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EXTRA
Progressive’s CVe Monitors are installed on moulds worldwide. Combined with CVe Live, this mould monitoring platform continues to advance to enable real-time visibility of critical tool productivity:

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This is only the beginning

By the time you receive this magazine, I will have attended my first larger press event as an editor of ETMM: The Moulding Expo Pre-Show in Slovenia. Right now, I am excited and curious what new insights this event will yield. Of course, I will share this with you in the future. This also marks the start of the large expos. Hanover Fair, Moulding Expo etc. Included in this issue are the first two show previews of this year. The first is Control 2019 the showplace for all quality assurance-related innovations. The fair, however, is slowly moving beyond this topic as the interconnected nature of the industry becomes more pronounced. Second, Rapid.Tech is focused on additive manufacturing solutions. Both are definitely worth a visit – find out why (p.16/p.18).

Our cover story focuses on CAD/CAM and the basics of both. With digital work processes being a huge focus in Industry 4.0, laying the groundwork for a lot of these terms that usually only appear in abbreviated form is important. Our article covers the topic from many different angles, so I honestly believe it can be interesting for all different types of readers, whether you are heavily involved with the topic or only vaguely aware of it. It is a fascinating aspect of the industry and one that will continue to gain increasing importance in the future.

Sticking with the topic of innovations to come, a lot of the processes that still have not made their way onto the factory floor are often deemed either too slow or too imprecise. However, researchers are working on technical innovations that aim to deliver on both ends: faster and more precise. As in many other areas, lasers are the possible answer to faster polymer production. Read more about this on p.38.

We hope you enjoy browsing through this issue. The next issue will feature a lot from the upcoming Moulding Expo and we hope you are as excited as we are.

Steffen Donath
Editor
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A basic introduction to the topic CAD/CAM and its role in Industry 4.0 to get you up to speed.

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TIP
CAD/CAM is an extremely powerful manufacturing tool for designers to give form to previously unthinkable design ideas.

Steffen Donath
Editor

Source: ©Maxamillion - stock.adobe.com

The tooling industry has undergone some changes in 2018.
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Ranking
March’s most-clicked articles on www.etmm-online.com

1. Markets: Packaging largest driver in the French and Italian injection moulding sectors
2. Cutting Tools: Ceratizit Group acquires 50% shares in Stadler Metalle
3. Markets: Injection moulding: thriving or surviving?
4. Software: What is Big Data? Analytics, definition, meaning & examples
5. Machining Equipment: Moduleworks and GSK announce partnership
**5G (5th Generation)**, the latest generation of cellular mobile communications succeeds 4G (LTE-A, WiMax), 3G (UMTS, LTE) and 2G (GSM) systems. **5G PERFORMANCE** targets high data rate, reduced latency, energy saving, cost reduction, higher system capacity and massive device connectivity. The first phase of 5G specifications in Release-15 is due April 2019 for commercial deployment. (Source: Wikipedia)+++

In the EU, 1 out of 3 managers is a **WOMAN**. About 9.4 million persons hold a managerial position: 6 million men (64% of all managers) and 3.4 million women (36%). Only 27% women are board members of publicly listed companies. (Source: Eurostat)+++

In the USA, largest export market for German mechanical engineering in 2018, was up 7.1% at €19.25 billion, with a share of 10.8% of total machine exports. China was second with an increase of 9.6% at €19.06 billion (share of 10.7%). (Source: VDMA)
Slovenia’s first Female Engineer of the Year

Slovenia – Dora Domajnko was named Slovenia’s first-ever Female Engineer of the Year. The development engineer at Renishaw’s associate company RLS was presented with the award for being an inspiration to young people. The award, organised by “Let’s Be Engineers!”, is an initiative to encourage more young people to consider engineering careers.

The youngest on the ten-person shortlist, Domajnko has had an impressive career to date. She has an MSc in Electrical Engineering and is now studying for a PhD at the University of Ljubljana alongside her work at RLS. As an undergraduate, Domajnko received the Dean’s Award for Learning Success four times. Now at RLS, she specialises in developing mathematical algorithms for rotary and linear magnetic encoders. Engineering is my dream career, explained Domajnko. “To many young girls, engineering is an unknown. As an industry, we need to ensure young girls are getting enough information about the benefits of a career in engineering and that they know that engineering is for everybody.” “There is a misconception amongst many children and young people that engineering is only for boys,” added Chris Pockett, Head of Communications at Renishaw. “Talented engineers like Dora can raise the profile of women in engineering. By explaining the importance of engineers in society and providing strong role models, we can help to increase the numbers of female engineers entering the workforce.”

Scholarship for the VDWF university programme

Education – Messe Stuttgart is awarding a scholarship for the VDWF advanced degree programme “Project Manager (FH) for Tool and Mould Making” at the Schmalkalden University of Applied Sciences for the second time.

At Moulding Expo (MEX), Messe Stuttgart will provide an overview of the courses and offerings and will be actively involved in the further training of young people in tool, model and mould-making. For this sector in particular, structural change remains a constant challenge, which is why continuous further training for technicians and engineers is a must.

The scholarship is for the winter semester of 2019/20 at the university to enable the student to continue his or her education for two semesters. About €5,000 will be sponsored by Messe Stuttgart.

“We want to take responsibility for the industry,” says Florian Niethammer, team leader at MEX. “The financial support should be seen less as a sponsorship and more as a partnership.”

VDMA: Industrial Strategy 2030 underestimates SMEs

Germany – Minister of Economics Peter Altmaier recently presented the “National Industrial Strategy 2030”. VDMA, the German Mechanical Engineering Industry Association, has criticised it, saying that the strategy underestimates the importance of SMEs. The Federal Ministry of Economics and Energy says that, together with the big players of the economy, the aim of the Industrial Strategy is to make a contribution to secure and regain economic and technological competence, competitiveness and industrial leadership at national, European and global levels. It is intended to define accounts when action by the country is exceptionally justified or necessary to avoid serious disadvantages to the economy and the welfare of the country.

VDMA notes that the mechanical engineering sector is, however, extremely sceptical about direct national interference. “Our strength lies in the innovative strength that distinguishes SMEs in particular. National intervention here is more of a curse than a blessing,” says VDMA Executive Director Thilo Brodtmann. “The best government instrument is an innovation-friendly framework.” The VDMA also criticised Altmaier for underestimating the importance of industrial SMEs. “The focus of the Industrial Strategy is one-sidedly directed at big corporations,” says Brodtmann. Industrial SMEs are more than just suppliers and added, “They are the driving force for digitisation and artificial intelligence. Their flexibility and innovative strength have made it possible for Europe to remain a serious competitor in a rapidly changing world.” The VDMA has also asked for international tax competition and a reduction in bureaucracy.
Show Report – For four days, the trade fair combination of Intec and Z was at the centre of attention for the metalworking and subcontracting industries. “On an exhibition space that expanded yet again, globally active companies as well as small and medium-sized companies demonstrated their impressive innovative capabilities. The extensive range of products and services received a strong visitor response,” says Markus Geisenberger, Chief Executive Officer of Leipziger Messe. “The excellent conversations and new contacts at the trade fairs make it clear that our trade fair duo is one of the most important industry events in Europe. Roughly 50 percent of visitors at Intec and Z 2019 were decision-makers. Thus, our trade fair combination was once again a great success.”

The exhibitors and visitors were also very positive about Intec and Z. In the official survey, 93 percent of Intec exhibitors and 91 percent of Z exhibitors expressed their satisfaction with the visitors’ professional qualifications. Furthermore, nine out of ten respondents stated that they would recommend the trade fair duo to others.

Martin Sprung, Marketing Manager at Intec exhibitor, ZCC Cutting Tools Europe GmbH, also expressed his satisfaction: “We want to grow with our market share, which is why Intec is becoming more and more important to us. Here, we get the customer contacts we need. Halfway through the Intec fair, the number of customer meetings had exceeded the total number at other trade fairs. In Leipzig, we have concrete project enquiries – even orders are placed.”

According to the survey, 94 percent of visitors said they would recommend the trade fairs to others. And 90 percent of respondents were certain that they would visit the next trade fair. Furthermore, 88 percent of surveyed visitors achieved their trade fair goals.

Both Intec and Z have a national and international appeal. Matthias Funk, CEO of Hedelius Vertriebsgesellschaft, which exhibited at Intec, emphasises this: “Originally, our aim was to present our products to customers from Eastern Germany. We were pleased that we were also able to have good discussions with companies from all over Germany and Switzerland. The strong interest at our booth shows us that the catchment area of Intec is growing. In some cases, customers came to our booth several times to discuss specific orders.”

Intec and Z a success

“What the extensive range of products and services received a strong visitor response.”

Markus Geisenberger, Leipziger Messe

Orders decrease in the German tool industry

Difficult international situations and uncertain investors led to a slowdown of the German machine tool industry in 2018. “The downturn in orders indicates that the situation will ease in the months ahead,” says Dr. Schäfer of the VDW. “At present, full capacity utilisation, a shortage of skilled workers, and bottlenecks in material deliveries are putting a brake on production, and leading to longer delivery times,” explains Dr. Schäfer.

Freeturn tools’ awards

After the Freeturn tools developed by Ceratizit for the new turning technology “High Dynamic Turning” had already been awarded a top-class industry prize for innovative products at the AMB in Stuttgart, they have now also convinced the jury at the Intec Award. Ceratizit secured the second place for their tools.

Intec – International trade fair for machine tools, manufacturing and automation.
Stratasys brings ancient artefacts to life

Additive Manufacturing - Underscoring the power of realism in 3D-printed models, Stratasys and Google Arts and Culture are re-imagingining some of the world’s most cherished artefacts and historical monuments through additive manufacturing. Backed by the Stratasys J750 3D Printer, historians can now re-create these items digitally and physically - raising both awareness and accessibility of ancient history. Google Arts and Culture is capitalising on Stratasys technology for its Open Heritage Project, designing and creating historical pieces with multi-material and multi-colour 3D-printed prototypes. With 3D printing, these remains can be more effectively preserved and shared - with files available for download around the world. The result is enhanced accessibility, in-depth understanding and enriched appreciation of centuries-old cultures.

“The project was to explore physically making these artefacts in an effort to get people hooked and excited about seeing pieces in a museum or research context. That’s when we turned to 3D printing,” said Bryan Allen, Design Technologist at Google. “With the new wave of 3D-printed materials now available, we’re able to deliver better colours, higher finish and more robust mechanical properties - getting much closer to realistic prototypes and final products right off the machines.”

One of the major initiatives of Google Arts and Culture is the restoration of rare plaster casts initially discovered by A.P. Maudslay during the late 1800s in Guatemala. For over 100 years, these relics were housed across storage facilities in the British Museum. By leveraging 3D laser scanners to virtually re-assemble each one, designers successfully reconstructed these items in physical form with Stratasys 3D printing - later allowing representations to be easily viewed by a wider audience online. “The J750 empowers designers to actually achieve their ultimate goal - matching the final 3D print to what is initially seen on the screen. Combining rich colours and translucency in a single print, designers and engineers can build models with heightened levels of accuracy and realism - mirroring opaque or transparent structures, and even complex materials like rubber,” said Rafie Grinvald, Enterprise Product Director of Rapid Prototyping, Stratasys. “Our relationship with Google Arts and Culture is the perfect demonstration of 3D printing paying off - with models that look and feel like the real thing.”
Digital future of plastic processing

Additive Manufacturing – Digitalisation will be at the forefront of Arburg’s presentation at Chinaplas (in Guangzhou, 21 to 24 May 2019) this year. There, the new customer portal will be presented for the first time. The application highlight will be a complex turnkey system that produces ready-to-use LSR/LSR wrist-watches within the injection moulding cycle.

"Digital transformation is a topic that we as industry leaders have been focusing on for years and one that we are currently defining with our 'Road to Digitalisation' campaign," explained Zhao Tong, Managing Director of the Arburg organisation in China. "We show our customers how our innovative solutions for injection moulding, additive manufacturing and automation can help them stay on track for success as we join them on the road to the digital future of plastics processing. "This allows them to fully meet all requirements in accordance with the state's 'Made in China 2025' industrial development plan." Zhao Tong explained.

An automated Allrounder 370 E Golden Electric will be used at Chinaplas 2019 to demonstrate that the Golden Electric series is suitable for the precise production of medical technology parts. The exhibit with a clamping force of 600 kN produces breathing masks for babies using a single-cavity mould from Mehow. The 298-gram moulded parts made from PC are removed and set down by a Multilift Select linear robotic system. The cycle time is around 15 seconds.

arburg.com

New trade fair for maintenance and services

Event - At In.Stand, industrial services from specialised service companies and internal maintenance and repair organisations will be presented. Messe Stuttgart is developing the event format of In.Stand, which over two compact days will showcase the entire range of consulting and financing, integration and training, maintenance, dismantling and recycling. The trade fair will take place from 23 to 24 October 2019 at the Stuttgart Trade Fair Centre. The targeted sectors are primarily mechanical engineering and plant construction, the automotive industry and the supplier industry. Sebastian Schmid, Department Director Technology at Messe Stuttgart, explains: "The location in southern Germany, which represents the automotive and mechanical engineering sectors like no other region, is an important factor for success. In addition, the aim is to achieve a close interlinking of maintenance and service. We are looking forward to developing this platform in the coming years together with the sector.”

The new fair will address primarily the machinery and plant engineering, automotive and ancillary supplier industries.

