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What can we learn from Brazil?

Quite a bit, actually. In May this year Metalworking News was privileged to be invited to Brazil by ABIMaq – The Brazilian Machine Tool Builders’ Association – to attend the second edition of the highly successful and largest Latin American trade show for the machine tool and industrial automation industries in Latin America – EXPOMAFE 2019. It had been nearly 10 years since this publication had last visited Brazil, and while some things haven’t changed, such as the Brazilian desire to want to be the country of the future, and the fact that everyone thinks that they are Ayrton Senna on the roads, much has, especially in manufacturing.

This was only the second time this exhibition had been held, but it was already 25% larger than its predecessor. Over 55 000 visitors from more than 30 countries – most of whom were deemed as ‘quality’ by the 750-plus exhibitors – descended on the energetic city of São Paulo for the show.

Brazilian manufacturing companies are fully embracing the Fourth Industrial Revolution and it was clear that some areas of the Brazilian manufacturing industry are realising growth – an industry that is also currently generating jobs in that country. The theme of the exhibition was to embrace Industry 4.0 and to bring together young and old by showing visitors what the potential of modern manufacturing and interconnectivity has to offer. Symbolised everywhere was the relationship between man and machine.

Emerging from a state of political turmoil, Brazil now stands at the precipice of a journey into yet more of the unknown, but at least people are cooperating and participating and collectively working together to build a better Brazil for all.

Ernesto Araújo, Brazil’s foreign minister, recently told the Financial Times that the South American customs union Mercosur, whose countries comprise of the powerful agricultural nations of Brazil, Argentina, Paraguay and Uruguay, are soon to finalise an extensive free trade agreement with the European Union.

So, while Trump’s US looks to sturdy policies of protectionism (Brazilian manufacturing equipment exports to that country are already on the rise), and the EU remains a protagonist of free trade, such free trade agreements could thrust the Brazilian economy into a state of growth.

Professor Louis Fourie, deputy vice-chancellor: Knowledge and information technology at Cape Peninsula University of Technology says: “At a currently undisclosed place in Latin America, an entire 3D printed neighbourhood for a small community of 50 farmers and weavers will be built in 24 hours.” Surely this is the kind of thinking we need in South Africa? South Africans don’t need a visa to visit Brazil - just another reason to put Brazil on your radar if it isn’t. Soon tourists from the US, Japan, Australia and Canada won’t either. Opportunities abound.

But it’s not all doom and gloom back home. With significant investments in plant upgrades and Industry 4.0 preparation and compliance from local automobile manufacturers like Nissan, Ford and Mercedes-Benz, and OEM suppliers like Maxion Wheels, it should come as little surprise to read that the National Association of Automobile Manufacturers of South Africa (Naamsa) is reporting that vehicle export sales continue to perform exceptionally well, and will do so for the remainder of this year.

There’s talk of Mercedes-Benz USA shifting all production of its C-class vehicles from its Vance, Alabama plant, to its East London plant. That’s another 40 000 vehicles that could be manufactured locally, Managing Director of Ford Motor Company of Southern and Sub-Saharan Africa Neale Hill says: “Where some might see obstacles, others see opportunities.”

Clearly OSG Corporation sees opportunity by investing R60 million over the next 24 months in new technology and equipment at its Somta Tools factory in Pietermaritzburg.

So, whatever you want to call it – the Internet of things, Industry 4.0, AI or Big Data – it’s complex, it’s here, and it’s here now, not next month or later this year. Like Brazil, and some of these companies, you should at least have a strategy in place for dealing with how these industry changes will impact your business. Some industry role players are already asking what comes after Industry 4.0. Don’t get left behind.
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Industry 4.0 and CAD/CAM Software: Five questions

Forward-thinking CAD/CAM companies are addressing the emerging shift in manufacturing towards Industry 4.0. Where does CAD/CAM fit into this picture? Specifically, where does the software programme you use fit into these goals at your company?

These are important questions to ensure that your shop or factory is robust from a data gathering and managing perspective. You’ll also want to become increasingly efficient so that the statistical markers improve over time. Here are five key areas to discuss with your CAD/CAM software provider regarding Industry 4.0.

Connectivity: How many places does the software touch to ensure that the data can be brought in, used and shared in the best way possible? Can that information be used in other areas of the shop? The CAD/CAM software directs the machine tool of course, but it’s also a platform for the shop to do a variety of things, including metrology, robotics and digital tool management. All of these pieces are necessary for the connectivity that comes with Industry 4.0.

Partnerships: How well does the CAD/CAM software play with others? Partnerships with machine manufacturers, tooling developers, and other software utilities ensure that all the pieces can connect.

Advanced Toolpaths: Does the software’s functionality improve with each release? Are the toolpaths “smart”? For example, dynamic motion toolpaths are a big step up. With dynamic motion, the angle of tool engagement constantly changes to keep a consistent, optimal chip load on the tool and more of flute length can be used. One result is reduced machine time for specific jobs. With 2D cutting and 3D roughing, for example, machine time can be cut by 75%. Also, tool life can increase due to cut consistency and the smooth motion is easier on the machine.

Another exciting advancement is a technique known as accelerated finishing, which is geared towards faster machining and better surface finish on parts with complex geometries. New classes of tools, such as advanced shaped tools, require CAD/CAM companies to work closely with tool manufacturers to develop toolpath motion that takes advantage of these shapes.

Further, with regard to toolpath development, what is the nature of the company’s beta effort? An active beta user base not only relays experiences about software, but proactive users often report what they see on the horizon from a shop floor level, generating new ideas that will need to be addressed in an upcoming release.

Testing: How does the CAD/CAM software company test its product? Having direct access to a machine shop, for example, exposes the issues that typical shops run into. With a variety of types and brands of machine tools–some new, some older–that shop can be the proving ground where great toolpaths and fresh approaches are forged.

Manufacturing Technology Education: Is the CAD/CAM software widely used in the educational market? Getting students–youth or adult–excited about manufacturing and training them are crucial to the future of Industry 4.0. People with knowledge of the software you use will get up to speed quickly after you hire them.

The future of manufacturing looks bright and exciting. There have been many technological advances in the last decade and the onset of Industry 4.0 is fascinating. It is essentially a digital thread, from start to finish, from the concept to the output. No one company or manufacturer encompasses all of what Industry 4.0 is and does. Many pieces need to be connected to each other to make Industry 4.0 effective and practical in the workplace and your CAD/CAM programme is an important part of that process.

Written by Ben Mund - Senior Market Analyst, CNC Software Inc.
TaeguTec launches new products

Korean cutting tool manufacturer TaeguTec has recently launched new products with promises that there will be new developments that will be launched at the upcoming EMO 2019 exhibition that takes place in Hannover, Germany in September 2019.

Chase2Mill line extended by TaeguTec

First introduced two years ago the TaeguTec Chase2Mill series of end mill tools is being extended with the arrival of two additional insert designations.

Suitable for ramp and slot milling applications, Chase2Mill is available in end mill, modular or face mill designations. Initially launched with a four-corner, double-sided 4NHT 06 insert range featuring a 90° entry angle that is suitable for high ramp-down applications, the 4NHT 06 has been expanded and a newly developed 4NHT insert series released.

The 4NHT 06 corner R range insert has been extended (04R-20R) to meet the wider range of corner radius requirements demanded by today’s industry. Adding to the existing 8mm and 16mm radius inserts, TaeguTec has expanded the line to include a 4, 12 and 20mm radius offering. The extended 4NHT 06 is available with TaeguTec’s ML and M geometry, and the TT8080 and TT9080 grades, which combine to improve cutting load, minimise built-up-edge and generate high surface finish, says the company.

TaeguTec’s 4NHT 06 insert designation has also been launched with the 4NHT 06-ML, which is said to be characterised by its ability to generate low cutting loads and high surface finishes (credit to ground cutting edges that minimise built-up-edge).

A further introduction is the 4NHT 06-AL series of uncoated inserts for aluminium and non-ferrous cutting applications.

Expands StarMill SED end mill series

The StarMill SED range of end mills from TaeguTec has been expanded to offer a greater choice of diameters, lengths, radii, coatings and geometries.

Already available for use on difficult-to-cut materials such as stainless steel, titanium, Inconel and other high-temperature alloys, StarMill has been extended with the arrival of the SED4 UL range of 4-flute extra-reach end mills. The UL extension introduces end mills in 3, 4, 6, 8, 10 and 12mm diameters with an overall reach from 63mm to 92mm, depending upon the chosen diameter. With a flute length from 10mm to 40mm, this addition to the SED line-up enables manufacturers to access small cavities and difficult-to-reach surfaces.

In addition to the SED4 UL line, TaeguTec has also introduced a complete line of SED4 UR end mills with a corner radius for enhanced tool life and machining performance. The SED4 UL range is available in diameters from 2 to 16 mm with each diameter offering the customer a selection of corner radii. Although the 4 mm diameter tool offers users the choice of a 0.1, 0.2 or 0.5mm radius, the largest 16mm end mill is available with a 0.5, 1, 2 or 3mm corner radius.

All ranges within the SED StarMill portfolio incorporate unequal flute spacing and a high helix that combine to reduce harmonic effects and vibration during high-speed machining. Furthermore, the polished high-helix flutes improve chip evacuation, while the TT5515 grade coating prolongs tool life, even under challenging machining parameters, says TaeguTec.
Topdrill - New DL chip former for mild steel machining

The TopDrill line’s current DP chip former is a multi-purpose insert that works wonders on various types of materials. Now TaeguTec has expanded the line’s capabilities by introducing the DL chip former specifically dedicated for mild steel machining applications.

The product line already includes several types dedicated to various materials: The DP for general purposes; The DK for cast iron, as well as the DA for aluminium machining. With the introduction of the DL insert for mild steel machining, customers now have a wider range of chip former options across more material types.

DL chip former features

The DL chip former is suitable for mild steel and low carbon steel machining due to its improved chip segmenting capability and the application range has been expanded.

TaeguTec has been supplying both the TT7005 and TT7015 grades for cast iron machining with great success. Now, an additional grade – the TT7025 grade – has been introduced to widen the scope in order to focus on low speed and interrupted cast iron machining.

The new grade has improved abrasion and chipping resistance because of the latest substrates and coatings ensuring excellent performance, stable and longer tool life in low speed and interrupted machining of cast iron. A further advantage of the new grade is it capitalises on recent trends due to its suitability for ductile cast iron machining. Very good surface roughness is achieved due to the GoldRush post-treatment technology. The TT7025 grade’s black and yellow appearance, black on the bottom and top faces and yellow on the sides, helps to easily determine the level of wear to the insert.

For more information contact TaeguTec SA on TEL: 011 362 1500 or visit www.taegutec.com
First Cut appointed agents for Garboli tube finishing machines and Comac tube and section profiling and bending machines

First Cut, one of South Africa’s leading distributors of capital equipment, cutting consumables and precision measuring tools for the metal, timber, textile, meat, DIY, paper and plastic industries has announced that they have been appointed as the South African representatives of Italian companies Garboli Srl and Comac Srl.

“These two agencies will complement our existing range of international tube and structural steel cutting and manipulation equipment manufacturers that we already represent in South Africa. These companies include Italian machine manufacturer the BLM Group, a company that manufactures tube bending and laser cutting systems, Voortman, a Dutch company that designs, develops and manufactures machinery for the steel fabrication and plate processing related industries, another Italian company CMM, a manufacturer that specialises in horizontal and vertical beam welding and handling equipment and Everising, a Taiwanese manufacturer of bandsaws,” explained Anthony Lezar General Manager of First Cut’s Machine Division.

Finishing – big challenge

“One big challenge in tube finishing are the growing expectations about the surface finish. The demand for high-quality finishes on tubing has increased over the years, much of it driven by more use of stainless steel in the medical, food, pharmaceutical, chemical processing and construction industries. Another driving force is the need for painted, powder-coated, and plated tubing. Regardless of the desired result, a properly finished metal tube requires grinding and polishing in many cases,” stated Lezar.

