level of integration, the system automatically factors in available materials, current machine workloads and existing production schedules when generating estimates. Once the quote is approved, all relevant data is transferred directly into production without manual intervention causing potential errors. This offers significant a reduction in rework, identifying potential errors early in the process long before materials are cut, lowering the risk of producing waste.

The merge of these systems also allows for real-time feedback into the quoting system from the shop floor such as machine performance trends, design modifications and material substitutions, making future quoting more accurate and aligned with production capabilities.

Another benefit lies in how material usage is managed. With advanced nesting technology, smarter planning and better material optimisation reduces waste and increases overall efficiency.

The future of integrated quoting

The quoting process is said to become even more intelligent and dynamic as new technologies continue to evolve. With artificial intelligence increasingly shaping cost estimation and with predictive analytics offering deeper insights into market demand, quoting is shifting from a reactive function to a proactive tool.

In the future, systems will not only calculate costs based on design files, they may also draw on real-time production data, customer inputs and historical trends to deliver instant quotes.

For fabrication shops embracing digital quoting isn't just about streamlining processes and reducing inefficiencies it is also about staying competitive and responding more quickly to customer needs.

For more information on Lantek and sheet metal machine software, visit: ***www.lantek.com***

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Nukon tube and pipe fibre laser brings significant benefits to redhill manufacturing

A new tube and pipe fibre laser cutting machine from Nukon Lasers UK, is bringing considerable production efficiencies and new manufacturing opportunities to Redditch-based access equipment maker, Redhill Manufacturing.

The machine, a Nukon NKT-125 2kW model, joins a Nukon ECO 315 4kW flat sheet metal fibre laser machine and two all-electric Unison Breeze tube bending machines that were installed at Redhill's manufacturing facility in December 2022.

Redhill's introduction to Nukon fibre laser machines came when the company was discussing purchasing the two all-electric tube bending machines from Unison Ltd, the inventor of all-electric tube manipulation.

"I'd read good things about Unison's British-built, all-electric 'Breeze' tube bending machines," says Redhill's managing director, Andy Colley. "I, therefore, got in touch with Unison to find out more about their range and with a view to ordering two 30 mm, tube diameter, single stack models, one to replace a machine we'd lost in a fire at our previous premises and the second for additional capacity."

It was during a meeting to discuss the specification of Redhill Manufacturing's two tube benders that the conversation turned to fibre laser machines: "I had a requirement for laser cutting, but wasn't aware that Unison had a sister company, the UK and Ireland distributor for Nukon's fibre lasers," adds Andy Colley. "At the time, I didn't really know a great deal about the Nukon brand, so sales director, Steve Haddrell, took me to visit a company in Sheffield that had been using a Nukon flat sheet metal laser for around a year, all so I could see the machine in action and talk to the operators about their experience of using it."

Hearing glowing reports about how the Nukon flat sheet metal laser had streamlined the process of cutting complex components at the Sheffield business, Andy Colley then travelled to Nukon's European HQ to see one of its tube and pipe fibre laser machines in action. Andy Colley said: "The build quality was very good and the accuracy excellent and just like the Nukon flat sheet metal laser, the tube laser machine was competitively priced, particularly considering their features included nLIGHT fibre lasers with adaptive beam optimisation and Lantek Expert nesting software."

Just like Redhill's Nukon ECO 315 4 kW flat sheet metal fibre laser, its new NKT-125 2 kW tube and pipe laser machine was selected for its speed, easy programming, precision and exceptional versatility, all essential requirements for businesses dealing with small production runs; in this case cutting pipe of round, oval, square and rectangular profile.

Since installation, the Nukon tube and pipe laser has streamlined the production of many of Redhill Manufacturing's products; its BSI-Kitemarked access steps being a good example. Previously, lengths of tubing would be cut to size using a bandsaw, then drilled, slotted and mitred, before having their ends flattened for welding. The entire process typically took around ten minutes per component. By comparison, the Nukon tube and pipe laser takes around 30 seconds to complete the same task, a process that also includes scalloping the tube ends to avoid any need for end flattening before welding. The cutting of hanging holes ready for the painting stage of several components has also been simplified. "All in all, with no secondary operations to carry out, the Nukon tube and pipe machine has allowed us to free up two staff members for other duties," comments Andy Colley.

Redhill's Nukon NKT-125 2kW tube and pipe laser has also helped simplify the design and manufacture of both existing and new products. Over recent months, the Redhill team has

redesigned several of its ranges to further benefit from the efficiencies the machine brings to the manufacturing process.