Plastics knowledge Day 2019

Event - Around 150 players from the plastics industry took part in the Plastics Knowledge Day 2019, organised by GOM GmbH on 29 January in Braunschweig, Germany. This event was the start of a global event series that will take place in more than 30 countries throughout 2019. The programme includes real-world application scenarios from the industry showing the use of optical 3D metrology and GOM’s solution approaches. The interactive transfer of knowledge offers beginners and experts the opportunity to learn about current and future trends in the industry. Some of the topics covered include toolmaking, production optimisation, inspection of components and analysis of material parameters. With plastic being such a versatile material, a lot of possibilities open up.

On 28 March, the Plastics Knowledge Day 2019 will take place in Leipheim near Ulm. In addition to a basic introduction to optical 3D metrology, the programme will include application scenarios from day-to-day practice as well as development issues of 3D metrology for industry-specific challenges. These will include virtual clamping of components in the GOM software, which in the future is supposed to make the use of expensive and complex clamping devices dispensable to a great extent. Moreover, industry representatives will report on their application experiences with the new GOM CT – an industrial computer tomograph designed for inspecting the structures of complex components from the inside.

gom.com

Pool-Net will be attending Midest 2019

Market – France is the second-largest customer of Portuguese goods, accounting for 12.5 percent of Portuguese exports in 2017. Regarding the mould industry, France ranks third in the export ranking, accounting for 12 percent of the moulds exported in 2017. Given the importance of the French market for Engineering & Tooling from Portugal, Pool-Net: Portuguese Tooling & Plastics Network is organising a participation in the Midest fair – the Global Show for all Industrial Subcontracting Know-how. Midest will take place from 5-8 March in Lyon, France. This fair features about 1,100 exhibitors, 30,000 sq./m of floor space and approximately 22,000 visitors.

The presentation of Pool-Net: Portuguese Tooling & Plastics Network has the main objective of promoting the "Engineering & Tooling from Portugal" brand and the skills of the Portuguese industry of moulds, special tools and plastics, namely the know-how, quality, technology and innovation, social sustainability, networking and reliability.

This participation is part of the "Highspot" project, promoted by Pool-Net, which aims to promote on the international markets the collective brand of "Engineering & Tooling from Portugal", contributing to the reinforcement of the positioning of Portuguese companies of the Engineering & Tooling cluster on supply and strategic markets. The Highspot project is funded by Portugal 2020, under the Operational Competitiveness and Internationalisation Programme, receiving €411,116 from Feder (European Regional Development Fund).

Pool-Net: Portuguese Tooling & Plastics Network is an association created in October 2008 to manage the Portuguese Engineering & Tooling cluster, being responsible for bringing together the engineering and tooling industry in Portugal and promoting the integration of this industrial, technological and scientific community.

The "Engineering & Tooling from Portugal" brand sets its strengths on accumulated know-how, innovation and technology, quality and reliability, networking, competitiveness and social sustainability, all of them core competencies of the Portuguese engineering and tooling industry.

Portugal is the world’s eighth-largest mould-making country and currently exports over 85 percent of production to 86 countries. In 2017, the country’s tooling exports reached a value of 675 million euros. Exports as well as employment have doubled in the last ten years. Europe is the main export zone.

toolingportugal.com
Mapal opens second site in Mexico

Expansion – Mapal Frhenosa occupies a leading position on the precision tools market in Mexico and employs roughly 120 people. The company’s headquarters are situated in Monterrey in the north of the country. The new factory in Querétaro gives it considerably more production capacity for reconditioning tools, as well as eventually creating 100 new jobs. “This second site gives us the opportunity to cut our response times by quite some margin whilst also meeting the ever more challenging requirements of our customers,” comments a delighted Dr Jochen Kress, president of the Mapal Group. In recent years, Querétaro has flourished into a major hub for the international automotive and aerospace industries. Alongside customised process solutions for machining all manner of workpiece materials, Mapal Frhenosa offers rapid reconditioning of PCD tools and regrounding of solid carbide tools in both Monterrey and Querétaro. The two factories use identical machinery and production processes and comply with the exacting international standards of the Mapal Group. “For us, creating this new capacity is an investment in the future. We aim to keep on growing,” explains Lazaro Garza, CEO of Mapal Frhenosa in Mexico.

Mexico has signed free trade and co-operation agreements with more than 60 countries and is a strategically important location for the international Mapal Group, with abundant potential for development.

mapal.com

Dormer Pramet acquires U.S.-based Wetmore

Acquisition – Wetmore Tool and Engineering is a manufacturer of adaptive shank drill technology as well as fasteners, reamers and rivet shavers. The company specialises in cutting tools for hand-held skin drilling applications performed by several global aerospace organisations. The acquisition strengthens Dormer Pramet’s position within the aerospace industry.

Stefan Steenstrup, president of Dormer Pramet, said: “I am very pleased to have reached an agreement to acquire Wetmore Tool and Engineering and we welcome them into the Dormer Pramet family. Wetmore has, for more than 60 years, been a leading supplier of high-quality cutting tools renowned for its precision and serviceability to the aerospace industry. Combined with a pro-active approach to customer service, this makes the company an excellent fit both strategically and culturally with Dormer Pramet. We very much see this as business as usual for both companies as we continue to grow and expand our presence within the aerospace industry. It gives us significant brand recognition, not only in the US, but worldwide.” He added that current Wetmore customers will still receive the high-quality products and services they are accustomed to and will now have access to Dormer Pramet’s extensive range of high-quality solid and indexable cutting tools. Similarly, the Wetmore brand will become well-known with Dormer Pramet customers around the world through the latter’s established global distribution and sales network.

dormerpramet.com

1,000th connection via rConnect

Software – The thousandth connection was established on an rConnect-ready Mikron MILL P 800 U high-performance milling solution at the Fraisa Tool School in Bellach, Switzerland this past November. This demonstrates the value the platform brings to manufacturers.

The installation at Fraisa also demonstrates the value of rConnect’s Live Remote Assistance (LRA) module, which links users’ machines to GF Machining Solutions’ diagnostic centres in real time. rConnect debuted in 2017 and continues to evolve with the addition of success-triggering modules. It represents the machine tool industry’s most in-depth remote machine tool analysis and GF Machining Solutions’ Service 4.0 vision of intelligent and high-performing services.

“Fast reaction and recovery are required when machines are down. Delay in production and production downtime are very costly so manufacturers need fast reaction times and reliable, fast communication processes,” said Stéphane Cru, Head of GF Machining Solutions’ Customer Services Center in Geneva. “Especially with time-critical incidents, long journeys to the custom-
Parts2clean – Cleaning solutions

Event – The need for cleaning solutions that measure up to today’s standards is greater than ever. Parts2clean will provide such solutions, the fair being held at Stuttgart Exhibition Centre from 22 to 24 October 2019. To an ever increasing extent, the levels of cleanliness achieved need to be documented on a continuous basis, and the results stored until the next processing stage or even through to delivery to the customer. “The exhibitors at Parts2clean will be presenting solutions for every requirement,” says Olaf Daebler, Global Director of Parts2clean at Deutsche Messe. “Parts2clean is the top international get-together for the industry and a prime showcase for best-fit solutions and the latest technological advances and trends.”

Parts2clean is the premier international source of know-how and purchasing options for industrial parts cleaning. The show’s visitors come in search of solutions for highly specific requirements. “Parts cleaning is a key issue in medical technology. As Parts2clean is the only trade fair covering every aspect of parts cleaning, that’s where we go to showcase our products and services. Those who came to see us at the show were industry professionals armed with a keen interest in finding answers to very specific questions,” reported Dr. Dagmar Martin, head of a working group called “Interface analytics in the production process” of the Natural and Medical Sciences Institute (NMI) at the University of Tübingen.

parts2clean.de

Record year for Mazak

Machining Equipment – Yamazaki Mazak celebrated a record year for machine sales in 2018. Despite uncertainty in the lead-up to Brexit, the machine tool manufacturer witnessed good sales throughout the automotive, oil and gas, and medical markets. Alan Mucklow, Managing Director UK & Ireland Sales Division for Yamazaki Mazak, commented: “Mazak is delighted to announce that 2018 proved to be the company’s best-ever year for UK machine sales. Mr Mucklow continues: “A particularly pleasing aspect of our 2018 sales performance was the volume of commodity machines, including the UK-made entry-level QT Compact turning centre range, and the high-performance Quick Turn series. The company has invested heavily in improving our European Manufacturing Centre in Worcester in recent years, and it is especially rewarding to see that investment translate into shorter lead times and strong sales for UK-built machines.”

“2018 also proved to be another fantastic year for UK sales of machines from our laser processing portfolio, following the recent additions to our Direct Diode Laser range, as well as the newly unveiled 8.0kW and 10.0kW additions to our highly popular Optiplex Fiber series.” He concludes: “2019 has already started off strongly, having generated an impressive volume of enquiries from our presence at Autosport Engineering in January. This year was the first time we exhibited across the weekend, rather than just the ‘trade’ days, and it paid real dividends, being the only machine tool manufacturer with a visible presence.”

mazakeu.de
Paris wants to tackle Industry 4.0 internationally

How can Europe compete in the global race for Industry 4.0? Given the financial strength of major American and Asian corporations such as Google, Amazon and Alibaba, France is relying on co-operations with other countries.

“A n industrial revolution means total change, not only the economy but life in general,” said Prof. Philippe Dessertine, holder of the Chair of Business Management at the University of Paris I Panthéon Sorbonne, at a conference accompanying the Be 4.0 exhibition in Mulhouse. The fourth industrial revolution goes deeper than the previous ones and is far from over: “We are on the second step of a staircase with 10,000 steps,” he continued. Overall, however, he takes a positive view of the topic – Industry 4.0 is for him the answer to challenges for the whole of mankind, such as the population explosion or climate change.

Dessertine became all the clearer with the situation in Europe. For him, the old continent has already missed the first two stages of the fourth industrial revolution, namely digitisation and artificial intelligence. “Europe must become aware of how far behind it is,” he demanded. In addition, the 20 largest companies in the world all come from Asia or America. “Europe’s position in the world results from the pioneering achievements of the first and second industrial revolutions,” Dessertine analysed. On the other hand, however, the continent benefits from the fact that Industry 4.0 projects are being tackled everywhere; in Asia and America, this is limited to a few regions.

Corporations tend to invest more than states

Jean Rottner, regional president of the Grand Est region, said that “we must strengthen cross-border co-operation”. “Where France invests 1 billion euros, a company like Alibaba spends 15 billion.” He particularly stressed the need for co-operation. For his region, he is striving for a strong exchange with the German federal states of Baden-Württemberg, Rhineland-Palatinate and Saarland as well as with Switzerland.

This international approach was also reflected at the Be 4.0 trade fair held at the end of November in Mulhouse, France. More than 3,500 visitors came to the second edition of the event according to the organisers, Region Grand Est, Mulhouse Alsace Agglomération and Parc Expo Mulhouse, 18% of them from abroad. The 230 exhibitors included established companies such as Siemens, Schneider Electric, EDF, Engie and Endress+Hauser as well as 50 start-ups. According to the organisers, the exhibition area totaled 10,000 m². The exhibition was accompanied by more than 50 conferences; topics included the digitisation of industry and new economic models, the place of man in the industry, the role of cobots and robots, big data and cybersecurity. “In its second edition, the Be 4.0 exhibition has developed dynamically and doubled its area,” commented Laurent Grain, Director of Parc Expo Mulhouse. For the coming year, he has set himself the goal of turning the fair into a Franco-German Industry 4.0 meeting. The Grand Est region sees itself as the engine of the current 4.0 transformation. Within one year, it has developed and implemented its own strategy, called SRDEII (Schéma Régional de Développement Économique, d’Innovation et d’Internationalisation). This includes a regional plan for the “Industrie du Futur”, which is intended to support companies in modernising themselves.
EBM-Papst strengthens presence in China

EBM-Papst has started to build a new plant in Xi’an, the capital of Shaanxi Province in China. The world market leader for fans and electric motors has a sophisticated strategy in place for the Asian market.

A sia plays a special role for the Mulfingen-based company. “The Asian and especially the Chinese market show the highest growth rates worldwide in all market segments of the EBM-Papst Group,” reports Thomas Nürnberger, Managing Director of EBM-Papst China. “The demand for our products on the Asian market is constantly increasing so that we need further production capacities in addition to our plant in Shanghai,” explains Stefan Brandl, Chairman of the Management Board of the EBM-Papst Group.

EBM-Papst China manufactures axial and centrifugal fans with up to 4 kW drive power on site, as Nürnberger further explains. In addition, customer-specific systems for the automotive, industrial drive technology and white goods industries are manufactured locally: “Only products whose quantities are too small for localisation are imported,” says the managing director.

It is the company’s strategy to be present on Asian markets not only with local production but also with local development: With a development team of 50 engineers in China, motors and fans are developed and adapted specifically for the Asian market. “Our Chinese R&D location thus offers the opportunity to exploit the advantages of the so-called China Speed. In China, we need less time to turn an idea into a commercial product,” says the managing director.

“The requirements of our Chinese customers have risen sharply in recent years,” explains Nürnberger. In terms of quality as well as performance and acoustics, Chinese customers today demand products that are comparable to those in Germany. According to the managing director, Chinese customers attach great importance not only to the product but also to local customer care and service. “Here, too, EBM-Papst China has gained a competitive advantage through its strong local presence,” he says. These customers are becoming increasingly important for the company. “Since the start of business in China over 25 years ago, the proportion of Chinese customers has steadily increased. Today, Chinese companies account for 70% of the company’s turnover. Subsidiaries of existing customers worldwide account for around 30% of sales in China,” explains Nürnberger.