“Finishing stainless steel tube or pipe can be tricky, especially if the product has quite a few bends, flares and other non-linear features. As the use of stainless steel has expanded into new applications, many tube fabricators are finishing stainless steel for the first time. Some are just experiencing its hard, unforgiving nature, while also discovering how readily it is scratched and blemished. In addition, because stainless steel is priced higher than carbon steel and aluminium, material cost concerns are magnified. Even those already familiar with stainless steel’s unique properties are encountering challenges because of variations in the metal’s metallurgy.”

“Garboli has been developing and manufacturing machines for grinding, satining, deburring, buffing, polishing and finishing of metal components for over 20 years, with an emphasis on tube, pipe and bar whether they are round, oval, elliptical or irregular in shape. Once cut or bent metals such as carbon steel, stainless steel, aluminium, titanium or brass will always have a semi-finished look. Garboli offer machines that change the surface of the metal component and give them a ‘finished’ look.”

“Machines with various abrasive processing methods (flexible belt, brush or disc) and in several abrasive grit quality allows you to obtain different finish qualities in accordance to specific requirements. Machines operate with three different working methods - drum finishing, orbital finishing and brush finishing. Again, the type of machine you choose will depend upon the shape of the
Applications for these components and finished products can be for bathroom fittings such as taps, balustrades, hand rails and stair components, automotive, lighting, engineering plants, construction and building and many other sectors. In many cases they are used in highly visible areas and need to be mirror polished so as to achieve an aesthetically pleasing look,” continued Lezar.

Comac tube and section profiling and bending machines
“Comac is our newest addition to complete our line of profiling and bending machines that we offer. They manufacture quality machines for rolling pipe, bar, angle or other profiles including round and square tube, flat angle-iron, U-channel, I-beams and H-beams to achieve the desired shape. Their machines use three rollers, and by adjusting these, the required amount of bending can be achieved,” explained Lezar.

“A profile bending machine is a machine used to perform cold bending on profiles with different shapes and sizes. The most important part of the machine are the rolls (normally three) that apply a combination of forces on the profile, the resultant of which determinates a deformation, along a direction perpendicular to the axis of the profile itself. The three-dimensional lateral guide rolls can be adjusted to work very closely to the bending rolls, minimising the distortion of non-symmetrical profiles. Moreover, the guide rolls are equipped with the tooling to bend angle leg-in. This tooling can also be effectively used for calibrating the bending diameters or recovering radii too tight.”

“All models are available in several versions, conventional, with programmable positioners and with CNC Control.”

“Again, there are numerous applications for these machines in industry. Regardless of whether you’re working with tube, pipe or section, and regardless of the bending process, making the perfect bend boils down to just four factors: The material, machine, tooling, and lubrication,” concluded Lezar.

For further details contact First Cut on TEL: 011 614 1112 or visit www.firstcut.co.za

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OSG Corporation, regarded as a global leader in the manufacture of round cutting tools and a company that is listed on the Tokyo stock exchange, has given the thumbs up to its South African manufacturing operation by earmarking a further significant investment in the Somta Tools factory in Pietermaritzburg, KwaZulu-Natal. OSG Corporation acquired a majority shareholding in Somta Tools in 2016 and has already made substantial investments in equipment and processes at the local manufacturing facility.

“OSG Corporation is investing R60 million over the next 24 months in new technology and equipment at its Somta Tools factory in Pietermaritzburg. This is an unprecedented investment in South Africa’s cutting tool industry and will go a long way toward helping Somta to achieve its goal of becoming the undisputed leader of machining solutions in Africa, and aligning itself with Industry 4.0, a global trend allowing a seamless process from raw material to finished product,” said Allan Conolly, Managing Director of Somta Tools.

“This is not the first time that the OSG group has invested in the Somta Tools factory. In 2018 we installed OSG designed and manufactured CNC equipment in both the high-speed steel (HSS) and tungsten carbide factories to improve the finish and geometry on the tools and to reduce setup and cycle times,” added Conolly.

“In addition, new measuring and inspection equipment was introduced to improve the degree and frequency of the stringent quality checks that take place during the manufacturing process. This development improved our in-line inspection capabilities such as measuring key geometries more accurately, resulting in greater consistency, reduced cycle time and improved tool life,” explained Conolly.

“The investments in new technology are key to enhancing productivity and quality, the benefits of which are immediately being passed on to our customers through price reductions and improved tool performance.”

2019 investments

“Our investment in equipment this year thus far has seen the introduction of a number of new machines and quality and measurement solutions into Somta’s manufacturing plant.”

“In the blanking preparation department we have installed a new DMG MORI NLX 1500 universal CNC mill turn machine to prepare a variety of blanks. The DMG MORI combines two operations that previously would have needed to be done on two different machines.

“Additionally in the blanking preparation department we have invested in a Haas VF2 SS CNC milling machine. The Haas has been equipped with a trunnion table that will allow us to do 5-axis milling. This means it can combine up to five operations that previously would have needed to be done on up to five different machines making it ideal for its primary purpose, which is to produce blanks for fringe items.”

“Another new machine is the ANCA MX 7 Linear, a versatile CNC tool grinder designed for production grinding. This machine has been installed in the carbide department. The powerful 38kW permanent magnet spindle provides high torque at lower RPM, which is ideal for carbide grinding and a wide range of other applications. The ANCA MX 7 Linear machine is also equipped with the latest cylindrical linear-motor technology.”

“As we join the so called Fourth Industrial Revolution and we move towards digital manufacturing and unmanned production it is important that you invest in the latest technology to improve quality and drive down costs.”

OSG Corporation gives Somta Tools factory thumbs up with R60 million investment
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manufacturing and unmanned production it is important that you invest in the latest technology to improve quality and drive down costs. Producing good parts with less labour is one way to drive down costs. But that’s especially difficult when tolerances get down into the microns and the parts require a 5-axis grind in carbide. Two things work together to achieve this. In-machine measurements to make sure you’re producing quality components and machine monitoring to collect and archive those measurement results to track machine performance."

“And secondly you automate. On the ANCA MX 7 Linear we have included a new Fanuc LR Mate 200iD robot that acts as a feeder for the machine and allows us to seamlessly transition from raw stock to finished component without human interference.”

“This is not a new development for us. We have previously implemented unmanned production by installing a robot with a machine. We are investigating more options of where we can make more use of robotic handling without any concern that the products may be defective.”

Quality and inspection

“We make some of the most geometrically complex products out of the toughest materials and with the tightest tolerances. And yet cutting tools represent only 3% of the total cost of the average metalworking process. But you still have to maintain the tight tolerances.”

“This is the reason why we continue to invest heavily in our quality and inspection departments. Recently arrived in the tap department is another of what we call a floating carriage. The measuring machine joins five other floating carriages in this department.”

“The floating carriage is an ideal measuring machine for comparative measurement of the external diameter of any cylindrical threaded component having defined centres. This simple machine is the most reliable measuring equipment for measurement of effective diameter and major and minor diameters.”

“The HSS department has been equipped with a new Zoller Genius 3, a measurement machine that fully automates the measurement of tools for in-process and final inspection. The Genius is the universal measuring machine for cutting tools. From testing of individual criteria to complete, fully automatic and operator-independent checks, your workpieces are inspected quickly, simply and with maximum precision. The measurement results are documented in detail and transferred to our grinding machines at the click of a button. The Genius saves valuable time during planning, programming and production while ensuring optimum performance and quality first-time results.”

“In the carbide department we have installed a Zoller Smart Check 420. This 3-axis CNC version is a powerful universal measuring machine and is designed for all cutting tools, enabling efficient checking before and after the sharpening process to ensure absolute precision and documented results. It features swivelling incident light image processing software, which allows you to inspect, measure and record axial or radial geometries of tools at the click of a mouse button and without expert-level knowledge. Measurements can be transferred directly onto CNC grinding machines for more accurate machining.”

“Additionally our Goniometer has been upgraded to include cameras and digital readout for in-line measurement of tools and solid-state controllers have been installed in the heat treatment furnaces to replace the manual contactors. This saves on costs and reduces power usage, a more environmentally friendly solution.”

Further investment

“Somta continues with its exciting new journey as part of the OSG Group, and these investments are part of several new projects planned. A TGT Accudress wheel truing and profiling machine complete with a camera system arrives shortly.”

In the carbide department Somta have installed a Zoller Smart Check 420, a 3-axis CNC universal measuring machine that is designed to measure cutting tools, enabling efficient checking before and after the sharpening process to ensure absolute precision and documented results.

Another new machine that has been purchased and installed in the carbide department is an ANCA MX 7 Linear, a versatile CNC tool grinder designed for production grinding.

The ANCA MX 7 Linear versatile CNC tool grinder has been equipped with a Fanuc LR Mate 200iD robot that acts as a feeder for the machine and allows for seamless transition from raw stock to finished component without human interference.
This machine will be utilised in the HSS factory as will the two 5-axis TGT V2 Advance Maxima CNC tool and cutter grinders that will arrive at the same time as the TGT Accudress. All three machines will be manufacturing HSS tooling.

“We have also purchased microscopic equipment, including software, that is currently being installed in the heat treatment laboratory. This will take our analysis of HSS and carbide materials to another level.”

“As demand for coated products increases, Somta is also planning the installation of a second coating plant together with further engineering solutions to continually improve its manufacturing processes, guaranteeing a superior and precise range of cutting tools. The company, in line with OSG’s philosophy of improving local manufacturing, plans to pass the benefits of these future investments on to the market as soon as they are realised,” concluded Conolly.

For further details contact Somta Tools on TEL: 011 390 8700 or visit www.somta.co.za
The global supply chain for steel, copper and aluminium products is set to gather in Johannesburg for the inaugural Africa Wire, Cable & Tube Conference. Metallic wire, cable, tube and pipe products are crucial to industries that are key pillars of economic development across Africa such as mining, power supply and construction. For the first time, a conference is being held to bring together local stakeholders and international experts to discuss how to boost production and trade in these products throughout the continent.

The inaugural Africa Wire, Cable & Tube Conference, co-organised by CRU and The Southern African-German Chamber of Commerce and Industry (AHK), will be held from 11 to 13 November 2019 in Johannesburg, South Africa. Wire and Tube Düsseldorf, the world’s largest trade shows in this field, are lead sponsors of this important new conference. This unique partnership is the basis for creating an event in which the international wire, cable, tube and pipe supply chain will meet and make new trade partnerships with key African stakeholders.

“CRU is a leading authority in wire and cable markets. We are delighted to build a unique partnership with AHK and Messe Düsseldorf. This important inaugural event is being launched in response to the interest in these rapidly changing markets and offers an ideal opportunity for local industry and key decision-makers to meet with the international supply chain,” said Nicola Coslett, CEO of CRU Events as she explained the rationale behind this new project.

“We are excited to be co-organising this new conference, which will serve to benefit local enterprise and the region’s best interests as well as establishing a dialogue with international investors wishing to make contact with local manufacturers and producers. We look forward to helping to build long-lasting relationships between South African SME’s and their new partners, and to the many discussions around the future business opportunities in the region,” commented Frank Aletter, Deputy CEO of The Southern Africa-German Chamber of Commerce and Industry.

Discussions at the conference will explore the main trends impacting the global steel, copper and aluminium wire, cable and tube products and what this means for Africa. Delegates will also be brought up-to-date on the expected consumption trends within Africa for these products in mining, utilities, oil and gas, construction and infrastructure.

Attendees will gain insights into the current political and investment climates across the continent from local experts and international organisations with real case studies. Investors will also have the chance to assess greenfield and brownfield project showcase presentations. In other sessions, industry experts will discuss the latest global technological advances in wire, cable, tube and pipe manufacturing, and how this can be applied to African operations.

The inaugural Africa Wire, Cable & Tube Conference will be held at Emperors Palace, Johannesburg, South Africa. Please visit http://bit.ly/CRAUAWCTPR for more details and to book your place.
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The Rapid Product Development Association of South Africa (RAPDASA) will hold its 20th Annual International Conference from 6 to 8 November 2019. The conference will be hosted by Central University of Technology, Free State (CUT) and will be held at the Emoya Estate, Bloemfontein in the Free State province.