"It has been an absolute pleasure to assist Redhill Manufacturing in the selection and purchase of its two Nukon fibre laser machines," comments Nukon Lasers UK's sales director, Steve Haddrell. "Nukon fibre lasers offer fantastic quality and features at extremely accessible prices and just as demonstrated by Redhill Manufacturing, provide manufacturers and subcontractors with the ability to not only develop exciting new products, but also produce their existing ranges far more cost effectively and efficiently."

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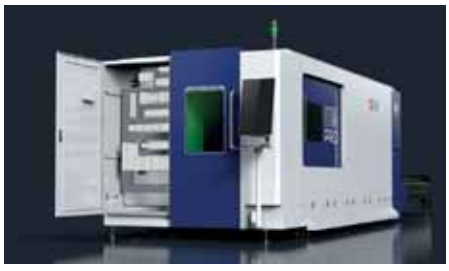
New products Summer bonanza from Penta

A host of new Penta Laser products are now ready for the UK and European metal processing markets, summary as below.

SwingPro: Flat bed laser

A development of the popular Swing VII model, the Swing VII Pro includes exciting new enhanced features including integrated electrical control cabinet, additional side access door and improved protective guarding. It provides 3-12 kW laser power with cutting bed sizes 1.5 x 3.0 m and 2.0 x 4.0 m.



Laser automation

Showcasing its automation range with a brand new multi million Euro installation in The Netherlands, Penta Laser have a broad range of laser automation products from semi automated load/unloading systems to fully automated storage and retrieval systems for lights out operations.

Bolt Cube: 3D/5-axis laser

Penta Laser is excited to announce that the well proven Bolt Cube 3D laser is now ready for sale in the UK and Europe. With many systems installed in the automative market in China, this capable and sophisticated laser cell has many features that will interest UK laser users.

The company states: "These new products from Penta really prove that this brand has real technical strength and depth and can compete shoulder to shoulder with dominant European laser brands."

The Penta range offers laser powers 3 kW-85 kW and flat bed cutting bed sizes from 3 x 1.5 m to 13 x 3m.

Penta Laser UK offers full UK sales and aftersales support including a huge UK stock of Penta spare parts.

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Unison mandrel tube bender brings significant performance improvements to new product development at Klarius

A new hybrid-electric mandrel tube bending machine from Unison Ltd is assisting Klarius, the UK's largest manufacturer of aftermarket emissions control products, to develop the increasingly complex exhaust systems that are used in today's petrol, diesel and hybrid vehicles.

Installed in the new product development area at Klarius' 5.6-hectare manufacturing site in Cheadle, Stoke-on-Trent, the machine, an 80 mm maximum tube diameter Unison Synergy model, is already reducing new product prototyping and development times by 30 to 50 percent depending upon complexity. Delivering uncompromising levels of accuracy and repeatability, it is typically used to bend mild steel tube ranging from 32 mm to 70 mm in diameter and for tight radius bends of up to 1.5x diameter (1.5D).

"Klarius is renowned for producing the highest quality, type-approved aftermarket vehicle exhaust products," says the company's head of product development, Doug Bentley. "We offer more than 11,000 different parts and provide replacement emissions control solutions for more than 24 million vehicles in the UK and some 152 million vehicles in Europe."

Leading the way in aftermarket emissions control products, however, means staying ahead of the game. That's why, in 2024, Klarius took the decision to invest in a new mandrel tube bending machine to assist in new product development. "The ongoing drive for more energy efficient vehicles, with greater gas-flow through larger diameter tubing and all within the constraints of more tightly packed engine bays, means tighter bends and increasingly complex aftermarket products," explains Doug Bentley. "By investing in the latest mandrel tube bending capability today, we are future-proofing our design capability and reducing the time it takes to develop first-class components.

"Having made the decision to purchase a mandrel tube bender for NPD, we considered a number of machines," he continues. "Ultimately, however, we selected the Synergy hybrid-electric model from Unison Ltd based on its quality and performance. The fact that Unison is a UK manufacturer gave us a great deal of confidence in terms of future support. A visit to Unison's Scarborough HQ for a product demonstration also confirmed their understanding of our needs."