Product pirates are still a nuisance. “We locate plagiarisms in a targeted manner or have them made available by our customers. Both the appearance and the technical data of our products are copied. Our patent attorneys then take action against infringements of industrial property rights. From our point of view, however, the sanctions against product piracy are still too lenient,” says Nürnberger. According to Nürnberger, with the development of ever new products and the permanent improvement of existing series products, Mulfinger is able to defend its technical lead time and again. “We are convinced that the quality and performance of the original will prevail in the end,” he says.

The decision for the new location near the city of Xi’an with its twelve million inhabitants is based on the company’s high availability of skilled workers and its logistical connections. “The new location in Xi’an, the third-largest university city in China, also offers the opportunity to expand development activities in China,” adds Nürnberger.

ebmpapst.com

Stéphane Itasse
Control 2019 – QA innovations in a new format

The 33rd international Control trade fair for quality assurance will open its doors in just about four weeks. Roughly 900 manufacturers and distributors from more than 30 countries will present innovative solutions for industrial quality assurance.

Digitalised and networked QA systems are booming. Industrial image processing is leading the way with record-breaking growth rates. And not only will industrial image processing and the associated components be presented by the Control international trade fair for quality assurance at the Stuttgart Exhibition Centre from the 7th through the 10th of May, 2019, but rather Industry 4.0 compatible measuring technology, sensors, QA software and much more as well.

The expansion of Control into Hall 8 will provide trade fair promoters P.E. Schall GmbH & Co. KG with the unique opportunity of thematically structuring the QA trade fair into individual blocks of expertise for the exhibitors and industry visitors. In the future, Hall 8 will be the central platform for QA systems, QA software and QA services. Furthermore, the significant increase in floor space at Control makes it possible to fulfil the long-standing demand of many exhibitors for larger booths.

In the future, visitors will be able to simply and concisely inform themselves about corresponding product and service offerings exhibited by as many as 80 to 100 manufacturers and distributors in a compact format. This restructuring of Control is intended to accommodate the growing demands being placed on the QA market, which is currently experiencing dramatic transformation due to, amongst other factors, digitalisation and the necessity to become consistently networked.

This transformation is also made apparent by the rapidly growing sector for industrial image processing and image systems: “During the last 10 years, turnover has doubled for the German industrial image processing sector. On average, the sector grew 13% per year between 2013 and 2017, and last
year alone it experienced an increase of nearly 18% – this is the message included in the current press release issued by the VDMA’s department for industrial image processing. According to the latest surveys, the VDMA expects that the record-breaking level of €2.6 billion will be maintained in 2018 as well.

This is due to the fact that, for good reason, the electronics and automotive industries have a greater propensity to invest than ever before. Despite all of the challenges resulting from trade regulations and the lack of qualified personnel, the industry sector is in good spirits according to the VDMA and the growth trend will continue.

Exhibitor Forum: Transfer of theory to actual industrial QA practice

As is the case every year, the exhibitor forum is an additional crowd-puller for Control visitors and exhibitors. In 2019, it will once again provide participants with the opportunity of transferring theory to actual industrial QA practice by means of technical presentations and best practice reports. Visitors will be able to derive solutions for their quality assurance tasks from the individual application cases introduced at the forum.

Image processing is more important than ever in production. New fields of application are opening up continuously in daily industrial practice, as well as in the area of mobility, for example, in the case of autonomous vehicles for intra-logistics, as well as for freight forwarding and passenger traffic. Beyond this, refined industrial image processing and vision systems are also replacing numerous conventional measuring and test set-ups. Industrial image processing and vision systems, as they’re presented at the world’s leading trade fair for quality assurance, are continuously in use in order to improve quality, increase reliability and enhance safety. Corresponding keywords include embedded vision and deep learning.

Globally recognised experts agree that image processing is the key technology for global automation. Thanks to networked sensor technology, modern vision systems and industrial image processing, production and assembly machines can acquire and process the required data in real time. This results in even better product quality, more productivity and a sharper competitive edge. Industrial image processing and the associated components have in fact been part of Control’s portfolio for many years.

Industry 4.0: new sectors and the smart factory

At Control, manufacturers, users and trade visitors from all over the world will continue along the path to the smart factory. And this is why Industry 4.0-compatible systems are just as much a part of the portfolio of offerings as modern measuring and test systems. In order to take best possible advantage of the flood of data, flexible system solutions such as quality data management systems, as well as in-process and integratable QS products and services, will have to be incorporated into all QA processes, and these will be presented at Control in a highly practical setting: mechatronic measuring instruments and 3D metrology, microscopy and endoscopy, image processing and vision systems, manual handling of test objects and individual parts, as well as robot-aided series inspection. Exhibitors at Control will have the opportunity of presenting their companies to a focused target group within an international setting, which is why numerous market and technology leaders take advantage of the globally leading trade fair to introduce their new products to an international expert audience. With a new structure and a re-focused perspective on the topics currently dominating the QA-industry, Control 2019 aims to provide the right platform for an informed exchange on the future of quality assurance. The smart factory is one of the main focal points of the show. This underlines the interconnected nature of the future of manufacturing. Single-topic expos are becoming increasingly interwoven with other areas of the industry. A trend that is likely to be observed more and more.

control-messe.de
Rapid Tech: More space for additive manufacturing innovations

In 2019, the “3D-Printing Family” will meet in Erfurt from 25th to 27th June for an event centred around additive manufacturing. Everything will revolve around innovations and applications in additive manufacturing, both at the trade congress and at the trade exhibition.

For AM-interested individuals, Rapid Tech + Fab Con 3.D might be of interest as it aims to provide a information and networking platform for generative manufacturing processes in Europe. Main focus is on the latest developments in rapid prototyping, the manufacture of end products with the aid of additive manufacturing and the transfer of the technology into series production, as well as the resulting challenges with regard to standardisation and legal framework conditions. Based on surveys conducted by the organisers, visitors and exhibitors largely agree in their assessment of Rapid Tech + Fab Con 3.D: If you are active in the field of 3D printing or want to start becoming active, attending this congress and trade fair for additive technologies in Erfurt might prove quite interesting to visit. According to the survey, a high percentage of visitors rated the trade fair in the top percentile.

A drive for improving

Close to 5,000 international visitors in 2018 from 27 countries commented positively on the innovative and open atmosphere as well as the quality of the exhibitors. “All the big names in the 3D printing industry are here” or “One can recognise new trends and find suppliers” are the formulations in the visitor questionnaires. Visitors mentioned the variety of exhibitors as well. The various specialist forums at the Rapid Tech Congress also receive a ‘very good’ or ‘good’ according to the survey.

Rapid Tech + Fab Con 3.D is used as a knowledge exchange platform, while aiming to provide an overview of current trends and innovations in the additive manufacturing industry.

From an exhibitor’s position, the survey concludes that those attending generally agree to have...
reached their target group by attending the fair. With such positive feedback, the pressure to keep it up is all the more apparent. “We are very pleased with these assessments and appreciations and at the same time, they are an incentive to constantly adapt the concept of the event to the needs of exhibitors and visitors and to further develop it in line with the times.” says Michael Kynast, Managing Director of Messe Erfurt GmbH.

While growing and adapting is important, it bears the risk of losing the original purpose and with it its audience. Messe Erfurt aims to keep growing while not losing sight of the “core topics” which is to be a first and foremost practice-oriented exhibition. Lectures are set to be part of the fair as well with selected keynote speakers relevant for the target audience of the fair. Yet, Messe Erfurt also tries to provide innovations with a suitable space in the programme with their “News & Innovation Studio”.

Now with an extended programme

In 2019, the programme of the congress will be extended to include three specialist topics and a total of 13 specialist and industry-related forums. New topics will include plastics, software & processes and standardisation & occupational safety. “We are thus responding to innovations and trends in order to illustrate additive manufacturing in all its facets and to offer an optimum platform for the exchange of expertise and opinions between experts in the industry. The proven topics such as automotive, medicine, aviation and contract manufacturing are still on offer,” emphasises Michael Kynast. In doing so, Messe Erfurt aims to merge the present and future of the additive manufacturing industry. The goal is a balanced coverage of user-for-users topics as well as the scientific contributions still far from making it to the show floor, but perhaps not uninteresting to those attending just for factory solutions and the like. The gaze has definitely been set to the horizon with an increasing emphasis on innovations. This push for future innovations can also be observed in the competition organised by Messe Erfurt.

3D Pioneers Challenge

The competition addresses specialists worldwide who look beyond their own horizons – pushing boundaries. Additive manufacturing processes are among the innovations of the 21st century. Hardly a day goes by without the technology news detailing new findings or processes that could potentially revolutionise certain areas of industries. It has become a permanent feature of university programmes and research institutes. 3D printing is on the threshold of integration into industrial manufacturing processes.

Moreover, for some time now, the technology has been pushing itself to the fore. It acts as an “enabler” of many concepts and innovations, even completely new business fields. Individual solutions can meet people’s needs and wishes. Spare parts procurement is rethought. Last but not least, lightweight system construction enables sustainable and ecological management. Social projects are only made possible by 3D printing in certain areas. But pioneering thinking also requires the courage to break new ground. It is precisely these pioneers who will be awarded prizes in the 3D Pioneers Challenge (3DPC).

In 2019, pioneers will again be sought for the 3DPC who continue to think 3D printing. The fourth edition of the design competition will be announced in the categories of Design, MedTech, Fashion Tech, Material, Architecture, Digital, Mobility and, as a new focus, Sustainability. In addition to non-cash prizes, the winners will receive prize money totalling €35,000, donated by the Thuringian Ministry of Economics, Science and the Digital Society. The 3D Pioneers Challenge is an attractive competition in the 3D printing sector.

Rapid Tech is interesting to those working/aiming to work in the additive manufacturing sector. The fair aims to build on the positive feedback of past fairs by providing a rounded representation of the current state of the industry with an equal focus on solutions for present problems as well as a space for future innovations and scientific research.

Source: Messe Erfurt GmbH/ Christian Seeling

The halls will offer many different eye-catching displays of technology and innovation.
What is CAD/CAM?

How do computer-aided modelling and computer-aided manufacturing work? Here’s what people should know about the basics of CAD/CAM.

INFO

Making sense of Industry 4.0

Page 21 Of input and output – defining CAD/CAM
CAD and CAM are easily defined by their respective products.

Page 23 History and future
The beginnings of CAD/CAM and where its development may go in the future, helping designers to create the currently unthinkable.
Computer-aided drafting makes it much faster to fiddle with the concepts underlying part models. For instance, a designer can instantly see how different product modifications might look without having to redraw numerous variations manually.

Drafting with computers also heightens the shareability of models. As engineering workforces become increasingly distributed, it behooves companies to use models that they can quickly disseminate via email, version control and other conventional methods. This workflow tweak also makes it a lot simpler to suggest changes and improvements without going back to the proverbial drawing board.

Digital models can also undergo advanced testing processes before they reach the field as tangible items. By importing these files into computer-aided engineering applications, it’s possible to simulate forces like fluid flow, wear and other real-life factors that a product may eventually face. Such steps help creators provide consumers with more satisfying products that have lower mean time between failure rates.

Finally, it’s worth noting that digital drawings and models are far less open to misinterpretation. Instead of worrying about whether a third-party fabrication firm’s lead engineer paid attention in their drafting classes, you can spend more time checking your work. As long as they’ve calibrated their machinery to the proper specifications, your model will be faithfully reproduced.

**Effective conceptualisation**

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**Enhanced fabrication success**

Computer-controlled manufacturing processes have dramatically changed the way companies create products. Instead of needing to send technical drawings off and wait for them to be prototyped, any start-up firm with enough money for a small CNC platform or 3D printer can create its prototypes in-house. This seemingly small process improvement results in more efficient testing, and it can cut down on mistakes by giving designers a chance to interact with the re-
Beyond the manufacturing industry: CAD/CAM also plays a huge role in dental research and treatment.

Results of their efforts while the ideas are still fresh. In most cases, computer-controlled machinery consistently outperforms its skilled organic counterparts. Although there are still some jobs that necessitate the manoeuvrability of human fingers and the creativity of human brains, robot arms and mechanical routers don’t succumb to forces like fatigue or distraction. When it’s important to do things a certain way every time, using a machine to complete the work is the obvious choice. This is especially relevant considering the fact that you don’t have to teach computer manufacturing systems like you would need to train humans. Now that you understand the basics, you can build a physical part from a model, right? Not so fast. Before leveraging computer-aided drafting and manufacturing involves translating a model into something that a fabrication device can work with. For instance, even if you’ve created a 3D DXF file that represents an object’s dimensions, the router or other machinery needs specific guidance that tells it how to make that shape from a block of plastic, metal or wood. This file can then be translated into manufacturing instructions for the respective machine to produce the intended object.

Conversion: from model to manufacturing instructions

Special applications usually fulfil this role by turning completed model files into instruction files. For instance, with many consumer and professional-grade 3D printers, the model takes the form of an STL file. This format specifies the geometry of a part by numerically describing the positions of the points that represent its triangular faces in three-dimensional Cartesian space. Other formats, such as AMF, also include instructions for different material colours and constellations, or object-grouping arrangements.

Upon opening an STL or AMF file, the software that runs the printer may translate it into something like a G-code file. These files contain the actual movements that the printer will have to make to create something. For instance, instead of saying “This object includes a point at such-and-such XYZ coordinates,” the G-code might say “Send the tool head to such-and-such XYZ coordinates and squeeze out some melted plastic.”