Additive Manufacturing (AM), better known as “3D Printing”, has matured from a prototyping technology into a fully-fledged manufacturing technology. AM products are increasingly being used as final products in the aerospace, automotive, medical, consumer product and other industries. Internationally, unprecedented innovation has been seen in the field of AM and South Africa is certainly contributing to the advancement of AM as a manufacturing technology.

Conference theme
The conference theme this year will be Creating the Future of Manufacturing – Layer by Layer. The organisers have also added a sub-theme of Establishing the 3D Printing Process Chain.

The conference and exhibition will offer many opportunities for participants from industry, R&D institutions, academia and government to gain insights from world experts in this field and for the South African AM community to showcase the cutting-edge work carried out in this country.

This year the organisers are running a special track on Biomimetic Engineering for Additive Manufacturing at the conference. You are invited to submit your industry or technical paper. Further information is available on the RAPDASA website at https://site.rapdasa.org/wp-content/uploads/2019/05/specialist-track-rapdasa-call2.pdf.

The conference will be preceded by a preconference seminar “Design and Additive Manufacturing of Titanium Parts” to be held on Tuesday 5 November 2019 at Central University of Technology (CUT) in Bloemfontein. The first call for papers and further information is available at https://site.rapdasa.org/pre-conference-seminar.

The conference will cover sectors such as Aerospace, Medical and Bio-medical, Automotive, Sport and Leisure and Architecture. Apart from these, papers will be presented on topics covering all aspects of the rapid product development chain, such as CAD, product engineering, reverse engineering, simulation and modelling, process modelling, structural analysis, materials selection for design, materials engineering, materials processing, tooling design and development.

Confirmed international speakers
Confirmed international keynote speakers Dr Terry Wohler of the USA, Prof Paulo Bartolo of the UK, Prof Ian Gibson of the Netherlands, Prof Alain Bernard of France and Prof Nataliya Kazantseva of Russia.

Conference package
The conference will be hosted at Emoya Estate in Bloemfontein, South Africa. On-site accommodation is limited, but arrangements with nearby hotels and guest-houses have been made. The conference fee of R6 100.00 per delegate excludes accommodation, which will have to be booked and paid by delegates. The conference package includes: Full conference participation, lunch and dinner, refreshments (tea/coffee breaks), welcome function and the gala event. The conference attendance fee for bona fide full-time postgraduate students is R4 350.00 (maximum of 5 students per institution and proof of registration must be provided).

For further information please contact Mrs Jenny van Rensburg at info@rapdasa.org
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Speaking at the recent announcement of Nissan’s decision to manufacture for the first time in history the full model line-up of the Navara on home soil, the President of the Republic of South Africa, Cyril Ramaphosa, commented that the automotive sector is an essential part of the industrialisation of our economy.

“The sector is a reliable partner but it is also a dependable ally, as it has demonstrated by this investment, on our path to position manufacturing as a catalyst to development and inclusive growth,” the President said.

Manufacturing of the new Navara at Nissan’s Rosslyn facility, in Pretoria, is expected to begin in 2020 and to see the plant’s current production output grow by more than 50 per cent. The Japanese vehicle manufacturer announced in April 2019 that the company will invest R3 billion in its Rosslyn plant.

Increasing capacity

In order to increase capacity to this level, a two-shift operation will be required and this alone will result in the immediate creation of an additional 400 jobs. Hundreds more vacancies will be created, though, at Nissan as well as within the broader industry and, specifically, the local component supplier industry.

“Nissan has a deep understanding of the need to invest in skills development in a meaningful way. Not just for our benefit, in terms of having a skilled workforce at our technologically advanced vehicle manufacturing plant in Rosslyn; but for the benefit of all the eager, young minds in this country, who are simply seeking opportunities to improve themselves,” says Managing Director for the Nissan Group of Africa, Mike Whitfield.

AIDC partnership

To this end, Nissan has in partnership with the Automotive Industry Development Centre (AIDC) built an incubation and training centre at the Rosslyn manufacturing plant, through which a five-year training and mentorship programme is offered. This programme serves to equip entrepreneurs with the skills they need to run their companies - with the AIDC’s focus on providing them with the business skills they need and Nissan’s, on giving them the necessary technical know-how.

“Programme hopefuls subject themselves to a rigorous selection process which includes multiple rounds of interviews as well as a two-day assessment incorporating psychometrics, role play and a case study. Successful candidates are enrolled in the programme and taught about assembly line layout, process optimisation, efficiency improvement, housekeeping, finance management, human resource management, payroll overview, company taxes, cost management and quality management systems,” explains the AIDC’s Dineshan Moodley.

“Through this programme, eight new black-owned suppliers have so far been developed with current plans to develop five more to be operational for local production of the new Navara pickup.”

Nissan teams from Japan will also work with suppliers here in South Africa to develop the local component industry through technical support, training and skills exchange.

“We aim to localise more in order to grow South African vehicle production as well as contribute to the transformation of the country’s automotive value chain as a whole,” says Whitfield.
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A struggling economy, political uncertainty, fragile consumer confidence, mounting pressure on disposable income, and diminished purchasing power as a result of higher interest rates and fuel price hikes, have all taken their toll on domestic new vehicle sales in South Africa. However, it’s not all doom and gloom for the automotive sector. According to the latest new vehicle sales statistics released by the National Association of Automobile Manufacturers of South Africa (Naamsa), export sales continue to perform exceptionally well. In April 2019, export sales at 33,090 vehicles reflected a substantial increase of 11,571 units, or a gain of 53.8 per cent, compared to the 21,519 vehicles exported in the corresponding month last year. Naamsa predicts that the momentum of vehicle exports over the second half of the year should increase further, and industry export sales for the year could reach close to 400,000 units, compared to the record 351,139 vehicles exported last year.

“Ford Motor Company of Southern Africa believes that the expansion of already thriving export programmes for locally built vehicles holds immense potential for job creation, and an opportunity for long-term sustainability of the sector. While domestic vehicle sales are an essential component of business for us, I believe that the real success and sustainability of the original equipment manufacturing (OEM) sector as a whole, relies on expansion of South Africa’s global export opportunities,” said Managing Director of Ford Motor Company of Southern and Sub-Saharan Africa Neale Hill.

“Over the past two years, we have invested over R3 billion to expand the production capacities of our Silverton Assembly Plant in Pretoria and our Struandale Engine Plant in Port Elizabeth, to meet the growing international demand for our Ford Ranger. We have carefully and strategically mapped our revenue pipeline to target exports and drive export-oriented growth,” he continued.

Currently, two-thirds of Ford SA’s total vehicle production is exported to 148 global markets, including Europe, the Middle East, and Africa.

“Around 400 vehicles leave our Silverton plant each day, destined for local dealers or shipment around the world via 15 to 20 vessels a month. Up until recently, all incoming and outbound Ford vehicles were shipped through Durban harbour’s Roll On Roll Off terminal. However, this facility has become increasingly congested, so we have adopted a multi-port strategy,” says Hill.

“We now also ship Rangers to European markets through Port Elizabeth’s harbour, to support our increased export volumes, in order to improve efficiencies and shorten delivery times.”

The Ranger is one of South Africa’s top vehicle exports, with volumes reaching an all-time high of 68,364 units in 2018. The bulk of these were destined for EU markets, with Ford of Europe notching up a final tally of 51,500 sales in the 20 traditional EU markets, which represented a gain of 15.7%.

“Ranger just proves what we – as Ford, and the OEM sector – are capable of. Where some might see obstacles, others see opportunities. Admittedly we’ve got a long way to go before we’re able to fully realise the vision we have for this industry, and the country. But I do believe with good leadership and continued expansion of our export programmes, we’re on an exciting trajectory – for both business and the economy at large.”
“Ranger just proves what we – as Ford, and the OEM sector – are capable of. Where some might see obstacles, others see opportunities. Admittedly we’ve got a long way to go before we’re able to fully realise the vision we have for this industry, and the country. But I do believe with good leadership and continued expansion of our export programmes, we’re on an exciting trajectory – for both business and the economy at large,” said Hill.

According to Carmag the Ford Ranger Raptor 2.0 BiT 10AT 4x4 costs R786 400.00. This puts it at number three in the list of most expensive double-cab bakkies in South Africa. Coming in at number one is the Mercedes-Benz X350d 4Matic Power at R973 188.00. Second on the list is the Volkswagen Amarok 3.0 V6 TDI Extreme 4Motion at R829 200.00 followed by the Isuzu D-Max 3.0 TD 4x4 LX Arctic Trucks AT35 in fourth at R785 000.0 and then the Toyota Land Cruiser 79 4.5D-4D LX V8 in at fifth costing R765 600.00. A few short years ago, Toyota’s Land Cruiser 79 was easily the most expensive double-cab bakkie in the land, but the arrival of the pair of German V6 models above and, latterly, the off-road versions of the Ranger and D-Max, sees Toyota’s highly capable pick-up pushed down to fifth.
Industry 4.0 has gone quickly from a buzzword to a standard operating strategy for businesses, including manufacturers. If you aren’t at least thinking about how to leverage data to improve your manufacturing processes, you risk being left behind.

But the implementation of Industry 4.0 in a plant or factory is not an end-point or checklist exercise. Rather, it is an ever-evolving philosophy that will continue to incorporate new concepts and to branch out into different, unexpected directions. So what comes next?

Firstly, let’s recap where we are now. Different organisations are at different stages but one thing is true for all those on an Industry 4.0 journey – namely, that they are trying to sift, sort, discard, rank and, most importantly analyse, the data coming from their production lines.

Within the process control environment there is a huge amount of data being produced – frankly too much for any one person to make sense of it. As a result, there is a real danger that operators are being blinded by a blizzard of information and are missing real opportunities for process and quality improvement.

The answer to this problem lies in augmenting human expertise with artificial intelligence (AI), not only to analyse but also to predict and ultimately prescribe actions. Correctly predicting what will happen next in any given situation and to prescribe corrective action to prevent it is extremely valuable if it can be done affordably, at scale, and early enough to meaningfully change outcomes, such as the elimination of wastage/scrap. In short, the goal of AI is to leverage Big Data to radically lower the cost of “non-quality” by prescribing optimal parameter settings to operators.

This commoditisation of our ability to predict the future at scale, is, unsurprisingly, revolutionising every discipline it touches. The most obvious examples of this revolution are Google, Facebook and Amazon, where AI has radically improved the applicability and efficacy of those platforms’ mass-market advertising.

In this example, AI is used to sift through massive quantities of online and seemingly unrelated, behavioural data generated by billions of users. Then, using AI they can predict in real-time the best answers to search queries or the most useful ads to display for each individual user.

The same process can be used with manufacturing data. Real-world production lines, in automotive, mining or other heavy industrial spaces, always include multiple process flows, some in parallel, some sequential, all more-or-less impacting each other and each requiring a specific combination of production variables to achieve optimal efficiency and lowest wastage.

AI operates in these complex manufacturing environments, including foundries, mineral processing, long steel mills and automotive manufacturing and assembly plants, where historical production and quality data from multiple sources are ingested to provide a unified view. Then it’s possible to process this data in real-time, through AI algorithms, to preempt potential quality problems downstream and proactively prescribe corrective actions to prevent variance in quality.

This is not theoretical. It is possible now to use advanced forms of supervised and unsupervised machine learning to create a digital twin of a plant and to discover the optimal operating regime for complex, multi-step, industrial processes. Traditional statistical methods struggle with the quantity, rate and diversity of data in large-scale manufacturing processes. Where statistical process controls strain to account for and deal with the unintended consequences that typically propagate through large, complex production lines, AI algorithms can analyse cascade effects and successfully...
make predictions, suggesting operating parameters in order to avoid unintended consequences and optimise quality.

The fine-tuning of production parameters has traditionally been performed at cell or machine-level in relative isolation from up and down-stream variables, which means it has been almost impossible to identify the impact of upstream changes or halt the propagation of further problems.

AI routines enable controls to be set based on the relative impact of every cell or machine in a production line. By simultaneously leveraging data from multiple sources it is possible to achieve a uniquely holistic perspective against which to set production parameters. The goal is to achieve the optimal operating state for a production line, effectively reducing the chance of defects occurring at every point in the production process.