Following a factory acceptance test, the Unison Synergy tube bender was installed at the Klarius manufacturing site in autumn 2024. "The installation process was trouble-free and included two days of operator training to ensure we were up and running very quickly," adds Doug Bentley. "Since commissioning, the machine has consistently produced good quality parts that are ready for scaling up for mass production. On the handful of times that we have needed support, typically when we were getting to know the machine, Unison's support staff were quick to respond, either visiting us on site or dialling in. To enable us to use our existing bend tooling, Unison also supplied us with adapter blocks. They are currently assisting us in the development of bespoke tooling for new exhaust products.''

Doug Bentley continues: "One of the big advantages of working with Unison is that just like Klarius, they are a UK company. They talk our language, understand our business, appreciate the importance of rapid support and have an excellent understanding of our goals and objectives. When we first began our search for a new tube bender, we did consider a machine from a manufacturer in the Far East, however the levels of support offered appeared vague.

"It was an absolute pleasure to equip Klarius with a new Unison Synergy hybrid-electric tube bending machine," comments Unison's international sales manager, Andy Worthington. "Doug and his team have been hugely appreciative of the work we put into ensuring the Synergy machine met their needs and we are particularly pleased to hear of the

considerable time savings it is already bringing to their new product development initiatives."

Unison Synergy hybrid-electric tube bending machines

Unison's range of hybrid-electric Synergy tube benders combine precise electric control with advanced, near-silent hydraulic operation. Developed for manufacturers and subcontractors who carry out both individual and repetitive tube bending tasks, Synergy machines are available in 50 mm and 80 mm, maximum tube diameter, versions. Standard features include Unison's user-friendly Unibend touchscreen control, leading motors and drives, exceptional power and rigid mechanical design. Synergy mandrel tube benders offer functionality and user-friendly features similar to Unison's industry leading, all-electric Breeze range of tube bending machines, but at a more accessible price.

Key features include:

- Electric control with advanced, near-silent hydraulic operation.
- 50 mm or 80 mm collet capacity.
- Exceptional power and rigid mechanical design.
- Dual-stack bending for combined bending and roll-forming applications.
- User-friendly Unibend touchscreen control system.
- Choice of industry leading motors and drives.
- 3D component simulation and measuring machine interfaces.
- Renowned Unison quality and reliability.
- Designed for individual and repetitive tube manipulation tasks.
- Servo-driven bend arm, carriage, plane of bend and carriage side shift.

Intelligent tube technology

Unison Ltd is a leading UK manufacturer of tube and pipe bending machines and continually innovates the tube and pipe bending marketplace. The company manufactured the world's first all-electric tube bender in 1994, followed by the world's first all-electric multi-stack tube bender, then the world's largest all-electric tube bender for the shipbuilding industry. Available in single-stack, multi-stack and right/left varieties, Unison machines are delivered to more than 20 countries globally. Unison's tube bending software is recognised as the most user-friendly control system for tube bending machines. The software is written and supported by Unison, ensuring complete control of its evolution, with no need for third party support.

The UK's largest manufacturer of emissions control components

Klarius Products Ltd is the largest manufacturer of aftermarket emissions control products in the UK. Based in Cheadle, Stoke-on-Trent, Staffordshire, the business combines in-house R&D, testing, manufacturing, warehousing and distribution facilities to provide market-leading components for a wide range of vehicles. Increased by some 350 new components every year, the Klarius emissions control range comprises more than 11,000 individual parts and includes exhaust systems, Catalytic Converters (CATs), Diesel Particulate Filters (DPFs), mountings and accessories. Offering solutions for almost every passenger and light commercial vehicle, all Klarius emissions control components are designed to meet both UK and EU legislative compliance.

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20 years of CMT

Unrivalled precision and stability in welding technology

Fronius, an innovation leader in arc welding, is celebrating the 20th anniversary of its revolutionary Cold Metal Transfer (CMT) welding process. Since its introduction in 2005, CMT has changed the world of welding for good and set new standards in precision, stability, and versatility.

CMT Cycle Step

The CMT process is based on a reversing wire movement that enables controlled droplet detachment. This movement ensures a stable arc and minimises heat input.

This results in almost spatter-free, clean welds that have a high quality and aesthetics. Another advantage of the CMT process is the low thermal load on the workpiece. This reduces distortion and deformation, which is an enormous advantage especially when working with sheets as thin as 0.3 mms and temperature-sensitive materials. Precise control of the welding process helps tackle demanding welding tasks with the highest degree of accuracy.