In the case of 3D printing, this conversion process is referred to as slicing a model, since it results in a set of instructions that tell the printer where to move for each thin layer of the print. With routers and other numerically controlled devices, the files may be converted into similar command sets known as M-code files. This goes to show how easy it is to employ completely different fabrication processes with the same original model.

Choosing the right tools for the job at hand

Different kinds of fabrication demand distinct flavours of computer-aided manufacturing formats. For instance, printed circuit boards, or PCBs, are commonly arranged in layers containing traces, or the paths of copper connecting different chips and components. Common tools like Fritzing and Eagle let you place different parts where you want them and draw the links between them or even have the program calculate optimal routes automatically. Depending on your chosen circuit board fabrication
method, such as screen printing and chemical etching, you may be able to convert the result into a vector-graphics-format Gerber file and send it straight to the printer. One of the best things about computer-aided manufacturing and modelling is that there are a ton of open-source programs out there. Anyone with an inexpensive laptop capable of running a basic version of a "nix operating system can easily download tools that let them set up their own garage-based manufacturing plant. Some common options with varying capabilities include:
- PCB Creation Tools: TinyCAD, PCBWeb Designer, Kicad, Fritzing and ExpressPCB.
- General 3D Modelling Tools: OpenSCAD, OpenJSCAD, Blender, QCad, Sculptris and FreeCAD.
- 3D Printer Control Tools: Repetier-Host, Slic3r, 3DPrinterOS, MatterControl and Cura.

It’s important to stress that these tools offer widely varied feature sets. For instance, one common open-source workflow bottleneck involves the fact that there aren’t too many free CNC device controllers that have the full set of capabilities needed for professional work. While options like LinuxCNC are highly popular and relatively well supported, the computer-aided manufacturing industry has historically been dominated by companies that create their own proprietary hardware and custom applications to go with it.

Common proprietary tools

Fortunately for companies that demand reliable processes, there’s no shortage of paid programs on the market. Many, such as Mastercam, Vectric and Autodesk, help unify workflows by making it possible to create models and control manufacturing hardware within the same application. Corporate requisitioning officers may also be interested in learning that several of these tools include free trials, so it’s usually pretty easy to test them. One of the biggest advantages of the computer-aided workflow is that it empowers companies to make better use of classic techniques. For instance, enterprises that create parts using injection moulding and similar methods have to invest significant amounts of capital into the creation of moulds. While such expenses are by no means prohibitive, the costs start climbing rapidly with imperfect processes. For instance, imagine that your firm fails to catch a mistake made during the modelling phase before sending the plans to the production line. You may suddenly find yourself sitting on thousands of expensive, unusable parts. Computer-aided models are also vital for creating high-quality tooling. As more advanced techniques become available, it becomes increasingly necessary to implement testing and quality control processes for consistency’s sake. Since applications can include alerts and safety notifications, it may be a bit easier to avoid silly mistakes, such as creating a tool with an overly thin shaft or the wrong fitting for the device that uses it.

Computer-aided production processes aren’t anything new, but they’ve certainly come quite a long way from their origins. Engineering professionals have jumped at the chance to integrate computers into their workflows since their industrial introduction in the 1940s and 1950s. While those early tools weren’t much more than glorified calculators by today’s lofty standards, they set the tone for what was to come.

The technology and brief history behind CAD/CAM

As computer technology and interfaces became more advanced, it was only natural for mankind to begin using these tools to reshape the world. Much of the early groundwork was decidedly theoretical. In the late 1950s, mathematician Paul de Casteljau published an eponymous algorithm used to describe polynomial curves in a numerically consistent manner. These ideas were subsequently popularised by Pierre Bézier, a Renault engineer who created a new notation and used it to describe the shapes of vehicle bodies. These Bézier curves would go on to become the standard for early typesetting languages like Postscript, the 1984 vector graphics brainchild of Adobe engineers.

Coincidentally, the proliferation of vector graphics modelling occurred at around the same time that computer technology was becoming democratised. With more people and companies able to access monitors, trackballs and other then-novel tools, businesses and academics naturally began hooking them up to production lines to see what they could create. Since digitised industrial systems, such as programmable logic controllers, were already being used in the automotive industry for decades by this point, it wasn’t a huge leap to connect fabrication devices to computers.

The state of the future

Many of today’s manufacturing machines continue to operate on the same underlying principles that early industrial processes leveraged. CAD and CAM, however, have undeniably made life more comfortable. As technologies like virtual and augmented-reality interfaces become increasingly widespread, computer-aided production methods will almost certainly take on exciting new dimensions. CAD/CAM is immensely powerful in manufacturing and it will only grow more powerful in the future, allowing for even more creativity. Other processes, such as additive manufacturing, will grow alongside it and enable designers to tackle projects previously thought unthinkable.
Automated quality control, Industry 4.0-ready on show

Measurement – At Hannover Messe, Creaform will focus on automated quality control – an increasingly important topic in the manufacturing industry and Industry 4.0. While it is today necessary to carry out dimensional controls within the production cycle with automated measuring technology solutions next to or on the production line, the industry of tomorrow is moving toward automated quality control. In Industry 4.0, where the entire manufacturing process is connected, integrated, and automated, 3D scanning is better suited than probing to inspect parts as they are manufactured: Indeed, 3D scanners capture a lot of data quickly, which is essential in the 4.0 manufacturing process.

Creaform’s MetraScan 3D-R is said to be a robotic measurement solution that can be integrated with production automation processes. The automated measuring system is available as a turnkey or customised solution, which can be installed next to the production line. This allows for the robot-mounted 3D scanner to perform fast, high-precision automatic inspections on complex surfaces.

With the portable 3D scanners Handyscan 3D and Metrascan 3D, Creaform makes the scanning of complex geometries and quality control easily accessible to everyone. They can be used directly where a part must be measured. Even in non-constant work environments like in production environments, the scanners deliver fast, reliable and accurate results.

creaform3d.com

High-speed material testing with intelligent camera series

Inspection – The Merkur smart line scan camera series from EVT provides high-speed inspection for materials.

The Merkur camera series from the specialist of machine vision products combines a line scan camera and a smart camera, resulting in an intelligent, high-speed system for testing ‘continuous’ material (as opposed to workpieces), printed material, paper and steel webs in the printing industry and in textile production. The Merkur ZLS features a FPGA and IP core to programme the testing independently. A Dual Core ARM processor can be optionally extended with a Myriad 2 Deep Learning processor, which then provides even faster applications in deep-learning surface inspections. The camera features Power over Ethernet (PoE), M12 connectors and IP67 protection, and has a maximum resolution of 2X2,048 pixels. The Merkur smart line is used to inspect products and goods transported on conveyor belts as well as high speeds in the printing, sorting, packaging and food processing industries, and all types of surface inspection.

Merkur can be easily integrated into machines, requiring no PC, and is a cost-effective alternative to conventional industrial line scan cameras.

Also, Merkur is supported by Eye Vision software and can thus be used with the entire command set of the drag-and-drop software. The combination of Merkur line scan camera and Eye Vision software is also available as Eye Check ZLS.

evt-web.com

Safe navigation in automated guided solutions

Navigation – Sensor specialist Leuze Electronic has worked with the optical sensor manufacturer Owen/Teck to develop specialised, cost-efficient custom solutions. The company says it offers effective and safe sensor solutions for continuous conveyors, high-bay storage devices and automated guided vehicles (AGVs).

An example presented recently at Logimat was Leuze’s RSL 400 navigation system – a safe scanner that combines safety technology with superior measuring output in a single device, which ensures reliable AGV guarding and navigation simultaneously. According to Leuze, the navigation can also control collision-free and easily adapted routes when multiple vehicles are in use, making the system very flexible.

Another system, the compact OGS 600 with edge detection and control signal transmission, enables flexible optical guidance. In production and storage areas, OGS 600 enables cost-efficient vehicle automation for the transportation of materials and goods.

leuze.com
Quality Control – Dimensional management is an engineering methodology used for preventative quality assurance, which ensures the functionality, producibility, repeatability and performance of any given product according to specific requirements. This methodology allows manufacturers to guarantee quality while mitigating production waste and costs as well as product returns.

“The shift in today’s global economy towards the delocalisation of R&D centres and production means that – in order to hit time-to-market, commercial, quality and performance targets – manufacturers must increasingly rely on dimensional management throughout the entire manufacturing process,” said Denis Daigle, Director at Creaform Engineering. “By providing all our clients with integrated dimensional management services and training, we are levering the tremendous potential of metrology to them by bridging the gap between design, production and quality assurance teams. Dimensional management is a complete game-changer when it comes to worldwide manufacturing.” Additionally, Creaform Engineering’s unique approach consists of applying dimensional management best-practices right from the start of a project in order to mitigate errors during assembly, which can increase costs, impact time-to-market and cause significant product recalls. The company’s enhanced dimensional management services help clients address critical manufacturing challenges, including:

- Identifying assembly-functional elements and critical dimensions
- Analysing variations and distributing tolerances according to manufacturing processes
- Applying functional tolerances (GD&T) according to ASME Y14.5
- Solving assembly problems related to dimensional management issues

Dimensional management services can be offered in conjunction with the engineering team’s range of services for a complete turnkey solution. Moreover, Creaform Engineering has a track record in helping clients in different industries benefit from its expertise in dimensional management. This can improve quality and decrease costs by evaluating designs through the entire product development process. creaform3d.com

**Gewefa’s new set for maintenance and servicing**

Testing – Degradation of internal components such as spindle bearings and the spindle pull-back mechanism will impact over time the precision of the workpiece being machined in the same way as tool wear. Using the right test equipment is important and by combining the latest OTT-Jakob Power Check spindle pull force measuring gauge with high-precision Gewefa test bars and alignment kits, monitoring spindle performance and servicing is now a straightforward and precision-guaranteed operation. The Power Check is a highly adaptable component that can be used as a portable service tool or permanently located in the carousel. gewefa.de

**Grinder-polishers for demanding laboratory applications**

Grinder-polishers from Buehler are now demanding ever-shorter lead times in their test laboratories. Our reliable Automet Pro grinder-polishers are contributing significantly towards accelerating sample preparation and improving sample quality, whilst saving time and money in the training of laboratory technicians. In day-to-day laboratory operations, these units eliminate the need for repeatedly setting up the machine and reduce operator errors to a minimum. buehler.com

**Dimensional management service**

The company’s engineering division will provide end-to-end dimensional management solutions.
Rudd Macnamara invests in Keyence measuring systems

Measuring System - For high-precision measurement applications, Keyence offers a variety of measurement systems that quickly communicate whether manufactured parts are good or no good. Rudd Macnamara is a diversified manufacturing organisation, according to Graham Caunce. “Most of the nameplates we make are in anodised aluminium or stainless steel, manufactured using a variety of processing techniques resulting in some level of variability that needs to be controlled and eliminated.”

“Dimensional integrity of our nameplates is critical to our business,” explains Graham Caunce. “Most of the nameplates we make are in anodised aluminium or stainless steel, manufactured using a variety of processing techniques resulting in some level of variability that needs to be controlled and eliminated.”

The Midlands specialist had been manufacturing these parts for many years. However, it became of the utmost importance to improve assurance processes, according to Graham Caunce. “We started looking not only at digital optical measuring solutions but also at our internal manufacturing processes to reduce those variabilities, which include hard tooling.” Staff also needed a quick way of checking that what they were manufacturing was in line with drawing. This is where the investment in a Keyence IM-7000 system proved especially helpful: It allows for faster, easier and more consistent measurements of width, radius and height, all with a single device. Inspection reports can be created with the push of a button, increasing post-measurement work efficiency.

According to Rudd Macnamara’s managing director, the best word to describe how this acquisition helped the company is “assurance”. It is now possible to quickly check a large number of parts and identify any rejects. Rudd Macnamara’s personnel know that what is supplied is correct, in line with drawing and within tolerance. Moreover, where the Keyence machine identifies a high number of rejects, staff are able to review the route to manufacture and quickly identify any improvements that are required.

“We looked at other machines but we found that the Keyence IM-7000 system was quick to program and even quicker to use,” analyses Caunce, who says Rudd Macnamara found its own “sweet spot”: “We find it is best to load the bed with some 10 parts. That makes it easy to keep track of the good parts and identify any rejects. We can also identify and measure print whereas competitive machines could not.”

High-performance drive controllers with add-on options

Controls – Aerotech will present two high-performance single-axis controllers, the digital Pulse Width Modulation (PWM) XC4 and XC4e, at Control 2019. Suitable for driving brushed or brushless DC motors, moving coil actuators and stepper motors, the controllers have a Hyper Wire fibre-optic interface, apart from the position-synchronised outputs (PSO).

The XC4 and XC4e controllers are powerful, having an operating voltage of up to 360VDC and a peak current of 30A. All drive variants are compatible with the A3200 automation platform, which uses the Hyper Wire drive bus. The digital current and position-control loop ensures good positioning and synchronisation accuracy and has a control bandwidth of up to 20kHz. It processes both digital and analogue inputs and outputs, data acquisition as well as control and real-time encoder interpolation, the company explains.