However, the proof of AI’s ability to revolutionise manufacturing processes comes from real-world cases. For example, at DataProphet, we have been working in recent years with one of the largest foundries in the Southern Hemisphere that manufactures Daimler engine blocks. The plant had significant problems with high scrap and rework rates, ultimately impacting its costs.

The solution was to gather 15 months of production data from all parts of the organisation, often in various formats, from Excel files to access data and then use predictive modelling to identify optimal operating parameters, and identify engine blocks that would go on to be defective.

The end result was a 50% scrap-rate reduction in the first month of operation, a 0% external scrap rate within three months and an annualised saving of $1 million. In fact, following the deployment, for the first time in the history of the company not a single defective casting was produced.

AI solutions allow users to map an entire manufacturing process via analysis of the multi-source historical and real-time production line data, offering operators a holistic view of the production and quality data relating to every unit produced. Consequently, users can review reports prescribing optimal parameter changes, and compare the efficacy of current operating parameters with past parameters.

Written by Frans Cronje, managing director of DataProphet, the developer of the OMNI artificial intelligence platform for manufacturing. Contact him via LinkedIn.
Could Mercedes C-Class US production be heading to South Africa?

No room at Mercedes US plant to manufacture C-Class because of SUV demand – 40 000 vehicle production might move to East London plant.

In a move that speaks volumes about the evolution of Mercedes-Benz and US consumers, the luxury automaker is considering booting its best-selling sedan out of US production, say sources familiar with the situation, to make way for the vehicles Americans want most - light trucks, according to a report in Automotive News.

Where and when the C-Class will move are unclear and Mercedes executives have declined to comment on the plan, which forecasters believe will come as early as next year.

The shift is a telling move

Mercedes spent nearly five years moving the C-Class into production at its sole US factory, in Vance, Alabama. It announced the decision during the global economic downturn in 2009, braving a backlash from German union officials who decried losing such a cornerstone of German factory output to the non-union Alabama plant.

It required considerable time and money to retool the US assembly line and find local suppliers to finally launch the American C-Class in 2014. At the time, Mercedes estimated the move was creating 1 000 US jobs.

Now, just five years later, the sedan appears headed out of America - a casualty of shifting US consumer trends. According to industry forecaster LMC Automotive, C-Class sedan production in Vance will end in the fourth quarter of 2020.

That scenario represents a new reality for a company that was long defined by luxury sedans and coupes and was once hesitant to sell a single light truck. It’s a different Mercedes. The company expects SUVs and crossovers to represent about 60 per cent of its sales in the US next year. Its American factory is already feeling the pinch of that reality.

Where the future is

The 560 000m² Alabama plant is operating at 93 per cent capacity, and is preparing to introduce more SUVs and
crossover volume. Alabama is the global production source of Mercedes’ flagship GLS SUV, and GLE and GLE Coupe crossovers. Global GLS sales have been forecast to increase 30 per cent over the next four years, while GLE crossover sales are expected to grow 28 per cent during that time.

“The SUV has really expanded from a consumer standpoint,” said Jeff Schuster, president of global forecasting at LMC. “That’s where the volume is. That’s where the future is.”

The C-Class sedan remains Mercedes’ second-best selling model line in the US but it is losing momentum to SUVs and crossovers. In 2015 US sales recorded were 81,886, which was a 31% share of US production. This figure has steadily been dropping and it is forecast that in 2019 it will be 43,240 and 19% share of Mercedes production. In 2018 the figures were 46,986 and 20%.

Mercedes-Benz USA CEO Dietmar Exler declined to comment when asked about the possible C-Class production move. Daimler’s incoming chairman, Ola Källenius, also declined to comment when asked. In a statement Daimler said, “We do not comment on speculation.” But the statement added: “The Mercedes-Benz Cars production network reacts flexibly on market demands and plant capacities.”

Exler provided a more reflective outlook, telling Automotive News that SUVs are ‘the perfect vehicle for the United States’. “Americans like their space,” he said. “They like the convenience of SUVs. The US demographically will stay as a suburban country.”

In addition to Alabama, the C-Class is made in Bremen, Germany; East London, South Africa; and Beijing. C-Class production from the US could head to the Mercedes South Africa plant, which produces C-Class sedans for export to right and left-hand drive markets. The plant has 25 per cent production capacity available, according to LMC data.

Meanwhile, the Alabama factory is amidst a $1 billion expansion as it preps to launch electric vehicles. Mercedes predicts its EQ sub brand of EVs could account for 15 to 25 per cent of its global sales by 2025. Those plans represent even more competition for the US factory’s production capacity.

The decision facing the Mercedes US plant is symptomatic of the seismic shift in consumer tastes away from sedans. That shift is especially pronounced in the luxury segment, where consumers want it all - comfort, performance and roominess.

Crossovers and SUVs accounted for 64 per cent of new luxury vehicle sales in the US last year, according to the Automotive News Data Center. That share is up 14 percentage points from 2015.

“That’s leading to a lot of tough decisions in the industry on the car side of the business,” Schuster said. “This is one of them.”

In hindsight, Mercedes’ 2009 decision to bring sedan production to Alabama might seem to be a mistake. But at the time of that announcement, America was loyal to sedans. And about the time the C-Class launched, light trucks accounted for just more than half of the passenger vehicle market, 53 per cent in 2014 and 57 per cent in 2015. Today, light trucks account for 70 per cent.

“That’s how fast the market has swung in the other direction,” said Ron Harbour, a manufacturing consultant with Oliver Wyman. “The market has really caught a lot of people flat-footed.”

LMC forecasts US C-Class deliveries to nosedive 47 per cent this year from 2015. Sales will continue to slip 13 per cent more until the C-Class redesign in 2021.

As sales slide, so has the C class’ share of production in Alabama - down to 20 per cent last year from 31 per cent in 2015, LMC said. Compounding that changing equation: The Alabama C-Class is strapped with an aging design from 2014.

Supply and demand

“The sedan-to-light trucks transition illustrates the need for automakers to be nimble with their production strategies so they can adjust to market conditions. What it’s really revealing is who’s good at flexibility and capital efficiency,” said Harbour.

“Honda, for instance, has standardised vehicle architecture and assembly processes across its models to make factory moves easier. That allows Honda to move production between plants faster and for less money,” added Harbour.

Honda manufacturing veteran Chuck Ernst, retired senior vice president of the automaker’s production unit in Lincoln, Alabama was tasked with making vehicle moves similar to the scenario facing Mercedes.

At about the time Mercedes was deciding to move its C-Class from Germany to Alabama, Honda found that rising gasoline prices were deflating sales of its Alabama-built Odyssey minivan and Pilot crossover. And just as Mercedes brought over the C-Class from Germany, Ernst and the Honda team introduced the big-volume Accord from Honda’s plant in Marysville, Ohio, to Alabama.

“If you need volume to keep the business viable within a facility the best thing you can do is swap out what’s not selling with what is selling,” said Ernst.
Elkana CNC Services has announced that they have been appointed the agents to look after the sales, service and maintenance of the Chiron brand of machines in South Africa.

The Chiron Group, headquartered in Tuttlingen, is a global company specialising in CNC controlled vertical machining and turning centers. It has production and development facilities on four continents, along with sales and service offices and trade missions. The Group, which specialises in the high-tech segment, achieved sales of about €498 million with around 2,100 employees in 2018.

The Chiron Group specialises in the development and manufacture of automated vertical machining centers for the machining of complex workpieces at minimal costs and also provides comprehensive services and digital support for optimal machine operation. The optimisation of the life cycle cost is the main focus of the company. The company boasts that it has one world’s fastest tool change systems. Key customer sectors are the automotive, mechanical engineering, medicine and precision engineering, and aerospace industries.

Founded in 1921 as a workshop for the manufacture of precision mechanical equipment and surgical instruments, the Chiron-Werke made a successful entry in the development and manufacture of vertical machining centers for metal-processing operations during the 1950s. Since 1957, the Hoberg & Driesch group of companies in Dusseldorf, Germany has owned Chiron-Werke.

Service and maintenance
“Elkana CNC Services is an independent service and maintenance company since,” said founder Emmel Kambouris.

“Our focus is on maintenance and servicing of various CNC equipment and will remain so going forward,” explained Kambouris.

“Chiron needed someone to look after the CNC machines that are operating in South Africa from a service perspective. I have been doing this unofficially for some time now and have considerable experience on their equipment.”

“Their machines are bracketed in the high-end segment of CNC equipment and are renowned for their precision machining operations. The Chiron brand has been neglected in South Africa and they (Chiron) needed someone to address the situation.”

“As I say our main focus will still be on maintenance and servicing of various CNC equipment along with installation and commissioning of new CNC equipment and second hand machines. Our services include shutdown maintenance, long-term maintenance contracts, equipment breakdown services and various electrical and mechanical repairs including, but not limited to, maintenance service and overhauling of spindle bearings, ball screws and end bearings, turret repairs, lubrication, pneumatics, IO Boards and Fanuc drives, as well as software changes.”

“We have a team of service technicians, including myself, that can work on virtually any brand of machine, whether it is imported from the Far Eastern countries, China or Europe,” added Kambouris.

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Macsteel has garnered two awards at the Absa Business Day Supplier Development Awards, which recognise and celebrate businesses committed to building a better South Africa via inclusive and transformed supply chains.

Macsteel won the Small Supplier and Local Manufacturing Award in acknowledgement of companies who have developed an ecosystem of small suppliers, manufacturers or value-add services and products from the local industry.

It was also recognised as a partner in South African Breweries Market Access Platform (MAP) Steering Committee, which collected the Collaboration Award in acknowledgement of companies who recognise the importance of industry relationships and cross-sector collaboration for the benefit of the wider ecosystem. Together with SAB, Total, KFC, General Electric and Coca-Cola Beverages Africa, Macsteel’s involvement in the MAP Steering Committee supports preferential procurement and localisation in the spirit of collaboration and towards building a more resilient economy.

“These awards are truly meaningful to Macsteel as they are testament to how we truly go beyond the scorecard and show true leadership, cooperation and long-term commitment in sustainably building our economy,” says Kim Allan, Macsteel’s Group CSR Manager.

In three and a half years, Macsteel has invested R27.2 million in the development of its enterprise and supplier development initiative, the Macsteel Usizo Supplier Development Programme. This initiative is designed to strengthen the capacity of SMMEs within the steel manufacturing sector to better enable them to deliver high-quality, fabricated products at competitive prices.

Allan says the company’s strong belief in providing sustainable support led to the development of Usizo, offering small-business customers a sustainable solution to overcome their operational limitations. Macsteel was the first corporate to enter into a private-public partnership with SEFA (Small Enterprise Finance Agency), and the first in the steel industry to implement a supplier credit programme.

“The programme aims to increase the participation of black-owned SMMEs in the steel sector where access to credit enables them to secure input goods for their businesses and build their credit profile. Many have been declined from obtaining credit via traditional channels yet to date, shared risk on defaults represents 4.1% of total credit, an excellent result which is testimony to the success of the programme.”

She says the initiative comprises three key components: Providing less stringent access to trade credit for small businesses with favourable cash flow terms in order to bring previously excluded entrepreneurs without collateral into the credit value chain; Providing programme participants with access to non-financial support through business mentorship and industry-related transfer of skills and: Thirdly, by deliberate action to provide further access to market opportunities for SMMEs in the Usizo programme.

The project was launched in May 2015 in partnership with the Small Enterprise Finance Agency (SEFA) and within 21 months, 114 SMMEs, primarily involved in some form of steel fabrication or construction, engineering, air-conditioning, irrigation or equipment maintenance industries, had benefitted from a R10 million credit facility. In February 2017, informed by the DTI’s revised BBEEE codes, the Usizo Supplier Credit Programme qualified for enterprise development.

“For many businesses trade credit is an essential tool for financing growth. Prior to the launch of the project, there was no comparable finance product available to support SMMEs for their start-up and early-stage business development,” Allan comments.

She adds that while access to credit is a primary element, all Usizo customers are encouraged to participate in Macsteel development programmes where each SMME is assigned an internal mentor to facilitate industry-related skills transfer.