CMT opens up the possibility of joining different materials together. For example, galvanised steel and aluminum can be welded safely and reliably. This creates scope for creative solutions in the production process. Variety of applications in different industries

"Over the last two decades, CMT has established itself as a versatile welding process that is used in numerous industries. Sometimes even we are impressed by the diversity and creativity with which our customers use CMT to their advantage and to solve their welding challenges," says Franziska Eichhorn, strategic product manager, Fronius International.

The automotive industry, for example, uses CMT to join thin sheets and lightweight materials such as aluminum, ensuring strong and reliable connections for vehicle frames and components.

CMT has also proven its worth in the aerospace industry, where the process allows the welding of high-strength and lightweight materials that are essential for the construction of aircraft and spacecraft.

In addition, due to the outstanding stability of the welding process, CMT is used in 3D printing or in the electronics industry, where it is used to braze components precisely.

Intelligent air gap detection and edge detection thanks to CMT

CMT's back-and-forth movement of the wire has also revolutionised robotic welding with the WireSense intelligent assistance system. This significantly improves the seam quality and efficiency by detecting inaccuracies and deviations in industrial production and avoiding them by means of the CMT welding process. The welding wire serves as a precise sensor that precisely determines the position of the weld and dynamically adjusts it. This saves material, time and costs as rework and rejects are reduced.

CMT is fit for the future

"The decisive factor is the perfect interaction of the components and the precision with which they are controlled," emphasises Franziska Eichhorn. "The harmony with which our intelligent welding machines and the Robacta Drive CMT drive unit, in other words the second wirefeeder directly on the torch, work together is still unmatched today and is constantly being further developed to meet the increasing

demands of the industry. The best thing about it is that CMT can be easily retrofitted to all intelligent Fronius devices."

Over the years, the Fronius has continued to perfect CMT and developed application-specific optimised welding characteristics such as CMT Mix, CMT Cycle Step, CMT Cladding and CMT Braze.

LaserHybrid CMT, on the other hand, combines the advantages of laser welding with CMT technology. When used on high-strength steels and aluminum components, this combination boasts high speed, quality and cost-effectiveness. A highly focused laser beam that penetrates the base material with a high energy density is immediately followed by the CMT process, which increases the seam volume and can further reduce the heat input.

The latest achievements are the CMT Additive Pro characteristics optimised for metal 3D printing, which take additive manufacturing to a new level.

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TIG cold wire welding

Dynamic Wire

Simplicity to unleash your welding potential

The innovative advantage of Fronius TIG DynamicWire, when compared to a conventional continuous wire feed in cold wire systems, lies in its automatic self-regulation. The power source actively adjusts the wire speed to the welding behaviour, torch position and current conditions - even compensating automatically for component tolerances of up to 30%. The result? Perfect welds every time. Existing iWave cold wire systems can be easily upgraded with the patented TIG DynamicWire Welding Package through software activation.

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CLOOS robot systems ensure maximum quality and efficiency

The fitness industry is booming and gym80 from Gelsenkirchen, Germany is a perfect example of continuous growth and innovation. This is why the company relies on state-of-the-art technologies to meet increasing customer requirements in terms of quality and flexibility. In the production of high-quality fitness, strength, medical and high-performance equipment, gym80 now uses a total of ten robot systems from CLOOS to weld a wide range of components. “The investments in automated welding production have enabled us to achieve precise and fast series production for many years,” says company spokesperson Carolin Kämpf. “We rely on CLOOS as our permanent partner for this.”

gym80 was founded in 1980 and has its headquarters and production facilities in the heart of the Ruhr region in Gelsenkirchen. The company develops and produces fitness, strength, medical and high-performance equipment that is known for its excellent biomechanics, precision and clear design. Its main customers include large fitness centre chains. However, private individuals, including some very well-known celebrities, have also discovered the equipment for themselves during the coronavirus pandemic and invested in their own studios.

With a vertical range of manufacture of over 95 percent on an area of more than 5,000 sq m^2, the company relies on state-of-the-art technology. With a total of 200 employees and eight trainees, gym80 also attaches great importance to the training and development of skilled workers. In their free time, employees can benefit from the exclusive fitness area, which is available for training at any time.

Today, gym80 uses ten CLOOS robot systems to weld a wide variety of components.

Modern robotic welding systems in use for 20 years

The welding shop plays a central role in production, as the quality of the weld seams on the equipment is of decisive importance. Since the installation of the first CLOOS robot cell, which has been in continuous operation since 2003, a lot has happened in welding production. gym80 has also continuously invested in machinery in this area. The two latest robot systems were added in spring 2024.