Standard features include Safe Torque Off, a data array with over four (XC4) or 16 million (XC4e) 32-bit elements, digital and analogue I/Os, single-axis (XC4) and multi-axis (XC4e) PSOs, special inputs for referencing and travel limitation as well as improved current monitoring. Square-wave, sine-wave and absolute encoder signals can also be processed. The maximum input frequency for square-wave encoder signals is 80 million pulses per second for both variants. With the additional MX1 function, the XC4 drive controller can interpolate sinusoidal encoder signals of up to 14 bits (16,384-fold). For the XC4e, the additional MX2 and MX3 functions are available as options, which enable interpolation of 16 bits (65,536x), while the MX3 option offers the processing of two encoder signals, achieving improved position and speed control.

In addition, options are available for the XC4e that extend the standard PSO functionality. For example, three encoders can be tracked in real time through the three-channel PSO, or a complete, axis system can provide a PSO signal depending on the actual point in the room.

Both XC4 variants can be equipped with an optional I/O expansion card, which significantly increases the number of inputs and outputs. The I/O card also offers a PSO output and PSO synchronisation input, which is often used for synchronisation with a mode-locked external frequency.

The XC4 single-axis motor drive controller has an operating voltage of up to 340VDC and a peak current of 30A.

Source: Keyence
Introducing the Equator™ 500 gauge – intelligent process control for larger parts

The larger Equator 500 system now enables the gauging of larger parts, with a working volume of 500 mm diameter, up to 400 mm height and a payload capacity of 100 kg.

- High speed gauging of size, position and geometry
- Accuracy with rapid temperature changes, now over a 45°C range
- Automatic update of tool offsets directly from Equator 500
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# SUPPLIERS DIRECTORY

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Hexagon Metrology Romer Division, Montoire Sur Le Loire, FR | www.romer.fr  
Hexagon Metrology S.p.A., Grugliasco (TO), IT | www.dea.it  
Horst Witte Gerätebau Barskamp KG, Bleckede, DE | www.horst-witte.de  
joke Technology GmbH, Bergisch Gladbach, DE | www.joke-technology.de  
Kistler Instrumente AG, Winterthur, CH | www.kistler.ch  
Kubotek Europe S.r.l., Costabissara, IT | www.kubotek.eu  
L. S. Starrett Co. LTD, Jedburgh, UK | www.starrett.co.uk  
Leica Geosystems AG, Untertiefenfelden, CH | www.leica-geosystems.com/metrology  
M&H Italia S.r.l., Tagliolo Mio to AL, IT | www.mh-inprocess.com  
Materialise N.V., LEUVEN, BE | www.materialise.com  
Metris Germany GmbH, Alzenau, DE | www.metris.de  
Metris UK Ltd., Derby, UK | www.metris.com  
Metrol Co. Ltd., Tokyo, JP | www.toolsensor.com  
Millutensil s.r.l., Milano, IT | www.millutensil.com  
Mitutoyo (UK) Ltd., Andover, Hants, UK | www.mitutoyo.co.uk  
Moldex3D, Chupei, TWN | www.moldex3d.com  
MTS Sensor Technologie GmbH & Co. KG, Lübberscheid, DE | www.mtsensors.com  
Newall Measurement Systems Ltd., Leicester, UK | www.newall.co.uk  
Nikon Metrology NV, Leuven, BE | www.nikonmetrology.com  
Platit AG, Selzach, CH | www.platit.com  
Proceq SA, Schwerzenbach, CH | www.proceq.com  
Raytek GmbH, Berlin, DE | www.raytek.com  
Renishaw GmbH, Pliezhausen, DE | www.renishaw.de  
Sensor Products Inc., Madison, USA | www.sensorprod.com  
Solartron Metrology, Bognor Regis, UK | www.solartronmetrology.com  
Taylor Hobson Ltd., Leicester, UK | www.taylor-hobson.com  
Tool MT GmbH, Gießen, DE | www.werth-tool-mt.de  
Vision Engineering Ltd., Emmering, DE | www.visioneng.de  
Vision Engineering Ltd., Woking, UK | www.visioneng.com  
Vista Développement International, Sonthonnax, FR | www.vista-plasturgie.com  
Wenzel Präzision GmbH, Wiesthal, DE | www.wenzel-cmm.com  
Werth Messtechnik GmbH, Gießen, DE | www.werth.de
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Erowa Robot Dynamic 150L – Low costs, high performance

With innovations back to back, it can sometimes appear perplexing to make an investment that should theoretically last many years. This is why an increased focus is placed on expandable machine solutions that can be flexibly integrated and expanded if the need should arise in the future.

How can a company make an investment when the technology appears almost obsolete at the moment of purchase? The innovation cycles have become so small, any larger investment seems to be too risky to take. Only equipment that can be adapted in the future and that can display a certain degree of flexibility has potential for the future. Investments with extension options often mean that you have to purchase functions or additional components that are not yet necessary at that time. Erowa Robot Dynamic 150L promises to provide you with a system that suits your current needs. If the requirements of your production capacity increase, the system is said to be capable of being expanded modularly at any time. Investments in manufacturing capacity are usually a medium- to long-term matter. It is often not all that easy to gauge what capacity will be needed in two, three or five years’ time. With the introduction of the ERD 150L, Erowa now offers a low-cost, linear automation system that is flexible and can easily be expanded at any time. This virtually eliminates the need to purchase additional components before they’re needed. Thanks to lean construction, the space requirement is kept to a minimum. Even with this lean design, the telescoping transfer arm is capable of extending up to 54 inches (1375 mm) and handling up to 330 lbs (150 kg). The central control unit is only equipped with only those connections that are required for the relevant cell. Additional connections can be integrated as components to be added.

Safety first

The ERD 150L incorporates a virtual safety system that prohibits the transfer arm to extend past the working envelope. This safety feature allows for less expensive barriers, which prevent operators from entering any dangerous zones. The barriers consist of large, transparent panels, which makes for the best possible supervision. Whether it’s the icons on the hand-held control unit or the accessibility of the magazines, user-friendliness was given the highest priority. The magazine levels can be extended on the operator’s side, which makes loading with an overhead crane easier. But small electrodes that have to be exchanged in great numbers are also optimally accessible in this way. Accessibility for loading has been optimised by extending the magazine levels on the operator’s side. This makes it easier to load either large/heavy components or a greater number of smaller electrodes.

The chip-to-chip time is substantially shorter with the new generation of Erowa automation solutions. This has been achieved through the use of double grippers in combination with the Quick-change function in the process control system. Thus, the robot can be moved to changing position before the machine has completed the machining process on the current workpiece. This functionality is not controlled by a fixed program but is constantly calculated for optimal results. While the operator is dealing with finished workpieces and new orders in a magazine, all other magazines can be accessed by the robot. This autonomy comes into its own during the day shift while simultaneously the next orders being set up and prepared.
Maximising potential of lathes and reducing set-up times

Quick-change Tooling – American-based Anthony Machine, Inc. in San Antonio has served a variety of industries, including the oil and gas, mining, transportation and power generation sectors, since 1946. Having accumulated precision machining experience over seven decades, there is actually little this job shop cannot handle.

However, after the company purchased a pair of NLX 3000 1250 universal turning centres from DMG Mori – the shop’s first Y-axis, live-tool lathes – Anthony’s manufacturing team was challenged with making the most of the new investment, which is where Kennametal (KM) was of help.

KM sales engineer Mark Davis explained to Anthony that the best way to reduce set-up times and maximise the new machines’ potential would be to equip them with KM’s Turret Adapted Clamping Units (Taku) and KM quick-change toolholders.

“The Taku system supports everything from KM32 up to KM63,” Davis said and added that the company offers blocks for both static and driven tools, and can tool-up lathes from companies including Okuma, Haas, Mazak, Doosan, and DMG Mori – most of the major machine tool builders. This makes it both easy and cost-effective for customers to equip more than 80 models of CNC turning centres with a fast, flexible and accurate quick-change toolholding system, the company noted.

Over the years, Anthony notes that it has built a number of KM-equipped custom toolholders for deep boring and other machining operations on its CNC lathes and machining centres as well as on several of the shop’s manual turret lathes to overcome limitations with available tool positions.

KM has also helped the company to achieve tolerances and surface finishes that many others couldn’t reach with conventional tooling, thereby winning new clients.

Anthony explained that, compared to the traditional wedge and screw-style blocks that come as standard on most machines, the KM-equipped Taku units are both faster and more accurate, routinely holding tolerances of up to 0.0005 inches (0.013 mm). Furthermore, the part size does not change from one clamping to the next. The turrett is also less crowded and everything is easily accessible without the chatter and deflection that one has with straight shank tools and set-screw type boring bar holders.

kennametal.com

Patent-pending slides for the Star

Linear Slides – Arno Werkzeuge has just presented its new AWL linear slide for the Star sliding headstock lathes. The patent-pending, tool-holding system for turning or grooving tools has an integrated adjustable coolant supply for high-pressure cooling of up to 130 bar. Together with the AFC quick-change system, users can increase productivity during long turning because set-up and non-productive times are significantly reduced, Arno notes.

“After Citizen, our new AWL linear slides are now also available for CNC sliding headstock lathes from Star Micronics,” Arno’s Technical Manager, Werner Meditz, says. The AWL tool-holding system is now available for the SR 20 R II, III and IV Star series. It has two independent cooling channels that can be opened or closed in a targeted manner and, thanks to various connection options, fit several machine types. Depending on the machine and design, the slide can accommodate between two to six tools. Each chamber has an integrated coolant supply to enable tools with and without internal cooling to be used simultaneously.

The design of the linear slide with integrated cooling eliminates time-consuming connections of external and cost-intensive tubing. In addition, interference contours in the machining room are eliminated. The company says users can increase tool life by over 25% with the targeted high-pressure cooling of up to 130 bar and provide stable wedge-clamping of the clamping fixtures during machining.

The tools can be loosened and fastened in just a few simple steps. When unscrewing, an integrated lock nut lifts the clamping wedge slightly. This allows the tool to be removed and inserted quickly and easily. Arco noted that tools from other manufacturers can also be changed into the linear slide, which is an advantage of the AWL linear slide.

An advantage for users is when they combine the AWL linear slide with Arno’s AFC quick-change system. To change the tool, only the front part of the two-part carrier has to be removed and reloaded with another carrier with a new tool. In many cases, this eliminates the need for recalibration. With the AWL linear slide and the AFC quick-change system, the manufacturer underlines its claim to increase productivity in user production with customer-oriented solutions.

arno.de
New laser for challenging surfaces

Surface Treatment – As a new manufacturing era dawns, GF Machining Solutions now provides manufacturers with a new laser-texturing technology solution that can execute challenging product designs at high quality and productivity. The new Agiecharmilles Laser S series – launched in Asia on February 27 – puts a highly efficient, fully digital, all-in-one texturing solution at product designers’ and mould-makers’ fingertips.

The new Agiecharmilles Laser S series helps users apply their designs to challenging surfaces while controlling their cost-per-part, reducing lead time and machining time, and significantly improving quality.

Conceived to help users increase their productivity while maintaining high quality standards, the new, high-performance Laser S series puts manufacturers at the forefront of the unfolding global digital transformation, the company says. With the GF Division’s laser-texturing technology, users have access to a fully digital means of overcoming the limitations of conventional and manual methods.

As a result, the daily challenges of difficult-to-realise designs and quality deviations are reduced and users are positioned to seize new business opportunities. The GF Division’s Laser P series became the market reference for laser texturing after its 2009 introduction, delivering the full range of laser texturing advantages and the big plus of controlled costs. This year, on the 10-year anniversary of the launch of the Agiecharmilles Laser family, the new Laser S series takes Laser texturing performance even further:

As an all-in-one solution, the Laser S series advances manufacturers’ productivity, quality, design freedom and time-to-market while reducing cost-per-part in challenging market sectors such as packaging, information and communications technology (ICT) and automotive. With performance proven in a range of benchmarking tests in various demanding industrial segments, the Laser S significantly reduces machining time while increasing machining quality and slashing fine texturing time. The Laser S does all that in a single set-up while limiting human error and opening new design possibilities.

The Agiecharmilles Laser S, unveiled in Asia on February 27, will make its European and North American debuts in March.

gfms.com

Corbetts the Galvanizers set out ambitious growth plans for 2019

Surface Treatment – Corbetts the Galvanizers is looking to build on significant investment in new equipment and a number of senior appointments to target opportunities in the agricultural, transport infrastructure, street furniture and utilities markets. The company specialises in hot-dip galvanising. Despite a challenging year caused by rising zinc costs, the Halesfield-based firm has managed to make the most of its quality processes and quick lead times to secure a number of new contracts that are making the most of the larger galvanising kettle it installed in late 2017.

This upgrading of capacity was part of a £400,000 investment project to deepen the kettle and to provide important infrastructure improvements at Plant B. “There has been a lot of discussion about what the next twelve months will bring UK manufacturing and most of it focuses around uncertainty and Brexit,” explained Sophie Boothroyd, Finance Director at Corbetts the Galvanizers. “We can’t control these factors so our approach is very much about focusing on what we do best and how we can continue to win new business. The capacity is there with the recent investment and the extended management team gives us the skills we need to target new opportunities. Our biggest sectors currently are utilities (made up in the most part by cable management product), transport (predominantly RV chassis) and parts for lighting columns and fencing. There’s still lots to go after in these sectors.” Boothroyd added that the only real concern with Brexit is the free movement of people given the vast majority of its staff on the shopfloor are Eastern Europeans. While there has been no mention yet of mass movement back to the native homeland of the foreign staff, this is a point Corbetts is keeping an eye on and taking measures to protect the company’s skills. One example is that the company is building relationships with local employment agencies, while looking at a wider catchment area and how it can transport people in from Wolverhampton and surrounding areas.