The results are clear. The impact of the programme has enabled a contribution in excess of R89.6 million to the economy and has resulted in 765 jobs (585 maintained and 180 new jobs created).

“Right from the outset, Macsteel’s desired result was to bring previously excluded SMMEs into the finance value chain. In just three years, this initiative has made a tangible and immediate difference in supporting local manufacturing suppliers via a sustainable enterprise and supplier development model and Usizo is now fully integrated throughout our business operations. We are delighted with these awards which echo our commitment to building capacity, expertise and knowledge and to create a platform which materially contributes to the economy,” Allan concluded.
Siemens acquires Esteq

Siemens Digital Industries Software has announced that it has signed an agreement to acquire assets of Esteq, a distributor of product lifecycle management, product design and simulation, and manufacturing operations software and services. Esteq is headquartered in Pretoria, South Africa, and has locations across the region serving the aerospace and defence, transportation, consumer products, energy, electronics, machinery, mining and minerals, and oil and gas industries.

“Through the acquisition of Esteq, Siemens Digital Industries Software will now have a direct presence in the South African market, which will enable Siemens to expand and enhance how we support and service our customers across the region. The combination of Esteq’s local knowledge and Siemens expertise makes it easier than ever before for manufacturing companies to tap into Siemens’ full software portfolio,” said Edwin Severijn, senior vice president, Europe Middle East and Africa, Siemens Digital Industries Software.

Siemens will incorporate Esteq into new software-focused sales organisations in South Africa and UAE, gaining direct presence to expand and grow the support and services to customers across the regions.

“With ever-increasing pressure from their customers and competitors, manufacturers across the region must rethink every aspect of their business. With our established and comprehensive knowledge of the South African market we can offer our customers the best and most appropriate products, solutions and services that can be used to take advantage of new and disruptive technology across their operations. As a leader in software and automation we are continuously expanding our leadership role in industrial digitalisation,” said Ralf Leinen, senior vice president, Siemens Digital Industries, southern and eastern Africa.

“For over 25 years, Esteq has had a strong partnership with Siemens, developing and growing its engineering and manufacturing software and services business across the southern African and Gulf regions. In that time Esteq has helped hundreds of customers, both large and small, by providing technology solutions that assist them with every step of the product development and delivery process. We are excited to join Siemens, so our customers will not only benefit from the existing relationships and local expertise that the Esteq team provides but will also benefit from the extended range of technologies and industry expertise that we can offer as part of Siemens,” said Cobus Oosthuizen, CEO, Esteq. The asset sale and purchase transaction is due for completion in the third calendar quarter of 2019. The parties have agreed not to disclose any details of the transaction. The Test and Measurement business, which formed part of the Esteq Group, is not part of the transaction and will continue as a separate and independent business.
Unlike some may think, 3D printing is not just an innovative technology for rapid prototyping, modelling and manufacturing of specialised one-off products. It is an essential building block of the Fourth Industrial Revolution (4IR) that has the ability to alter the way in which manufacturing and consumption are connected.

Manufacturing with 3D has the potential to level the playing field for new and established businesses by taking advantage of less complex design tools and real-time production to test innovative new concepts, prototype new product ideas and get them to the users in days instead of weeks.

These are some of the reasons why it is predicted that by the year 2030 additive or 3D manufacturing technologies will allow companies to manufacture completed products on a large scale, which will change the manufacturing sector forever.

The earliest application of additive manufacturing was in the tool room, where 3D (or additive) printing was used for rapid prototyping to reduce the lead time and cost of developing prototypes of new parts and devices.

Before 3D printing, time-consuming subtractive tool room methods such as Computer Numerical Control (CNC) milling, turning and precision grinding were used for prototyping. It was only in the 2010s that additive manufacturing slowly entered production.

Today, 3D printing is a very successful commercial technology that is used in numerous fields with great success. It is a game-changer in manufacturing, from clothes to houses and even complete jet engines.

Already in 2016, offices were built in Dubai using large 3D printed polymer shells assembled on site. In the US, houses with a ground surface area of 225m² are 3D printed within 24 hours.

At a currently undisclosed place in Latin America, an entire 3D printed neighbourhood for a small community of 50 farmers and weavers will be built in 24 hours. Perhaps 3D printing could be a solution for South Africa’s low-cost housing needs.

In cars, trucks and aircraft, additive manufacturing is beginning to transform both the unibody/fuselage and the powertrain design and production. The futuristic Audi RSQ that was used in the movie I-Robot was made with 3D printing or rapid prototyping industrial robots. Rapid prototyping or manufacturing reduces development time by allowing rectifications to a product to be made early in the process.

Many Formula One teams use 3D printed non-carbon brake ducts and many other car parts that are 3D printed. Local Motors developed Strati, a fully functioning vehicle that was entirely 3D printed using ABS plastic and carbon fibre.

Many fully functional jet engine models have been 3D printed. It may sound like science fiction, but 3D printers are capable of printing the hundreds of very precise components of a jet engine.

The well-known YouTube user Punk Rocker created a very realistic jet engine modelled after the engines of a Boeing 787 Dreamliner, complete with thrust reverser for backwards motion. Although 3D printed in polymer, it looks and operates like a real engine.

The JetX group at the University of Glasgow manufactured a fully functional jet engine consisting of more than 260 3D printed parts. They used about 4.6km of filament to produce this small powerful engine. It is fully equipped with internal sensors to measure temperature, altitude and pressure and is a great instrument for aerospace education.

At the moment, 3D printed jet engines are used only for educational purposes and for prototyping. But with just two weeks to 3D print a jet engine, I believe we may sooner than later be flying with 3D manufactured jet engines.

Boeing and GE Aviation are already using 3D printed turbine blades, fuel nozzles, fuel mixers, sensors, heat exchangers and separators in the new Boeing 777X twin-engine jet, making the engine lighter and more fuel efficient. Airbus is using more than 1 000 3D printed components in their Airbus A350.

GE Aviation also used additive manufacturing to create a complete helicopter engine with 16 parts instead of 900, showing the potential impact of 3D printing on reducing the complexity of supply chains.

But 3D printing has also reached the world of clothing, with fashion designers experimenting with 3D printed bikinis, shoes and dresses. Ruth Carter, the Oscar-nominated costume designer of the highly successful film Black Panther, used 3D printing to create most of the costumes and jewellery used in it.

At the recent Met Gala in New York, American fashion designer Zac Posen showcased several of his sensational 3D printed dresses and called it “the future of fashion”. The dresses were made from durable polymer, of which some were sprayed with colour-shifting paint.

However, it took more than 1 000 hours to print one dress. It will, therefore, take some time before 3D printed dresses become a reality.
become widely available or before 3D printing is successfully transformed into a print-it-yourself tool for the average dressmaker. But the time will surely come.

In commercial production, Nike is using 3D printing to prototype and manufacture the new Zoom VaporFly Elite Flyprint 3D shoe upper, which is particularly suitable for wet conditions. According to independent research, the custom-fit running shoe lowers the energetic cost of running by 4%.

Adidas is using 3D printing to manufacture thousands of its Futurecraft 4D shoes and, together with the company Carbon, overcame one of the biggest problems of 3D printing, namely mass production.

Printing in 3D has had a considerable impact on the eyewear industry, allowing producers to make custom frames and even enabling customers to 3D print their own frames. Luxexcel Technology developed a unique 3D print technology to create ophthalmic lenses which do not require polishing or grinding. In South Africa, architect Handre de la Rey created sunglasses made of concrete. The glasses, which weigh only 100g, were 3D modelled and printed. The major benefit of the 3D printing of glasses is that it makes on-demand custom-fit and styling possible.

Similarly, additive manufacturing had an impact on the firearms industry. This impact involves two dimensions: New prototyping and manufacturing methods for established firearm companies and new prospects for the do-it-yourself firearm user. It is quite easy to download 3D designs for pistols and semi-automatic assault rifles from the Web and to 3D print your own firearm. The 3D printing of firearms is not allowed in South Africa, where any unlicensed printed firearm would be illegal. Nonetheless, such printing of firearms does raise serious concerns regarding gun control.

Since 3D guns are not made of metal, they may slip through metal detectors or other security measures undetected. In the US, there was an unsuccessful attempt to prohibit the online publishing of firearm designs and to make it compulsory that all printed firearms must contain at least one metal part so that they can be detected by metal detectors.

Although desktop 3D printing currently does not allow high-quality firearms to be created at home, this could change as metal 3D printing becomes more affordable and accessible. However, until now no violent crimes involving 3D printed guns have been reported. This can probably be attributed to the unreliability of 3D printed firearms and the danger to the shooter, as was proved in tests. Yet, we will have to keep an eye on this space as technology develops.

It is time for South African lawmakers to act pre-emptively. Additive manufacturing makes the distribution of product designs and build files around the world possible, thus bringing manufacturing closer to the consumer. Product delivery will be significantly faster and customised, since its production will be based on consumer demand and local consumer taste.

Written by Professor Louis Fourie, the deputy vice-chancellor: Knowledge and Information Technology at the Cape Peninsula University of Technology.

Factory of the Year announces five shortlisted finalists

Atlantis Foundries, Columbus Stainless and Eberspächer South Africa on the list.

Factory of the Year, a global benchmarking competition run by A.T. Kearney, has announced the shortlisted finalists for the inaugural Factory of the Year (FOTY) competition. Since its inception in Germany in 1992, it has become the leading global benchmarking competition for manufacturing firms.

Selected by a jury panel comprising the Department of Trade and Industry, Manufacturing Circle, Council the Scientific and Industrial Research (CSIR) and the Lean Institute Africa the selected finalists include Atlantis Foundries, Columbus Stainless, Eberspächer South Africa, Nampak (Bevcan) and Nyamazela Metering. Submissions are judged across five key dimensions: Customer satisfaction, quality, value creation, economics and agility.

According to Igor Hulak, Partner at A.T. Kearney, the Factory of the Year Award is recognised as the toughest benchmarking test for companies based on standards and best practices from over 2 000 factories across all industries and over 30 countries.

“Today’s globalised world presents a challenge for all manufacturing operations. To successfully sustain and grow production, achieving and maintaining world-class excellence in manufacturing is a top priority. Factory of the Year aims to identify and reward world-class performance and provides all participants with a confidential evaluation of their competitive position as part of our assessment of all finalists,” said Hulak.

“From a local perspective, the South African manufacturing sector’s contribution to GDP has declined significantly from highs of above 22% in the early 1990s to approximately 12% today. This has had a negative effect on the country’s development agenda,” said Theo Sibiya, Managing Director of A.T. Kearney South Africa.

Since 1992, hundreds of factories have participated and benefited from the independent, cross-industry feedback that comes with the benchmark. It has enabled them to analyse their strengths and weaknesses and initiate spot-on improvements.

“Factory of the Year competition is an important initiative aimed at promoting the competitiveness of the local manufacturing sector and its importance to the South African economy, and it’s a great way for organisations to identify and drive improvements needed to deliver competitiveness both locally and globally,” concluded Sibiya.
Defy says its R130 million investment in South Africa will not only boost the country as an investment destination but also aid in creating much-needed jobs. The investment will see the multinational manufacture a range of top loader washing machines for both the local and export market.

The investment is projected to create a total of 75 new job opportunities that will manufacture 500 top loaders per shift.

Speaking at the announcement of the investment at Defy’s factory in Jacobs, Durban, former Minister Rob Davies said the manufacturing development is a much-needed boost to the local community. “It is important to note that even though statistics of this investment sound modest in nature, they will go a long way in unlocking job opportunities in the South African economy. They will also help us sustain our position which has seen us continue increasing foreign direct investment into the country, while the rest of the continent has experienced a contraction,” he said.

Defy has also signed an agreement with Wits University to start a cooperation for joint engineering studies focusing on developing new technologies for some of its products. The new satellite laboratory will be located in Midrand, Johannesburg and will be operational by July 2019. The total investment for this project is R15.7 million with a total of 39 new employment opportunities created.

“We are on the cusp of a very big change for Africa and the ratification of the Africa Continental Free Trade Agreement, which was adopted by 22 members in Gambia on 22 April 2019, will open up the market for products manufactured from these countries,” former Minister Rob Davies said at the announcement.