“The robot systems have optimised our production processes, enabling us to achieve higher welding quality and stable production times, thereby increasing productivity,” emphasises production manager Jörg Köhl.

Now, the company is continuing to invest in future-proof production in order to meet the shortage of skilled labour and the high quality requirements. gym80 is currently building a fifth production hall, which will be completed shortly. The welding workshop is to be fully integrated here in future.

New compact robot systems further increase productivity

The two new, identical QR-CS-5 compact systems are ideal for components weighing up to 500 kgs per station. They have a two-station turning table and the station change is carried out by a horizontal rotation. The clamping tools for holding the components can be easily mounted on the faceplate of the positioner. The heart of the compact systems is the QIROX QRC-350 robot in overhead position. This robot

With automated welding production, gym80 achieves higher welding quality.

Automated welding production enables precise and fast series production.

mechanics offers flexible application options for the changing requirements of the many different components that are processed at gym80. The integrated QINEO NexT welding package consists of a welding power source, a powerful wire drive and a water-cooled welding torch as well as a mechanical welding torch cleaning. Due to the 2-station principle, it is possible to insert the components in one station while the robot is welding in the other station, an enormous saving of time in the whole process run.

Automation is a benefit for employees

"The new robot systems are very easy to operate. The programming work with the QWP software in particular makes our work much easier and saves us a lot of time," explains robot programmer Jörg Noffke, who has been working at gym80 for more than 30 years and has been a significant part of the company's growth.

"Working with the CLOOS robot systems makes our daily physical labour much easier and is much cleaner compared to manual welding." Another important aspect is the reduced fine dust pollution, as the employees are minimally exposed to welding fumes due to the distance to the welding robot and the effective extraction system.

Long-standing partnership and cooperation

"The partnership and cooperation between CLOOS and gym80 has existed for several decades and is an excellent match," explains company spokeswoman Carolin Kämpf. "As a German company, local like us, CLOOS keeps the promises we make to our customers."

gym 80 has fixed contacts, both at CLOOS itself and at the CLOOS representation Lixfeld who support the company in the realisation of its automation projects and with service issues. If gym80 has special requests, needs adjustments or settings to be optimised, someone is quickly on site to provide support.

"The service provided by CLOOS is always solution-oriented and always offers us professional help," emphasises production manager Jörg Kohl.

He concludes: "To summarise, the cooperation between gym80 and CLOOS is a benefit for our company."

The easy-to-operate CLOOS robots make the employees' work much easier.

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A compact all-rounder for handling and welding

The new KR IONTEC ultra from KUKA

The new KR IONTEC ultra completes KUKA's portfolio in the payload range of 80 to 120 kg. With a reach of 2,300 to 2,700 mm, this compact and powerful robot offers maximum efficiency and flexibility in the modern production environment for example in handling or spot welding with lightweight welding guns.

Thanks to its compact design, the KR IONTEC ultra can easily find its way into even the tightest of spaces: customers can use the slim robot to create narrow automation cells. As a result, the space saved leads to lower costs. In addition to the small footprint, the robot has very good performance, which helps to minimise cycle times.

Economical in terms of space and maintenance

The KR IONTEC ultra fits seamlessly into the KR IONTEC family, which has impressively low maintenance requirements: an oil change is only necessary every 20,000 operating hours and the central hand concept does not require belts. The robot has a streamlined build with fewer breakable small parts.

The all-rounder demonstrates its strengths in handling, especially in the battery area and in spot welding with lightweight welding guns, lightweight spot welding. With its payload of up to 120 kg, the robot can move heavy battery cells and modules for use in electromobility. The slim robot also fits perfectly into compact welding cells, a feature that is highly sought after by suppliers to the automotive industry for example.

The ideal robot for a cost-effective entry to automation

In the KUKA portfolio, the KR IONTEC ultra has the advantages of both the KR IONTEC and KR QUANTEC product families. With a smaller footprint than the KR QUANTEC and high performance at the same time, it is a cost-effective option for entry-level automation. “The KR IONTEC ultra can be quickly and intuitively integrated into existing production environments,” says Michael Laub, platform product manager for medium payload and palletising robots at KUKA.

As the robot can be implemented with the KUKA.PLC mxAutomation interface, it can be programmed and operated by the user in a familiar control environment. This means that the compact, powerful and cost-efficient robot can quickly make its contribution to production in various handling applications and in spot welding with lightweight welding guns. The KR IONTEC ultra with a payload capacity of 120 kg and a reach of 2,700 mm is available to order now, with three further model variants to follow this summer.