The company also noted that its other big project for 2019 is its commitment to secure the ISO 9001 accreditation, which will help Corbetts gain entry into other vertical markets and on high-profile projects that demand this standard as part of their tendering requirements.

wcorbett.co.uk
Boride introduces pencil die grinder

Surface Treatment – Boride Engineered Abrasives is pleased to present a new and much improved pencil die grinder. This new model has replaced the previous model and brings with it many new features including a newly designed roll throttle that offers ease of use to the operator, a new moulded sleeve resulting in improved ergonomics, insulation and operator comfort and a modification to the motor, delivering enhanced power and torque. Everything is aimed at making handling easier. It still offers the same slim body design for intricate work, a small diameter for precise control and increased speed (80,000 RPM) for a finer finish.

“This new grinder is slim and compact for control and precision yet extremely powerful and the perfect tool to use with our large variety of mounted points and our made-in-the-USA line of carbide burs,” says Betsy Burns, Sales and Product Manager at Boride. “We’re very excited to be able to offer this much improved pencil grinder.”

borideabrasives.com

New spray dispenser

Surface Treatment – Viscotec presents a new spray dispenser. With this product, the manufacturer focuses on volumetric spraying.

According to the company, the spray dispenser RD-Spray is characterised by an economical material application. Spray width and spray intensity can be regulated via air pressure. The speed-dependent dosing can be flexibly changed – even during the dosing process, it is said.

The dispenser should enable the user to coat the surface to be sprayed evenly. Viscotec says that the product incurs low cleaning and maintenance costs. It is suitable for low to medium viscosity materials. Spraying is a proven application that is used, for example, when painting with materials that contain colour pigments or for component geometries that are difficult to access. Viscotec’s technology ensures gentle and homogenous material application.

viscotec.de
How did toolmaking develop in 2018? What countries managed to strengthen their position and which ones had to deal with decreases in sales? In a comprehensive study, the international development of the toolmaking industry is presented.

With the exception of the financial crisis in 2008 and 2009, the tool demand of German manufacturing companies has been rising for many decades. On the one hand, this development is linked to increasing product derivatisation and shorter product life cycles. On the other hand, globalisation has contributed to the internationalisation of production sites, requiring multiple and distributed tool sets per product. This development is forcing both manufacturing and toolmaking companies to intensively deal with international toolmaking markets. They are vital in order to supply international production sites with tools in a reliable manner, to capitalise on differences in factor costs and to achieve innovations within the proper tool shop. Today, one thing applies to the “World of Tooling” more than ever: Your rivals never rest.

In hardly any other industry is it more difficult to gain the corresponding market knowledge than in toolmaking. Toolmaking is a niche industry and characterised by a large number of small and medium-sized companies across the globe. The market visibility is therefore – in contrast to series manufacturing companies – commonly limited. However, in order to achieve cost-effective tool supply, international market knowledge and collaboration are essential.

The WBA Tooling Academy Aachen has dealt with the evaluation of tool shops and tooling markets for many years in co-operation with the Laboratory for Machine Tools and Production Engineering (WZL) of RWTH Aachen University and the Fraunhofer Institute for Production Technology IPT. A unique, constantly growing and updated database with more than 1,000 benchmarking datasets of German tool shops as well as more than 2,000 evaluated international tool shops built the foundation for sound statements regarding the performance and development potential of tooling markets. In addition, numerous excursions to different markets in Asia, North and South America as well as Southern and Eastern Europe consolidate the impressions. The second revised and extended edition of the study “World of Tooling 2018” shows the collected and concentrated results as well as an objective and validated comparison of tooling markets relevant today and in the near future.

Twenty-one international markets valued as noteworthy in regard to market size, competencies and development potential are presented in detail. The study creates transparency by presenting, aggregating and interpreting a systematic selection of the most important key figures, in particular, in particular due to a large amount of different data.
SPECIAL REPORT

available for a heterogeneous and small-sized tool-making sector.

Market profiles and market comparison

The two main results of the World of Tooling study are a market overview with market profiles and a market comparison with the World of Tooling radar (WOT radar). The market profiles summarise the most important analysis results for each country and are divided into three sections: “The Country and its People”, “The Economy and Industry” and “Toolmaking and Tools”. The WOT radar evaluates and compares the analysed countries in a portfolio with the three dimensions of market size, toolmaking competence and development potential. Market size describes the importance of the respective market in relation to the volume of the toolmaking industry. Toolmaking competence takes into account toolmaking-specific key figures related to product, process and resource competence. The development potential bundles information on the outlook for the market in a summary indicator.

The WOT radar was first compiled in 2015. Since then, there have been some changes with regard to the competitiveness of the toolmaking industry and the overall economic situation in the respective countries. Overall, a continuous growth of the markets can be observed. The most significant changes can be seen in the toolmaking markets of China, Switzerland, Spain, Austria, Turkey, Mexico and Vietnam.

Germany still on top

Germany will continue to occupy a leading position in the global toolmaking industry in the future. However, the results show that the competition is not only getting closer, but is also becoming more
numerous and more international. China’s relevance has increased significantly due to its market size and growing toolmaking expertise. An increasing number of Chinese toolmaking companies is able to manufacture tools of high quality and complexity. The inhomogeneity in the market is steadily decreasing. The number of state-of-the-art equipped companies with highly skilled employees is growing and justifies the improvement in terms of competence. In some cases, even markets with longstanding toolmaking tradition are being overtaken. These include, for example, Italy, which can no longer sustain its position among the world leaders, coupled with only limited development potential for the foreseeable future. Likewise, many Eastern European markets have been able to catch up and impress with their reliability at favourable prices. In particular, the Slovenian market has distinguished itself in recent years through positive developments and has thus been integrated into this new edition of the study.

The Swiss toolmaking market has shrunk compared to other markets due to the difficult overall economic situation. In contrast, the markets in Spain and Austria have grown as a result of a significant increase in domestic demand and have now overtaken the Swiss market in terms of size. The development potential of the Turkish toolmaking market has declined significantly due to the political situation. Foreign direct investment, which is important for the Turkish economy, has fallen by a third. The value of the German exports to Turkey has fallen by around 20% in 2016. The Vietnamese toolmaking sector is benefiting from a growing manufacturing industry, which has led to a continuous increase in both market size and competence. In addition, the market strongly benefits from local automotive suppliers and is supported by a growing association structure. Thus, there are already a few toolmaking companies known today that can face international competition. India and Indonesia, which continue to be the most rapidly growing economies of the world and attractive production locations, are also experiencing a similar situation.

USA an uncertainty factor

The toolmaking market in Mexico has strongly advanced in recent years. The construction of new automotive production plants has led to a significant increase in tool demand and quality requirements. In order to counteract the shortage of skilled workers, German companies with locations in Mexico are starting to systematically qualify their employees with domestic support. In contrast to the positive developments, the threat of punitive tariffs for the export of vehicles to the USA is currently causing great uncertainty.

The USA, which has experienced progressing deindustrialisation for many years, currently shows increased investments in toolmaking. These have led to positive developments in regard to toolmaking competence. South Africa, which has been attracting attention for years due to numerous social, political and infrastructural problems, may again become an interesting market in the future. It is still the only country in the rapidly growing Southern Africa with industrial toolmaking experience. All in all, international toolmaking markets continue to be subject to enormous dynamics. From a toolmaking perspective, it is necessary to anticipate given dynamics and take advantage through the use of international co-operation and the development of new markets. From a customer perspective, it is important to gain and use knowledge of international markets to design one’s own tool supply sustainably and competitively.
A new 5-axis machine for tool and mould-makers

The compact G-S-F(15-10)/MK was presented for the first time by HG Grimme at the AMB in Stuttgart. It is said that this machine ideally complements the model and mould-making programme.

According to the manufacturer, the unit offers a large working area with traverse paths of the X/Y/Z axes of 2300/1800 and 1200 mm, respectively. It is also said to have a very small footprint of around 5200 mm × 2700 mm × 4500 mm. The machine operator stands in front of the long X-axis and has direct access to the machine room via four hinged doors, thus enjoying a full view of the component during milling.

Whether plastic, composite or aluminium components, all materials can be machined on this machine from full blank material thanks to the very strongly designed 21 kW milling spindle and the machine components well adapted to this force and dynamics. Roughing or finishing, down to the finest “superfine finish surface”, is very easy to do and easy to handle. The newly implemented, thermally coupled (with water cooling), backlash-free rotary axis gears also support this, explain the machine builders. According to HG Grimme Systech, all fine dust or chips can be removed manually or automatically. Around the machine table, the manufacturer has also fitted treads that should also allow the remaining pieces and chips to fall down. The machine can be closed at the top by means of an optional folding roof, HG Grimme continues. In addition, all machine guides are well protected above the events during the machining process.

According to HG Grimme, not only the dynamics of the machine (acceleration per axis up to 3700 mm/s², linear axes X/Y/Z up to 60/60/30 m/min, rotary axes A/C up to 14,000 °/min), but also the acquisition costs of around 300,000 euros, offer attractive and promising perspectives.

It is a well-known fact that low acquisition costs keep the machine hour rate low and provide the user with good economic advantages. The machine can therefore be used for large, heavy components, and also for machining relatively small and simple components.

Here are a few application examples for this milling machine

- A deep-drawing company can process and produce its own deep-drawing moulds from solid aluminium. However, it can also rework various deep-drawn components made of plastic or composite with five axes.
- A mould-making company that also produces aluminium or plastic components can distinguish itself economically on the market with this machine investment. The hourly machine rate will be kept within reasonable limits compared to that of a very heavy machine tool.
- A manufacturer of large, heavy composite parts does not have to outsource this work. He can carry out this work himself in-house. The know-how and the vertical range of manufacture remain in the company’s own operations and the independence of deadlines for the company’s own projects is guaranteed.

HG Grimme has completed its product portfolio with this new, compact model milling machine in addition to the machine types P-S-F/M and G-S-F-F/M and can offer machines for component sizes from 1500 mm × 1000 mm × 600 mm up to 14,000 mm × 3200 mm × 1500 mm (3D machining).

According to HG Grimme, the machines are designed according to customer-specific modular principles. The adaptable nature thus allows for a machine to be individually suited to the different demands of customers. Combined, HG Grimme offers a dynamic and adaptable machine that is easily fitted into a production line.

hg-grimme.de

The G-S-F(15-10)/MK from HG Grimme is, according to the manufacturer, the ideal 5-axis partner for model and mould-makers. From roughing to precision machining, it “has it all,” emphasises HG Grimme.
Producing polymer structures faster and more precise

It is either fast or precise – both cannot be achieved when producing the finest polymer structures by laser. Or maybe it can be? Combining stereolithography and multiphoton polymerisation should make it possible.

Scientists at the Fraunhofer Institute for Laser Technology ILT are developing a machine for high-precision, cost-effective 3D construction technologies using both methods. On 01 November 2018, Fraunhofer ILT and its project partners launched the project “High Productivity and Detail in Additive Manufacturing through the Combination of UV Polymerisation and Multi-Photon Polymerisation – HoPro-3D”, which is funded by the European Union and the German state of North Rhine-Westphalia.

Together with Lightfab GmbH from Aachen, Bartels Mikrotechnik GmbH from Dortmund and Miltenyi Biotec GmbH from Bergisch Gladbach, experts from the Fraunhofer ILT are developing a new machine for producing macroscopic polymer structures with a resolution down into the submicrometre range. So far, various separate processes have been available for this purpose: UV polymerisation based on lasers, such as, for example, stereolithography (SLA) or micromirror arrays (DLP), and multiphoton polymerisation (MPP) on a microscopic scale.

In the SLA process, a UV laser writes a two-dimensional structure in a resin bath, causing the photosensitive material to polymerise. The component is lowered step by step and a 3D structure is built up in layers. For the most part, the build-up rate is well above 1 mm³ per second. Newer 3D printers use UV LED light engines and a DLP (Digital Light Processor) chip instead of the scanner. This enables the exposure to be parallelised, thus increasing the build rate. Both methods achieve a maximum resolution above 10 μm.

Multiphoton polymerisation is suitable for constructing even finer structures. In this process, the
necessary photon energy is generated by intense laser pulses with wavelengths in the visible or infrared range, with several low-energy photons virtually adding up to a UV photon. The advantage is the extremely high precision of up to 100 nm in all three spatial directions; however, the build rate here is only about 10 μm³ per second.

Saving time with two systems in one machine
The project partners are now combining the DLP-based process with the MPP process and developing a machine with two selectable exposure systems for either high build rates or high precision. They use high-performance LEDs emitting at 365 nm wavelength and a DLP chip with HD resolution for lithography. The MPP module uses a femtosecond laser with a fast scanner and microscope optics. “The advantage lies in the interplay between the two procedures: Depending on the need, we intend to switch between the exposure systems in the process,” explains Dr Martin Wehner, HoPro-3D project manager at Fraunhofer ILT. “The challenge we face is in process control. The concept has been developed; currently, an appropriate machine is being built.”

In addition, control software is being developed, which shall independently decide – on the basis of CAD data – when a change between the two sources makes sense. The bottom line is that this transition works smoothly and the structures can be built in a resin vat without having to change the photo resin. The project team is examining different materials and optimising the process combination in detail.

Many components have a body that can be assembled quickly, but there are also certain structures that require high precision. The combination of processes allows, for example, optical function elements such as lenses or prisms to be integrated directly into a larger component with great precision. Thanks to this approach, complete collimating optics for reading optical information in analysis technology can conceivably be built.