Davies anticipates a significant increase in South African products to be exported to the African market, way more than it is at this current stage. “We are on the cusp of a very big change for Africa and the ratification of the Africa Continental Free Trade Agreement, which was adopted by 22 members in Gambia on 22 April 2019, will open up the market for products manufactured from these countries. I hope that this ratification will also enable an expansion of South Africa’s exports into Africa as well and commit to work with initiatives of this nature,” said Davies.

The multinational will also invest in new cooking products. In July, Defy will launch a new outlook for their 60cm built-in ovens with an investment of approximately R7 million which will be followed by a new free-standing stove investment of approximately R18 million launching in the first quarter of 2020.

Defy has also signed an agreement with Wits University to start a cooperation for joint engineering studies focusing on developing new technologies for some of its products. The new satellite laboratory will be located in Midrand, Johannesburg and will be operational by July 2019. The total investment for this project is R15.7 million with a total of 39 new employment opportunities created.
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The Maxion Wheels aluminium wheel manufacturing plant in South Africa was recently recognised as being one of the most technically advanced in the international group when senior executives, including Marcos Oliveira, President and CEO of Iochpe Maxion, Pieter Klinkers, CEO Maxion Wheels and Juan Lorenzo, President, Europe, Africa, Asia, visited the plant in Alrode, Gauteng to see the recent developments at the plant and to hold executive meetings.

Maxion Wheels is a division of Iochpe-Maxon S.A., a leading Brazilian company in the production of wheels and structural components for light and commercial vehicles. Maxion Wheels comprises 20 manufacturing plants in 12 countries on five continents.

Maxion Wheels and its subsidiaries have been supplying OEMs with wheels and innovative technologies for over 100 years. With an international network of strategically located engineering, technology and production facilities, Maxion is one of the few wheel manufacturers who can deliver on a global platform in the true sense. This allows the company to reduce logistical costs and eliminate duplicate processes. A world leader in the light-weight wheel market, the company currently supplies aluminium passenger car wheels to every major automotive OEM in the world. Maxion Wheels produces cast aluminium wheels at multiple plants throughout the world with a high degree of styling flexibility and an endless selection of coatings, finishes or claddings.

The company produced more than 58 million wheels in 2018, had US $2.1 billion in sales in 2018, employs more than 10 000 employees around the world, and one out of every eight OEM wheels in the world is a Maxion wheel.

“This is the first time that the senior executives of Maxion Wheels have visited the plant in South Africa,” explained Milos Despotovic, Plant Manager for South Africa.

“We have been investing substantially in our plant, equipment, processes and people over the last four years. In 2016 we spent R60 million on a quality expansion programme, in 2017 and 2018 we spent R90 million..."
on capacity expansion for the manufacture of 19" and 20"
wheels and so far in 2019 we have spent R30 million on
automation and equipment upgrades,” continued Despotovic.
“This included installing x-ray inspection upgrades, a
new paint plant, upgrading equipment in both the foundry
and machine shop, installing numerous robots to automate
material handling and installing a conveyor system to
eliminate as much as possible the human handling element.”
“As a result our flow lines within the plant, from melting of
metal to casting in the foundry and then on to heat treatment,
machining, painting and finally dispatch, have improved
dramatically.”
“Over and above this was the beginning of our programme
with implementing Industry 4.0 and AI and our accelerated
move towards becoming a smart factory.”
“The capacity expansion programme was two-fold. On the
one side we extended our capacity to respond to the volume
demand from the local OEMs while at the same time we took
into account increased export requirements.”

Moving from 15/18" wheels to 15/20" wheels
“However, you can’t just judge it on production

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figures alone because there are many variables at play. Our expansion programme included moving from just manufacturing 15” to 18” wheel sizes to adding 19” and 20” wheel sizes. We now manufacture the biggest size wheels in the group and one of the most complicated, a factor that makes us stand out.”

**Staff wellness**

“All through this expansion and upgrade programme we have not neglected our staff. Money has been spent on a brand-new canteen and they can now enjoy subsidised meals in a very pleasant environment, which they did not have before.”

“But it is not just about keeping the tummies full. Training and mentoring are a high priority in the company. This includes both local training and travelling abroad to our other group plants. Additionally, we are working on our own training academy that will be Merseta recognised.”

“We believe that we have to provide the tools and the environment that will attract the best, whether it is an operator on the floor or an engineer in the design department. A combination of this culture and our expansion programme has seen us having a stable and secure working environment.”

“This is despite all our automation investment, which includes the deployment of 80 robots across the manufacturing process.”

“The senior executives wanted to come and see for themselves what made our plant start to be recognised within the group. The Turkish plant has been winning most of the internal awards in recent years and now suddenly South Africa is up with them. We are very proud of this.”

**History**

NF Die Casting was founded in 1965 by the Anglo American group as a general-purpose non-ferrous foundry. The foundry focus was on aluminium production in high pressure, low-pressure, gravity and sand castings before the introduction of low-pressure die-casting for wheels in 1979 for the South African automotive OEM market. The first export of alloy wheels was for the E30 generation BMW 3 Series to BMW AG in November 1985.

A new wheel plant was constructed in 1990 and since 1992 has been linked to Hayes Lemmerz through a technology agreement. In 1998 Hayes Lemmerz acquired a 35% stake of NF Die Casting and upped this to 76% in February 2000 before acquiring the remaining 24% of the shares in May 2002. The company had previously been acquired by the Industrial Development Corporation of South Africa from Anglo American.

A name change - Hayes-Lemmerz South Africa - took place in 2004 before the Brazilian company Iochpe Maxion acquired Hayes-Lemmerz in 2014, forming Maxion Wheels. In 2016 the South African plant began its upgrading towards manufacturing 19” and 20” wheel production and the first of these wheels were delivered in 2018.
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There has been a worldwide trend towards OEMs using bigger wheels on their vehicles and we have had to respond to this trend. Aluminum alloy wheels manufacturing processes have developed a great deal since the 1970s. Due to sophisticated wheel design, casting has become the dominant manufacturing process. Alloy wheel material has evolved too. Car wheel alloys now contain 7 to 12% silicon content, and varying contents of magnesium in addition to aluminium, in order to meet the demand for metal mould casting properties, corrosion and fatigue resistance.

The aluminium alloy wheel usually has better heat conductivity, anti-corrosive properties and is much lighter than the steel wheel, making it the best option for passenger vehicles. Aluminium alloy wheels are manufactured using the casting and forging process. Less weight on the wheel creates less stress on the tyre, and so a balance is created. Aluminium and alloy wheels are largely corrosion-resistant, but prone to galvanic corrosion. They also enhance performance by manipulating handling and suspension and add a brilliant appearance to the vehicle.

Furthermore, high thermal conductivity of aluminium allows heat to dissipate faster and improves braking performance in highly demanding driving conditions that lead to over-heating related brake failures. Hence, wheels constitute nearly 15% of the average aluminium content in passenger cars and light trucks with aluminium wheels on approximately 50% of the vehicles produced today.

Their main advantages, when compared to steel wheels are a high styling versatility, weight (equal or less than steel without styling), dimensional accuracy (mass distribution), recycling ability and static and dynamic behaviour.

The foundry

At the heart of the manufacturing process at Maxion Wheels’ South African plant is its foundry, although the wheels that you see on your car today cannot exist without the other downstream operations and processes. The foundry department is the biggest department within the South African subsidiary, which includes melting, degassing, low-pressure die-casting, x-ray inspection, sprue removal and heat treatment.
There are numerous low-pressure die-casting machines in the foundry, all of them with their own Fanuc robot for material handling and each having its own holding furnace.

**New Striko furnace**

Initial melting of ingot and scrap metal before degassing is done on two Striko tower furnaces before the metal is transferred to the individual low-pressure die-casting machines. There is also a third melting furnace, which melts shavings and chips from the machine shop once they have been degreased, dried and preheated.

This shaving recovery or chip melting furnace is in the process of being replaced by a new Striko tilting furnace, which has a large holding capacity to accommodate the 2-ton an hour melting capacity. This new furnace is being supplied by Ceramic & Alloy Specialists.

Two of the power sources for the low-pressure die-casting machines are now fully Industry 4.0 compliant and are supplying data to DataProphet, a Cape Town-based machine learning company, for AI and machine learning analysis.

**Processing after casting**

After casting, wheels are 100% x-ray inspected and then eventually heat-treated prior to machining. This step is followed by a pressure tightness testing. After a cosmetic inspection wheels are then painted or varnished. This operation includes a pre-treatment (degreasing, phosphating and/or chroming). 3D dimensional controls, dynamic balance checking, bending and rim roll fatigue as well as impact tests are also usually performed.

"The wheel industry continues to evolve and has for many years. The main story had been the substitution of aluminium for steel in many applications. This continues to be the case, but in recent years lighter materials have been gaining, though limited to certain niches on account of cost and other factors. Reports estimate that the global wheel market was at US $81.7 billion in 2017, up from US $64 billion in 2012, and they anticipate a robust growth of 8.7% per year through to 2022, when the market will approach US $124 billion," noted Despotovic.

**Machine shop**

The machining department of Maxion Wheels has not
After machining each wheel progresses through a new dynamic inline measuring and inspection system that Maxion Wheels recently installed.

DataProphet’s Artificial Intelligence solution

DataProphet, a global leader in Artificial Intelligence (AI) for manufacturing and Maxion Wheels are working together to significantly reduce the cost of non-quality in the production of aluminium wheels. DataProphet’s AI solution aims to achieve a substantial reduction in non-quality incurred at casting. Aluminium casting plants can experience high levels of internal defects due to the complexity of the process. The South African contingent of Maxion Wheels lead the charge in driving digital transformation with DataProphet to enhance its plant productivity. The implementation and data extraction started in South Africa and Brazil in early 2019. If successful, DataProphet and Maxion Wheels hope to continue the relationship to benefit global plant operations.

“Our partnership creates synergy by combining a mix of our automation knowledge, innovation drive and engineering experience with DataProphet’s sophisticated data scientists, software and development engineers,” said Despotovic.

“The exchange of knowledge across our team is phenomenal and will be a driving force in developing the future of manufacturing, both locally and internationally,”

DataProphet’s solution creates a unified learnt digital twin, using Maxion Wheels’ historic plant data, consisting of 780 million measurements. The machine learning solution will continuously make the best decisions for the current plant state, whilst being mindful of the processes up and downstream of them.

“DataProphet has immense experience and a good understanding of data that governs the complex plant processes in the foundry and automotive industry. We are excited to see how artificial intelligence will bring real quantifiable results to our plant delivery,” continued Despotovic.

DataProphet Prescribe, also known as OMNI, is the only machine learning solution that can prescribe optimum parameters through a customised single model approach, while taking into account higher order effects. Through deep learning, DataProphet will navigate Maxion Wheels through each minor shift in its journey to being a smart factory and reducing the costs of non-quality.

For further details contact Maxion Wheels South Africa on TEL: 011 617 4700 or visit www.maxionwheels.com

missed out on automation and equipment upgrades. Several new CNC turning, drilling and milling centers have been introduced.

“In the machining department cells have been set up with three machines and a Fanuc robot to load and unload wheels from the CNC machines. A cell consists of an IMT International CNC 4-axis twin turret vertical lathe carrying out turning and milling operations and two Victor Vcenter-22W 4-axis vertical machining centers. The Victor machines are equipped with a rotary table and a drilling fixture,” explained Despotovic.

“Including a Fanuc robot in the cell falls in line with our automation ambitions. At this stage we have created three identical cells and are in the process of converting all our wheel machining operations into the same cell configuration.”

“We do also have a number of CNC machines in our toolroom that maintain our existing dies and manufacture the new dies that we are regularly introducing.”

“After machining each wheel progresses through our new dynamic inline measuring and inspection system that we recently installed.”

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Economic activity in modern-day South Africa has been centred on mining activities, their ancillary services and supplies. The country’s stock exchange in Johannesburg was established in 1887, a decade after the first diamonds were discovered on the banks of the Orange River, and almost simultaneously with the gold rush on the world-famous Witwatersrand.