The robot is suitable for the following applications:

- Mechanical machining and polishing.
- Handling.
- Assembly.
- Cutting/Separation.
- Spot welding.
- Pick and Place.
- Machine loading/unloading.
- Additive manufacturing, 3D printing.

KUKA is a global automation corporation with roughly 15,000 employees. The company is headquartered in Augsburg, Germany. As one of the world’s leading suppliers of intelligent automation solutions, KUKA offers customers everything they need from a single source: from robots and cells to fully automated systems and their networking in markets such as automotive, electronics, metal and plastic, consumer goods, E-commerce/retail and healthcare.

Concept with few spare parts: The central hand does not require any straps.

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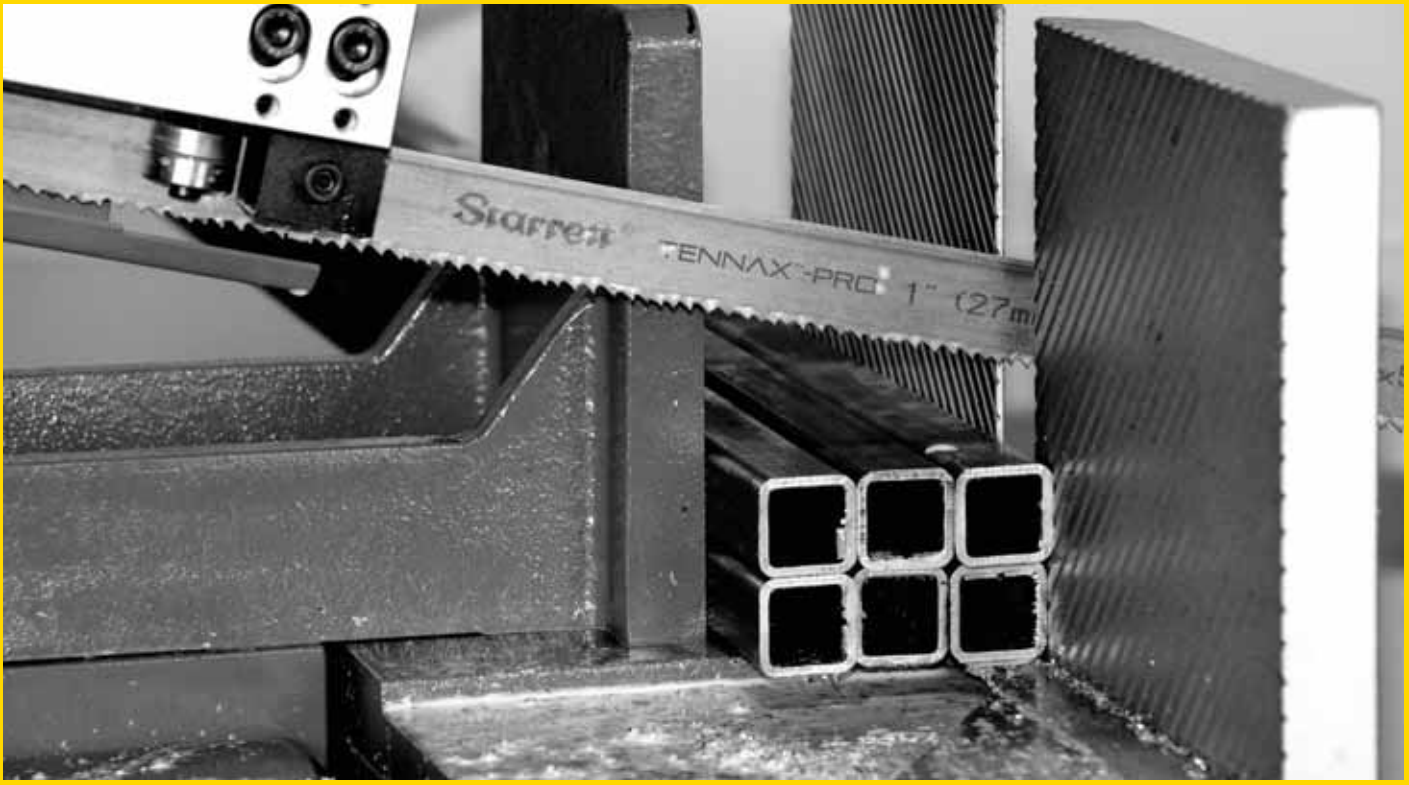

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