The fields of application are manifold, but this machine should prove most interesting for the production of components used in biomedical analysis technology. Support scaffolds for 3D tissue models, micromechanical components or complete microfluidic systems are typical application examples for this.
Forming a chipformer

Designing the rake face of an indexable insert requires some engineering skill, such as knowledge of metal-cutting theory and the chip formation process, understanding specific features of machining different materials, knowing principles of powder metallurgy and limitations of manufacturing sintered products, experience and appropriate training in tool design.

Over the years, technological options for cutting tool manufacture have largely dictated the shape of the rake face. For example, in the earliest days of indexable tooling, the inserts featured flat faces. Breaking a long chip when turning by tools carrying these inserts often required using additional cover parts that were mounted in the tools above the inserts. In certain tool designs, even an upper clamp, which secured the insert, acted like a chipbreaker. Another common solution for flat-face turning inserts was to produce a chip-breaking dimple by grinding. The dimple promoted curling the chip in a spiral and then its breaking into smaller segments. Both these methods should be considered through the lens of time, but they were far from perfect.

The chip-breaking cover part produced a natural obstacle for the chip flow. The chips caused intensive abrasion of the part and significantly reduced its tool life. The shape and dimensions of the dimple strongly depended on a grinding wheel that considerably reduced possible dimple forms. But the main problem was the necessity of long-term tests to develop a chipbreaker that would ensure stable performance when machining different types of material.

Advances in powder metallurgy changed the situation dramatically, bringing new machines and computer-based control that substantially improved stability and reliability in a range of processes. The technology of sintered carbide products facilitated the shaping of insert rake faces in various forms and broke the dependence of a chip-breaking surface on the dimple or the cover part. The rake face received a look of combined concave and convex portions, local protrusions etc. This complex geometry was designed to provide the necessary chip formation and effective chip control. Rake faces of today’s indexable inserts feature the same surface texture.

CAD provides tool designers with a powerful tool for complicated 3D modelling, engineering calculations and analysing possible limitations of a designed insert and, of course, its rake face. It not only enabled the production of a wide variety of inserts with geometrically complex faces but substantially shortened the design process. The totally new level of cutting tool design and technology reduced testing needs significantly. However, the time required for studying cutting capabilities of a new insert geometry with the use of machining trials remained considerable.

This holds true for the design of all indexable inserts, not only turning. In the case of milling inserts, the rake face shape is considered mainly from the point of view of chip forming only – mill-
ing is a process of interrupted cutting and therefore chip breaking creates no difficulties. In milling inserts, the rake face is called a chipformer and not a chipbreaker as it is characterised for turning inserts. To be clear, the rake face of the turning insert is also intended mainly for chip formation, though it should enable chip breaking. In the context of geometry, the rake face of every indexable insert is a combination of concave and convex areas.

Three-dimensional modelling

Scientific researches, numerous tests and the analysis of accumulated information in the field of metal cutting, combined with significant advances in computer technology, have provided the cutting tool industry with a new, powerful design tool – three-dimensional modelling of chip formation. The first simplified models of chip formation were based on empirical and calculated data, and suffered from serious inaccuracies. Today, cutting tool designers utilise advanced software that enables simulation of chip formation processes with a sufficient approximation to reality. Even though the software still cannot replace machining tests, it is able to contribute greatly to the effective design of the indexable inserts and, most of all, their rake faces. Iscar, a leading company in the cutting tool industry, has implemented modelling practices that allow R&D engineers to determine which insert geometry is appropriate for which operation, even at the design stage. When designing the CNMG 120404-F3P turning insert, it was found that simulating cutting action was useful for shaping the insert’s top surface (Fig. 1). The fancy patterning was not devised to reflect the virtuosity of an R&D team, and in fact modelling proved to be an extremely valuable tool in realising the team’s objective of ensuring the best cutting capabilities.

Drilling hard-to-cut austenitic and duplex stainless steel (ISO M application group) presents difficulties, especially if the depth of a hole is substantial. Iscar developed ICG exchangeable carbide heads with chip-splitting geometry. The range of the head diameter (D) is 14 - 25.9 mm (0.551 - 1.02 in). The heads are mounted in standard Sumocham drill bodies and provide high-quality machining holes with depth of up to 12×D. With head geometry featuring chip-splitting notches on the cutting edge and a specially designed chipformer to ensure superior chip control, chip evacuation problems in deep drilling applications are simply solved.

Chip flow modelling represents an important step in the chipformer shaping process, and has been integral in determining the success of the proposed design (Fig. 2). In its recent “LOGIQ” campaign, which launched a range of new and enhanced cutting tool lines, Iscar introduced a series of indexable mills in the small-diameter range (up to 20 mm or 0.75 in). The Nanmill family of indexable milling cutters within the diameter range of 8-16 mm (0.315-0.625 in) integrate a new design concept: They feature a clamping screw located above the insert and a screw head that functions as a wedge. However, to prevent any contact between the screw head and the chips that are produced, the insert chipformer required additional adaptation. Modelling the chip formation process was an important factor in successfully solving the problem (Fig. 3).

iscar.de

Fig. 2: Chip flow modelling represents an important step in the chipformer shaping process, and has been integral in determining the success of the proposed design.

Fig. 3: Modelling the chip formation process was an important factor in successfully solving the problem.
Renishaw collaborates to produce unique surgical implants

Renishaw has announced a collaboration with the teaching University Dental Hospital of Wales. The two are collaborating on the production of implants with the use of additive manufacturing technology.

Global engineering technologies company Renishaw is collaborating with University Dental Hospital of Wales (UDH), Cardiff, to help overcome some of the challenges associated with surgical implants. UDH has previously used Renishaw’s additive manufacturing (AM) services to manufacture a series of dental products, including cobalt chrome frameworks. However, the hospital has also been using AM to produce custom maxillofacial implants and surgical guides.

By using custom-made devices, hospitals can reduce surgery time considerably as, unlike standard ‘off the shelf’ implants, each device is designed to fit the patient. Standard implants may need modifications or the patient’s surrounding bone may need extra trimming for the device to fit.

Not only is this highly likely to improve patient experience and reduce the risks related to extended time under anaesthesia, but it can also save significant time in surgery and therefore cost. By using AM to produce a wider range of implants, UDH is bringing these benefits to its patients and staff.

AM for production of implants

“AM allows hospitals to achieve high precision when producing implants,” explained Ed Littlewood, Marketing Manager of Renishaw’s Medical and Dental Products Division. “By collaborating with Renishaw, UDH can develop their maxillofacial implants further, seeing improvements with each case and helping a wider range of patients and surgeons across different departments.”

“Several hospitals are reaping the benefits of additive manufacturing in implant production,” explained Roger Maggs, Senior Chief Dental Technologist and Head of Dental Technology Services at UDH.

“We have the advantage of having worked with Renishaw for three years in the dental field. This has put us ahead of the game and in a position where we can now start thinking about producing more unique designs that will benefit our surgeons.

“The staff at UDH are also benefitting from the partnership,” continued Maggs. “The team are involved in every stage of the development of new technologies for medical applications, including inputting CT data and making and manipulating digital models ahead of surgery.

It is admirable that our staff are at the forefront of the latest medical technology. This fact has enabled the evolution of some very talented technologists, such as Luke Maxwell and Paul Clark, who must be considered leaders in this technology.”

UDH treats 100,000 patients per year and acts as a teaching hospital for Cardiff University’s School of Dentistry. It is the only teaching dental hospital in Wales and provides unique and important leadership in dental research, teaching and patient care.

Renishaw is fast becoming a major supplier of dental and medical AM solutions. The company is the only UK manufacturer of metal AM machines and works with hospitals across Europe to develop innovative manufacturing that ultimately benefits surgeons and patients. Furthermore, the uses of AM technology are a testament to the versatility of AM processes and their adaptability.

renishaw.com
5-Axis Quaser investment set to help Hampshire manufacturer

Wilson Manufacturing, which supplies precision parts to the aerospace, marine, medical and oil and gas sectors, has installed a Quaser MF400UH 5-Axis machine to complement the earlier addition this year of a new mill turning centre.

The latest purchase has been sourced by the Engineering Technology Group (ETG) and is set to help the growing firm increase capacity and reduce operations on its milling sections, boosting quality and reducing significant set-up times in the process. This investment crowns a successful year for the Ringwood-based company, which has seen it create two news jobs and increase sales by 25%, putting it on course for a £1.35m turnover.

“Our customer base is spread across a number of demanding sectors and there is an increasing need for more complex components, a trend that we knew we had to meet head on with the purchase of a 5-Axis CNC machine,” explained Andy Wilson, Director of Wilson Manufacturing. “We discussed our requirements with ETG and the machine tool supplier spent a lot of time getting to understand our processes and the parts we make. This was crucial in providing a complete picture of where we wanted to go and led to it suggesting the precision control and speed of the Quaser MF400UH.”

He continued: “It has only been up and running for a few months and we have already been really impressed with the performance. The control, speed of the spindle and the ability to machine multiple faces of a complex part has been a game-changer – in some instances, we have improved cycle time by 30%.

“This makes us a lot more competitive and, at a time when speed-to-market is crucial, gives us another USP when exploring new business opportunities.” Wilson Manufacturing, which has been AS9100 aerospace and defence-approved since 2013, works with the company’s clients in a range of materials and offers first stage design support through to full production.

As part of the machine install, ETG identified the need for a full simultaneous 5-axis seat from Mastercam, which gives the company the best possible foundation for fast and efficient milling. The 5-axis toolpath means every component it makes can be produced on the Quaser MF400UH, while also opening up new opportunities for entry into new sectors.

Wilson continued: “It’s a massive investment for our business, so we knew it had to be right, which is why we were so impressed with ETG and its team, ranging from sales and technical support to the installation and service engineers. “I have no doubt it will be money well spent and we could well make a return on our investment within the first two years.”

Steve Brown, Sales Director for ETG, said: “Quaser machine technology is proving extremely popular with UK machinists and this latest install for Wilson Manufacturing will play a key role in achieving ambitious growth plans for 2019.

“The addition of Mastercam software gives the company complete control of the manufacturing process and will help it deliver the complex components it is fast becoming renowned for.”

Engineering Technology Group (ETG) delivers productive turnkey solutions to customers involved in automotive, aerospace, domestic goods, high value engineering, medical, oil and gas. Adding to existing purchases is always an option and ensures a smooth workcycle, helping the company to remain in control of all aspects of production.

wilsonmfg.com
Terri Hiskey talks about the changes and challenges of Industry 4.0

The challenges and changes accompanying Industry 4.0 are of concern to any company. The change of expertise required in the manufacturing sector as well as how the change may affect the image of certain areas of the industry are all topics that I discussed with Terri Hiskey.

For some, Industry 4.0 may sometimes seem like a tidal wave crashing into the status quo of the manufacturing industry, destroying all that has been painstakingly built up over the years in a single blow. This need not be the case, however. Rather than bracing for the crash and hoping for the best in the aftermath, a company can proactively work on getting ready for Industry 4.0, thus not only softening the blow but coming out on top. Preparation is key, of course. And since Industry 4.0 will be largely governed by digital changes and developments, it is two minutes to midnight in terms of starting to work on a digitalisation strategy for the future.

In this interview, Terri Hiskey, as a representative of Epicor, outlined some of the changes and challenges that come with this great paradigm shift of the industry, as well as Epicor’s possible role in this process.

Do you think Industry 4.0 can change the image of what are currently perceived as “old-fashioned” businesses and make them attractive again?

Businesses in manufacturing and distribution can be perceived as “old-fashioned” and “not a young person’s industry”, so technologies like robotics and AI can help industrial businesses encourage more talent to join the market. Our research has shown that people are willing to embrace working with robots, and are excited to do so. Some 41% of young people want the opportunity to work with the latest innovations, whilst 33% of millennials want to be at the cutting edge of new developments. In this way, Industry 4.0 technologies could help ease the skills shortage crisis that the industry is currently facing. With the workforce only getting older, businesses still need to encourage new recruits to join traditional industries, in order to flourish and grow. The use of technology in manufacturing is something that industrial businesses need to get better at celebrating. Talking more widely about the use of robotics on the production line, or the use of AI to bring new products to market quickly, can only help to get industrial businesses noticed by young people. After all, factories running with robots can be squeaky clean, highly intelligent, and inspiring environments to work in. These environments have technology at their heart, and are often a far cry from the dirty mechanical factories of the past.

What do you view as the biggest (or among the biggest) challenges for companies when facing the transition to Industry 4.0?
As digital transformation gains momentum, shortage of people with the correct skills to support this shift will be one of the biggest hurdles for manufacturers. Research suggests that as we move closer to a new Industry 4.0 world, over one-third of the skills considered important in today’s workforce are likely to no longer be relevant. Manufacturers will soon require different expertise from their workforce to master new technology.

The implementation of new technologies such as robotics and automation will not only help businesses maintain and improve production levels, it will also help to encourage new recruits to join more traditional industries. According to our research, 20% of businesses believe that the chance to work with robotics and AI is a big draw for young talent. Businesses that invest in creating a skilled and agile workforce that can successfully use these new technologies will be able to rise to the challenges presented by Industry 4.0. These companies will then, in turn, be in a strong position to navigate the ever-changing economic and international business environment, improve productivity, and drive future business growth.

How is Epicor Software able to assist in tackling this great change?

In order to make the most of Industry 4.0 innovations, such as workplace robotics and AI, businesses need up-to-date IT infrastructures in place. For example, cloud-based enterprise resource planning (ERP) solutions like Epicor ERP can be crucial in coordinating robot workflows and sharing data between machines and humans across multiple digital platforms. Indeed, around a fifth (19%) of businesses questioned in a study agreed that they rely on a single core business system to manage everything.