In many ways, South Africa’s political, social and economic landscape has been dominated by mining, given that, for so many years, the sector has been the mainstay of the South African economy. Although gold, diamonds, platinum and coal are the most well-known among the minerals and metals mined, South Africa also hosts chrome, vanadium, titanium and a number of other lesser minerals deposits.

According to Minerals Council South Africa in 2018 the mining sector contributed R351 billion to the South African gross domestic product (GDP), a total of 453 543 people were employed in the mining sector in 2018 and each person employed in the mining sector has up to nine indirect dependents.

The mining sector has, for many years, attracted valuable foreign direct investment to South Africa and South Africa is one of the world leader’s in mining. The country is famous for its abundance of mineral resources, accounting for a significant proportion of world production and reserves, and South African mining companies are key players in the global industry.

However, the face of mining operations has changed dramatically over the last decade. In South Africa this is especially true as the mining industry is constantly shrinking due to costs and other external pressures. High costs, low commodity prices, load shedding, labour strife and falling productivity have all taken their toll. South Africa has most of the world’s deepest (and historically richest) gold mines. They are clustered some 70km south-west of Johannesburg. The deeper they go, the more expensive and difficult the work of extracting the ore becomes. Most of these mines are reaching a mature phase and the cost of extracting the gold may soon exceed its value. It is reported that gold continued its long-term decline with a 14.5% drop in production in 2018, the biggest annual slump since 2008. It is no surprise then that for mining companies worldwide the brief is now to maximise processes and reduce costs.

Despite this for a mine to operate successfully and profitably it needs a multitude of services and equipment. Each type of mining equipment comes with its own set of mining activities. The most common types of mining equipment vary depending on whether the work is being carried out above or below ground or whether you are mining above or below ground.

Conbrako focusing on growth and transition into 5-axis machining

Bullish in supplying the mining industry with drill bits – more products being launched.

“One of the larger drill bits that Conbrako manufactures

“Expertise and the right equipment for machining components will enable this shop to succeed. This is the reason we have gone the 5-axis route. Although they remain costly in terms of capital investment, 5-axis machine tools offer the opportunity to save a lot of set-up and production time and cost that will speed up the return on investments.”
for gold, metals, coal or crude oil. From drilling machines to excavators, crushing and grinding equipment the mining industry needs all the right tools.

However, manufacturing products and components for use in harsh environments and challenging applications is not a task every company relishes. It becomes even more of a significant challenge if you are supplying the demanding mining industry, and your competition is not just the local supplier down the road, but rather multi-nationals that have been in the business for many more years than your company.

The manufacturing division of Conbrako Trading (Pty) Ltd has only been operating since 2017. The company is part of the Conbrako Group, a group that has origins dating back to 1958 when Consolidated Brake Company was established to manufacture and supply vacuum braking equipment for the South African rail industry. In 1986 this company would merge with two others that manufactured air brake systems and other products for the rail industry and the name was

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Following the success and technological breakthrough with the ENSIS fiber laser, AMADA now presents the ENSIS range in 3, 6 and 9 kW derivatives of this fiber Laser. The ENSIS range uses variable beam control technology developed by AMADA that enables modulation of the laser beam as a function of sheet thickness, changing the beam shape to suit material/thickness utilizing a single lens for the entire range of materials and thicknesses which reduces machine setup requirements.

Ease of operation – intuitive AMNC 3i numerical control, large front and side access sliding doors, and a high-capacity automatic nozzle changer are further features ensuring machine setup is reduced to a minimum.

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Leadership isn’t attained through compromise. It’s achieved when excellence is the only noteworthy benchmark. Amada’s ongoing commitment to maximise your productivity has resulted in machines that set the global standard for speed, precision and performance.

Unwilling to settle for anything less than the optimal fiber laser source, Amada became the first manufacturer to produce its own fiber laser - teaming with JDSU to develop the AJ fiber engine. Unlike other fiber lasers on the market, Amada’s AJ series of fiber lasers and punch/fiber laser combination machines are engineered as fully integrated systems. This comprehensive design approach optimises the inherent benefits of fiber laser technology to ensure maximum productivity and accuracy.

Despite the crowded field of fabrication equipment manufacturers, it’s really quite simple. Only one company name is synonymous with leadership.

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**LCG 3015 AJ**

**Fiber Laser**
changed to Conbrako (Pty) Ltd. Today this company still
has its own manufacturing division equipped with robotic
welding and the latest CNC machines to manufacture air and
vacuum brake equipment, hand brakes, draw gears, couplers,
snubbers and many other components and products used on
rail wagons and locomotives.

The manufacturing division of Conbrako Trading was
established when Richard Child, CEO of the Conbrako Group
and Terence Scrooby formed a partnership to manufacture
hard rock and hammer drilling tools for the mining industry.
Scrooby has been in the mining industry all his life, both
working on the mines and also manufacturing products for
the mining industry, with a special interest in hard rock drilling
tools. Before joining up with Child to form the manufacturing
division of Conbrako Trading, a 100% black women-owned
Level 1 BBBEE company, Scrooby had been consulting in the
industry after selling his previous company that manufactured
hard rock tooling for the mining industry in 2010.

“For many years the South African hard rock mining
industry had been stuck in a time warp with relatively little
change in the mining process. This was equally evident in
the tooling and equipment that the industry used. Rock
cutting offers a number of advantages over drill-and-blast
mining. Possibly the most significant is that cutting offers the
opportunity for continuous operations. Blasting introduces
a cycle into mining, which then forces a batch mode on the
process: Drill, blast, clean, support,” explained Scrooby.

“I was always looking to develop ideas and products to
replace existing technology that would offer an effective
alternative as well as efficiency gains. A good example in the
mining industry was the introduction of water hydraulic rock
drills in place of pneumatic rock drills. As gold mining got
deeper the effectiveness of pneumatic rock drills decreased.
This reduction in drilling rate was partially caused by poor
maintenance of the compressed air distribution system and
a corresponding reduction in rock drill operating air pressure,
and partially by the more intense face fracturing of the
rock. The fractured rock acted as a brake on the drill steel
and more of the available energy in the rock drill was used
in breaking the rock.”

“Top hammer rock drilling tooling was also focused on
integral steel shafts to drill and cut rock. Not only are they
cumbersome to move underground but also when blunt they
have to be refurbished and re-sharpened above ground. In
1978 I was involved with introducing disposable drill bits or
knock-offs as they are referred to in the industry. Basically they comprise the drill bit bodies, which remain standard, and these bodies are fitted with replaceable drill bits. The transformation was that you only had to change the drill bit, whether they were tapered or threaded drill bits. The advantages were obvious when it came to logistics. A miner could now carry a drill bit around in his pocket and then just replace it when needed. Changing to this system also resulted in productivity gains for the mines.

“We machined these drill bits and other products like coal picks on Wasino horizontal turning machines, the first to be imported into the country from Japan. It was also way before CNC machines were introduced into the country.”

Conbrako Trading – Rock Tool Division

“The manufacturing division of Conbrako Trading was only established just over two years ago to manufacture a variety of taper and threaded drill bits. We had access to CNC machines via the other companies in the group so initially we did not have to fork out huge amounts on capital expenditure. However, as the company has grown we have now started to invest in our own CNC equipment and have also built our own 3 200m² factory alongside the Conbrako building in Chamdor, Krugersdorp.”
“This has allowed us to concentrate on what we do best – manufacture taper and threaded drill bits – while also having access to a host of other CNC equipment and also incorporating ourselves into the ISO9001:2008 management system that they are accredited for.”

“Initially we inherited four Goodway CNC turning centers, which we still have operating on our floor, and a Fanuc RoboDrill with a fourth axis.”

**New machines**

“In the same year that the company started we also purchased a Victor Taichung Vcenter AX 350, a fully simultaneous 5-axis machining center. Driven by a Fanuc control system, the advanced 5-axis application has an innovative mechanism “Roller CAM Driver” inside. This non-backlash fifth axis table guarantees high machining accuracy and reliability. The AX 350 is equipped with a fully integrated 2-axis tilt/turn table, which provides us with the platform to machine both 3 + 2 and full 5-axis. The tilting table offers a workpiece capacity of 170mm or 25 mm diameter and the axes travel on the machine is XYZ of 650 x 480 x 540mm. We operate in the three-micron accuracy range so the Victor fits our needs.”

“2019 has been a big year for us in terms of capital expenditure on new CNC machines. First to arrive was a Kafo CV-11B vertical machining center that has XYZ travels of 1 100mm x 600mm x 600mm, a table size of 1 200mm x 600mm that can take a load of 800kg and rapid speeds of 36m/min.”

“We also installed a Takisawa Nexus CNC turning center. Both of these machines were supplied by Vaughn Hanwith-Horden when he was with his previous company.”

**Victor Taichung Vcenter 165 vertical machining center with fifth (4 +1) axis table**

“This was followed shortly afterwards with the installation of the largest vertical machining center that we have purchased – a Victor Taichung Vcenter 165. This Victor has XYZ travels of 1 650mm x 850mm x 950mm, a table size of 1 700mm x 800mm that can take a load of 2 500kg and rapid speeds of XYZ 20/20/18m/min.”

“We have turned this Victor Vcenter 165 into a 5-axis machine by adding a 15” (450mm) fifth (4 +1) axis table. We have been able to do this by signing the obligatory non-nuclear/weapon manufacture treaty for full 5-axis machining. This is a major step forward for us as we move towards full 5-axis machining.”

**On order – second Victor Taichung Vcenter 165 vertical machining center with fifth axis table and three 5-axis Fanuc Robodrills**

“We have also ordered another Victor Vcenter 165, also with a 15” (450mm) 5th (4 +1) axis table, and three 5-axis Fanuc Robodrills. All of these machines will be arriving towards the end of July 2019.”

“You might think that these large Victors...
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are a bit of an overkill for the type of products that we are manufacturing but we are gearing up to introduce other products to the mining industry. These include a range of DTH bits."

“Our drill bits are made from a special material that we import from the US, UK or Europe as it is not manufactured locally. We import a large amount at a time and Macsteel cuts to size (billet) before it is either hot or cold forged, normalised/annealed, shot treated and then goes for heat treatment. We machine in a very hardened state so machining of components can take longer.”

“Once machined the product is fitted with tungsten carbide buttons and this is why we have to have great accuracy. You can’t fit a button to a bit and it malfunctions after the first use. Every drilled hole on a bit is measured to check for the tolerance before it is sent for the button fitting. The buttons are heated in a furnace before being fitted in the drilled holes on the bit and depending on the design, size or use a bit can have different numbers of buttons fitted.”

“The carbide buttons are actually the ones doing all the work in fracturing and grinding up the solid rocks and this is why we have worked very closely with Powder Industries, also a local manufacturer, to develop our specially formulated carbide buttons.”

“We design all our own drill bits. Taper drill bits are generally used in the knock-off range and threaded drill bits are used for mechanised drilling operations. We also manufacture retract drill bits for drop raised drilling, reaming bits, DTH and other special bits, taper hex rods, threaded and drifter rods, couplings and adapters, shanks and other drilling accessories. They now have over 3 000 different designs of the products that they manufacture going through now is significant,” said Alan Scrooby.

“I have also embraced the design software that is available – something I cannot expect of Dad at his age of 76.”

“Expertise and the right equipment for machining components will enable this shop to succeed. This is the reason we have gone the 5-axis route. Although they remain costly in terms of capital investment, 5-axis machine tools offer the opportunity to save a lot of set-up and production time and cost that will speed up the return on investments. For a manufacturer or machine shop that wants to optimise production times and maximise profits, the upgrade should be made sooner rather than later,” added Alan.

“Dad gained his experience on conventional equipment. Although, when I joined him in 1989 after qualifying with a mechanical engineering diploma CNC equipment was not around, I have been able to make the transition. We have invested heavily in equipment over the years but the phase that we are going through now is significant,” said Alan Scrooby.

For further details contact Conbrako Trading - Rock Tool Division on TEL: 011 762 2421 or visit www.conbrakotrad to attend EMO Hannover 2019, the world’s premier trade fair for the metalworking industry, will be held from 16 to 21 September under the motto of “Smart technologies driving productivity.”