For English manufacturer Southco, Epicor Mattec’s manufacturing execution software (MES) links with other smart technologies, including Epicor ERP, to seamlessly blend data with its production, optimising every machine and production run for maximum efficiency.

The advanced analytics have helped optimise its assembly line by increasing bench utilisation from 20% to 60% and enabling significant cost savings as a result. As Southco continues to grow, Epicor software will continue to remain at the heart of its operations – helping management make smarter business decisions and improving accessibility to vital information.

I want to thank Terri Hiskey for taking the time to answer my questions.

epicor.com
Renishaw and Hartford combine to deliver smart factory solutions

CNC machine manufacturer Hartford aimed to develop an innovative, easier-to-use human machine interface (HMI) for its CNC machines. The company strived to ensure process measurement and inspection at its CNC machine manufacturing operations could keep pace with product quality goals.

Developments in Industry 4.0 technology and world shortages in skilled labour have meant that forward-thinking CNC machine manufacturers like Hartford are placing greater emphasis on automation, connectivity, data transparency and ease-of-use.

However, achieving Industry 4.0’s goals of ‘intelligent manufacturing’ and the ‘smart factory’ still relies on accurate and effective process control systems. They need to be easy-to-use and provide sufficient immediate data to enable self-correction and adaptation to any sources of process variation.

For Hartford, maintaining the very high quality of its product in the face of rapid technological and economic change and fierce international competition is a key consideration.

At its manufacturing facility in Taiwan, the company produces a complete range of medium to large-sized three-axis and five-axis CNC machines for use in major industry sectors including aerospace, automotive, electronics and energy. Its product range comprises vertical machining centres, precision boring machines and gantry-type machines.

With more than 95% of Hartford’s cast components being manufactured and machined in-house, a continuous and progressive approach towards quality inspection is essential for achieving the precision required for a wide range of machine components, including machine heads, spindles and automatic tool changers.

Hartford has invested significant resources into the research and development of intelligent CNC controllers in recent years and developed Hartrol Plus. The Hartrol Plus intelligent controller is as simple to use as a smartphone.
The HMI provided by the Hartrol Plus CNC controller follows key design principles promoted by Industry 4.0 ideals and helps address skills shortages. The way in which it visualises data helps operators to make more informed decisions and solve problems more quickly.

**Intelligent HMI with Renishaw app**

Renishaw’s Set and Inspect on-machine app has been integrated with Hartford’s new controller, enabling users to exploit advances in automated measurement and data collection, thereby making machine tool operation and human-machine interactions simpler and more intuitive. Set and Inspect is a highly visual graphical user interface (GUI) that leads the operator through every step of on-machine probing processes including workpiece set-up, tool setting and other measurement tasks.

Hartford began using Renishaw products more than 20 years ago. In order to meet its stringent high-quality objectives, the company has introduced a variety of Renishaw high-precision measurement systems.

The precision of all CNC-machined components it manufactures is verified using Renishaw PH20 5-axis probes on co-ordinate measuring machines (CMMs). This happens before components enter the assembly line to ensure that they are ready to be assembled.

Precise assembly and positioning of machine tools is also critically important, with five-axis machine tools needing to be positioned with a deviation of less than ±6 µm. A Renishaw XL-80 laser interferometer is used to measure machine position and both linear and angular errors. The XL-80 generates an extremely stable laser beam with a wavelength that conforms to international standards. Linear measurement accuracy of ±0.5 ppm is guaranteed thanks to a precision stabilised laser source and accurate environmental compensation. Hartford uses the Renishaw QC20-W ballbar measurement system to perform cross-validation at different operating speeds to ensure that X and Y axes of the machine tool are correctly matched, and errors are kept down to less than 5 µm.

Every Hartford CNC machine not only undergoes 100% laser verification and ballbar testing before dispatch, it can also use the customer’s own workpiece for processing verification, with Renishaw OMP40, OMP60 and RMP60 machine tool measurement probes used to measure the precision of the processed workpiece.

Hartford also uses Renishaw AxiSet Check-Up to analyse the performance of machine rotary axes. Compatible with common 5-axis and multi-axis machines, it provides CNC machine users with a fast and accurate way to check the location of rotary axis pivot points and automatically compensates if necessary.

Importantly, AxiSet Check-Up does not need to rely on operator experience, as the operator can simply call up the relevant program and press ‘Cycle Start’ to complete the test process in just a few minutes.

Mr Lin said: “We also recommend that users use AxiSet Check-Up to test the machines’ rotary axes after they are installed, as factory conditions may differ significantly from Hartford’s manufacturing conditions in terms of foundations and how level surfaces are. Shipping and installation can also cause precision errors, so AxiSet Check-Up’s automatic compensation allows machine tools to maintain high levels of precision and quality.”

He continued: “All machine tools can suffer from wear and drift after a certain period of usage, with the level of precision of their positioning declining over time and causing a correspondingly poor level of machining precision. We therefore recommend that users perform scheduled checks on machine tools using AxiSet Check-Up every 6 to 12 months in order to ensure that the level of machining precision remains consistent and productivity remains high.”

Hartford’s imaginative use of leading-edge Renishaw measurement solutions over time has helped sustain its global competitive edge and reflects its bold corporate philosophy: “We are here to make the best machines to the highest standards.” —

Source: Renishaw

renishaw.com
Non-parametric design from Visi benefits Brandauer’s products

Visi mould and die software has helped a 150-year-old precision stamping company overcome design issues, enabling them to ship around 150 billion individual products a year.

Known for their strapline of “From Pens to Particle Physics,” Brandauer was established back in 1862, originally producing pen nibs. It has now grown to be one of Europe’s largest contract presswork and stamping companies, manufacturing high precision metal components – mainly electrical connectors for automotive, medical, environmental, telecoms and micro-connector customers around the world.

Operating with around 70 employees out of a 45,000-square-foot facility in Birmingham, most of their end products are stamped from a range of advanced materials including phosphor bronze, high-carbon steels, stainless steel, copper, brass and aluminium.

The press tools themselves are machined predominantly from D2 hardened tool steel with carbide inserts.

Manufacturing Director Stuart Berry says they needed integrated CAD/CAM software to fully support their CNC machine tools, which are capable of cutting within +/- 1-micron tolerances. They turned to Visi after finding that traditional parametric CAD systems led to a number of inherent issues in particular file sizes. “When we’re working on press tools with over 1,000 components, we design the parts to a micron and even size-on-size. This means a fully detailed model quickly becomes a huge chunk of data, and the computer can take between 30 and 40 minutes to open it.

“Another issue with parametric systems is that when we made a change to one area of the design it would affect other areas of the tool without us knowing it. So very often we’d end up with a design we weren’t intending and didn’t want,” Berry explains.

“But as the Visi Progress package isn’t parametric as such, there are no data issues. We can make design changes exactly as we wish without it affecting anything else in the tool. And it’s also a small
file, so there’s no delay in opening it.” He says it is simple to design a full progression layout with Visi Progress’s built-in functionality, easily establishing where punches are to be sited, and where the guidance pillars need to go.

Non-parametric design

And he cites a number of design changes during the 12-month development of a lead frame for power steering systems as an indicator of how important that non-parametric aspect is. “We were manufacturing a high-precision modular press tool to supply around 1.5 million components a year. Our design team used the original CAD data to create the tool in Visi Progress. This was a very quality-orientated product, so we needed to strictly adhere to all tolerances. The tool was constantly evolving, requiring a number of design changes. And certain parts had to be re-manufactured until we achieved the accurate, high-precision tool that our customer had ordered.”

All of the individual parts were produced in Brandauer’s machine shop on Agie Charmilles Wire EDM machines using Visi Peps-Wire, with 2D machining tool-paths for their Mikron millers programmed by Visi’s CAM package. Toolmakers then built the tool to one-micron accuracy, and it was transferred to a Bruderer Si-tonne press with the capability of running at 1,200 strokes a minute. “We set the tool and carried out a full product review, and compared data from the first-off, back to the CAD models. Everything was perfect, so we began manufacturing.”

Other examples of their automotive work include the EloPin, which is a push-fit solder-less contact, used most effectively with electronic systems found ‘under the bonnet.’ And thanks to its low electrical resistance, it is particularly suitable for over-moulded hybrid parts. Brandauer components are also used in automatically dimming rear-view mirrors, airbag sensors and hydraulic braking systems, along with connectors for battery-charging, satellite navigation systems and wiring loom connector blocks.

Medical products include surgical implants, components for scanners and cardiac pacemakers. Over the years they have also produced more than 2.5 billion nose clips for protective and surgical face masks.

Visi is fundamental in day-to-day work

Brandauer generally works with three tooling ranges, each with different lead times. “The Precision range is our most accurate, highest-spec tool with a lead time of between 16 and 22 weeks depending on the complexity of the product. Our Fixed Design tool can be produced within ten to 15 weeks, and the Modular Tool usually takes between 18 and 25 weeks, again, depending on how complex the end product is. Visi is key to manufacturing all three ranges. It’s a fundamental part of our day-to-day activities, from design to manufacture, ensuring that we are able to offer improved lead-times whilst meeting all tolerances.”

As well as three suits of Visi Progress and two of Visi Peps-Wire, Brandauer has recently invested in Edgecam to handle its turning requirements. And the sales team use Workxplore, a powerful CAD viewer and analyser, from the same stable as the CAD/CAM software. Workxplore was created to efficiently import and analyse all file types and sizes at high speed.

“When we receive CAD data from a customer asking us to price a job, the sales department looks at the file in Workxplore, which means they can provide an accurate quote.”

Once the order is confirmed, the designers start to analyse the product in Visi Progress, creating a strip layout. “Then we construct the tool using libraries that we’ve built up in the software, comprising parts from all leading suppliers of progressive die-tooling components. They all comply with recognised global standards to ensure we design the most accurate precision tool possible.”

visicadcam.com/brandauer.co.uk

Intricate and evolving workpieces put a lot of strain on the design software.

Source: Daniel Graves Photography.com

Since design software is such a fundamental part of production, an investment will always pay off.

Source: Daniel Graves Photography.com
ISTMA World News & Events

The International Special Tooling & Machining Association (ISTMA) is an international association representing 19 special tooling and machining associations throughout the world. Collectively, ISTMA member associations represent over 8,000 companies and over $40bn in annual sales. ISTMA World is in charge of the central coordination and organisation of all international activities.

NEWS

ISTMA General Assembly in Chicago

The city of Chicago, USA, will host the ISTMA Meeting and its 2019 General Assembly. The event will be organised by NTMA – National Tooling and Machining Association at the Heidenhain premises in Schaumburg (IL) from 23-25 April.

National Association representatives will have the chance to meet and share their experiences and opinions about industry challenges and future trends. The programme also includes visits to local companies and networking events.

Delegates and attendees from several member countries and regions are expected to attend the ISTMA annual reunion.

istma.org

ISTMA World 2020 Conference

The 16th ISTMA World Conference has been scheduled for June 2020 at the Intercontinental Hotel, Shanghai, China. Hosted by CDMIA, the China Die and Mould Industry Association, the event’s website has been officially released: www.istmaworld2020.com.

Organised by ISTMA every three years, this edition will include technical sessions to keep attendees up-to-date on the latest market, industry and technological trends. It will be combined with the DMC 2020 show and participants will have access to networking meetings to facilitate regional and international co-operation and to visit local toolmaking companies.

istma.org

ISTMA Forum @ MEX’19

The ISTMA Forum 2019 will take place at the ISTMA Lounge in Hall 9 at the Moulding Expo (21-24 May). ISTMA national association participants will introduce their country’s industry, local initiatives, best practices, R&D projects, new technologies and concepts. Panel discussions will be held by renown experts of global partners, international editors and publications.

Events will be scheduled for the first three days. The programme will be promoted by ISTMA and Moulding Expo organisers.

istma.org

EVENTS

Hannover Messe

■ The annual global trade fair for industrial technology will take place in Hanover, Germany, from 1-5 April.
■ Partner country this edition is Sweden.

Industrie Lyon

■ France-based leading event for production technologies will take place in Lyon from 4-7 April.

Control

■ The 33rd edition of the international trade fair for quality assurance will take place in Stuttgart, Germany, from 7-10 May.
■ This event will bring together technologies, processes, products and system solutions in the field of industrial quality assurance.

MEMBERS

Tool Factories Association
www.svaz-nastrojaren.eu
Estonian Special Tooling Association
www.estatools.ee
The Federation of Finnish Technology Industries
www.techin.fi
Association Française des Industries du Moule, Modèle et Maquette (AFIM)
www.afim-france.com
VDMA
www.vdma.org
The Gauge & Tool Maker’s Association (GTMA)
www.gtma.co.uk
Szerszámgyártók Magyarországi Szövetsége (SZMSZ)
www.szmsz.hu
Unione Costruttori Italiani Stampi e Attrezzature di Precisione (UCISAP)
www.ucisap.it
Stowarzyszenie Techniczne − Tworzywa Sztuczne
www.stts.com.pl
Associação Nacional da Indústria de Moldes (CEFAMOL)
www.cefamol.pt
Slovenian Tool and Die Development Center
www.tecos.si
Toolmaking Association of South Africa (TASA)
www.tasaweb.co.za
Swedish Moulding and Press Tools Association
www.swf.se
Swissmem
www.swissmem.ch
International Mould Manufacturers Union
www.ukub.org.tr

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