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The EMO Hannover 2019, the world’s premier trade fair for the metalworking industry, will be held from 16 to 21 September under the motto of “Smart technologies driving tomorrow’s production”.

It will be concentrating on the current paradigm shift in industrial production operations, which are no longer focusing (only) on “better, faster, more accurate”, but on the development and implementation of new functions within the framework of Industry 4.0. Digitalisation and intelligent networking in conjunction with numerous new developments, from Big Data, data analytics and artificial intelligence, all the way through to the platform economy, creating the foundations for new business models, so that customers and vendors can reach a new level of productivity.

When it comes to solving metalworking challenges you need a source you can trust.

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New ideas spur success at young startup

SP Laser Cut flourishes as a custom manufacturer.

It is not hard to work out what the initials SP stand for in the company name SP Laser Cut, a young startup company whose directors look at work as a fun and an exhilarating experience rather than a means to earn a living. Both directors are successful businessmen in their own right. But even though they have known each other for over 30 years this is the first time that they have ventured into business together.

So how do a machinist, who trained himself to be a competent designer in 3D using high-end software, and a bulldozer mechanic partner to start what they call is a sheetmetal jobbing shop? It’s because they are brothers-in-law and the time was never right before for them to start a business together. Shaun Welthagen and Pierre Parente are linked through Pierre’s sister Esmerelda, a graphic designer who helps in the family business when the two men, who are close to her, need artistic work to be done on the final product they are manufacturing for clients.

“Pierre was involved in his father’s engineering business from an early age and eventually took over running the business when his dad retired in 2003. This business, which was focused on machining metal when it was established, was eventually sold but not before it took a monumental change in focus in 1993 when the company purchased a press brake. Before that it had mills and capstan and conventional lathes as the equipment that it used because of my father-in-law Carlos’s training as a toolmaker,” explained Shaun Welthagen.

“Pierre got his machining experience on those machines but this would change. A friend, who was in the precision electronic enclosures business, Peter, influenced them to start manufacturing the enclosures for him, the reason for the company purchasing a press brake. But you need more than a press brake to manufacture enclosures. Subsequently they would purchase a turret punch press and then a CO2 laser. The company continued to offer a mixture of machining and sheetmetal operations until 2000 when there was a definite swing in the business focus. That year the business was transformed from shaping metal to forming metal and then fabricating and assembling.”

Transylvania Towing Services

“My background is in the trucking industry. After working at my trade for a while I started my own business Transylvania Towing Services, a 24-hour recovery, towing and specialised abnormal transport company. With an ever improving modern fleet of over 30 vehicles we say we are able to move anything to any place at any time.”

“Our lowbed fleet comprises of lowbeds varying from the smallest - which is a double axle capable of between 16 and 18 tons - to our abnormal lowbeds that can transport a payload of up to 65 ton. Our recovery vehicles can either free tow trucks and
similar and as they are fitted with a fixed crane and two 40 ton winches they are big enough to recover most vehicles in precarious situations."

"I have expanded the business to include servicing and repairs of trucks, which includes those that have been in an accident and need body work to be done."

"This is one of the reasons Pierre and I have started our sheet metal jobbing shop. Once it is fully up to speed SP Laser will be able to form and cut components for my repair side
as well as develop the ideas that can be used on trucks in general."

After selling his business, Parente was gainfully employed but the lure to develop, design and manufacture his own products soon took hold again. With his background of working the machines on the shopfloor, Parente still today likes to get his hands dirty, although he does have competition from his brother-in-law these days who as he states, “If we can make it we will”. However, Parente finds the area of developing and designing products and components most exciting.

“I made a conscious and deliberate decision to jump into the world of 3D and invested in the latest software so that I could offer a full service from drafting to final product. When we purchased the various Amada machines, I was using the Amada AP 100 software, which is perfect for creating 2D CAD drawings or importing DXF/DWG files from an existing system and for communicating with the machines, but you need Inventor or SolidWorks if you want to design in 3D,” explained Pierre Parente.

“Any company today that is not designing in 3D should also be using conventional machinery,” quipped Parente.

“The full range of products that we manufacture today, such as the 19” racks, wall boxes, cabinets and IP enclosures, are all designed in 3D. Many of the products are purpose built and are for clients that have followed me,” continued Parente.

“We only started the business in September 2018 and
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it was only in January this year that we got into full production. To make it easy for us we have taken over underutilised space - about 800m² - at Shaun’s factory complex in Anderbolt, Boksburg. The equipment that we have acquired includes an Amada AE 2510NT turret punch press that has a 200kN press capacity and worksheet size of 1 270mm x 2 500mm, an Amada 4kW FO3015 laser that has a worksheet size of 3 000mm x 1 500mm, an Amada RGM2-8024 bending machine that has a bending length of 2 505mm, an Amada RGM2-3512 bending machine that has a bending length of 1 250mm and Shaun’s favourite, an Amada HK400 bandsaw.

“But before we could install this equipment we had to get the Ekurhuleni Municipality to install extra power and do they know how to charge!”

“Although we say that we are a jobbing shop, in the strict sense of the word we are not. Our enclosures are a good example. There are different variants that we manufacture, either for indoors or outdoors and for different industries, including IT and electronics. You have to consider what footprint the cabinet or enclosure is going to occupy, the space requirements inside, shelving, adding remote control systems, security and many others. Then the finishes on these could be different and this could affect the electroplating and powder coating requirements, which we outsource. The aesthetics also play a part. You don’t want an ugly enclosure in an office or retail situation.”

“You might say that an enclosure is a bit of sheet metal cut, bent or folded, that has had a few holes punched in it and then welded and fabricated before being finished if required. As simple as that. But there are many aspects you have to consider before you design a cabinet or an enclosure, especially if you are supplying product to the IT industry. So really we are a custom manufacturer.”

“However we are not just making one-offs all the time. The numbers vary but there are generally always multiples of them.”

“An area of industry where we are gaining traction and where we are making hundreds at a time are the enclosures for the fiber industry. This is one industry that is very vibrant in South Africa at the moment as fiber telecommunication gets rolled out.”

R&D phase

Welthagen takes up the story: “At this stage of the company’s history we are happy with the amount of clients we have and the numbers are growing. We now employ 10 staff and we are looking to increase this number as we introduce some of our own products. So we regard this stage as our R&D phase. With Pierre’s ability to conceptualise, design and develop products in a relatively short period we have a big advantage over many businesses of a similar type to ours. At the same time he has the machine and process knowledge.”

“My skill is that I have the engineering ability to interpret and observe with concept. Years of experience in the trucking industry have taught me these skills. But it is not just about concepts and abilities. We have recognised that, again because of my years in the industry, that there are many
accessories that we can manufacture and install on a truck or tanker.”

“According to the Road Freight Association of South Africa, figures indicate that there are more than 500 000 commercial trucks in use on South African roads and there are around 15 000 truck fleets in South Africa that have five and more trucks representing agriculture, mining, quarrying, manufacturing, and many others including 3 100 transport companies.”

“That is plenty of trucks to supply product to.”

“However it is not only that aspect that we are looking into.
I have developed a reasonable size repair facility, including a spray booth, at Transylvania Towing Services and we are constantly having to repair bodywork and other areas of a truck. This is not restricted to my fleet as we have regular customers that make use of our facility and services.
This is where our ability to cut, bend, form and fabricate at SP Laser will be very useful. This aspect will grow organically as we progress. It might require some different skill sets but that will all be part of the learning curve.”

“We are not restricting ourselves to this type of work though. We have just completed a prototype of a storage draw for the back of a bakkie.
This could be rolled out for any type of bakkie that is sold in South Africa. It’s made from aluminium so it does not add much weight.”

“We have also just completed an extra length trailer for transporting cars.
A great product for someone that is into motorsport.”

“One of our bigger clients today is a multinational conglomerate company that makes a variety of commercial and consumer products,

engineering services and aerospace systems for a wide variety of customers, from private consumers to major corporations and governments. We supply a range of electronic enclosures. Although we have clients in many varied industries, I would say the telecommunications electronic component businesses are the most important to us.”

For further details contact SP Laser on TEL: 011 917 1717
Successful development of innovative and dynamic parts in today’s miniature dental and medical components industry presents a formidable and equally dynamic challenge to cutting tool manufacturers.

The fast-growing field is driven by enterprising orthopaedic surgeons and dental professionals together with medical screw and implant companies, who work in close cooperation with computer aided design and manufacturing (CAD/CAM) software developers and dedicated machine and tool manufacturers to transform their inventions into parts that are revolutionising medical and dental procedures. Each new component demands correspondingly advanced tools and geometries to create the new and complex shapes, and to ensure extreme precision and consistently excellent surfaces.

The materials used for producing medical screws and implants are titanium superalloys, although stainless steel hard materials are used when a special ratio of depth of cut to chip thickness is required. These materials are gummy and cause built-up edge (BUE), which tends to wear down edge sharpness, while the high temperatures generated during chip breaking shorten tool life and damage surface quality.

Iscar, a manufacturer of cutting tools for metalworking has invested time and resources to develop optimal machining solutions for the medical sector, applying unique geometries, tools and grades. Utilising CAD/CAM systems to create custom tool assemblies according to the ISO 13399 standard, Iscar developed cutting tools for machining miniature medical parts, specifically dental screws and four components for hip joint replacement implants: Femoral head, acetabular shell, femoral stem and bone plate.

Dental screws
Iscar provides dedicated cutting tools for each of the main operations involved in machining dental screws.

Iscar developed two options for rough OD (outer dimension) turning. The SwissCut compact tool is designed for Swiss-type automatics and CNC lathes, and enables reduced setup time and easy indexing without having to remove the toolholder from the machine, while the inserts are equipped with chip deflectors designed specifically for machining small parts.

The second option features SwissTurn toolholders, with a unique clamping mechanism to optimise insert clamping and replacement on Swiss-type machines, and JetCut high pressure coolant tools. SwissCut tools are used for the turn threading operation.

ChatterFree endmills are utilised for the slot milling stage to maximise stock removal rate, eliminate vibration and reduce cycle time. The unique ground geometry provides excellent surface and tool life, while machining at high material removal rates.

PentaCut parting and grooving inserts perform the cut-off operations. With five cutting edges and very rigid insert clamping, PentaCut is a stronger insert for higher machining parameters particularly on soft materials, parting of tubes, small and thin-walled parts.

SwissCut tools are used in the face and OD turning (screw head turning) operation while the drilling operation is performed by SolidDrill solid carbide drills with 3xD and 5xD drilling depths and right-hand cut. The drills feature coolant holes.

The thread milling operation features SolidThread thread mills, whose short 3-tooth cutting zone with three flutes and released neck between the cutting zone and the shank enable precise profiles and high performance. The extremely short profile exerts a low force, which minimises tool bending, facilitating parallel and high thread precision for the entire length.

Solid carbide SolidMill endmills with two flute, 30° helix medium length, perform the key head milling operation.

Hip joint replacement
Complex operations are involved in machining components for hip joint replacement, which demand high accuracy, pristine surface quality, and absolute reliability. Iscar provides products for each operation to maximise their precision and efficiency.

Femoral head
The machining required for a femoral head involves rough turning or rough grooving, semi-finish profile turning, rough drilling, semi-finish milling, semi-finish internal turning, internal grooving (undercut), cut-off, rough turning, and semi-finish turning.

IsoTurn turning tools may be used for rough turning. The ISO standard tools perform most of the industry’s chip removal in applications ranging from finishing to roughing. Offered in all standard geometries, the trigon (semi-triangular) turning inserts for axial and face turning features six 80° corner cutting edges. For profile machining, Iscar provides intricate and precise V-Lock V-shaped special profile grooving inserts for the range of 10mm to 36mm. Precision ground and utility Cut-Grip full-radius inserts are used for performing semi-finish turning.

SumoCham drilling tools perform the rough drilling operation, offering fast metal removal and economical indexing with no setup time. SumoCham integrates a clamping system that enables improved productivity output rates and a shank designed with twisted nozzles, and a durable and stable body.
ChatterFree four flute endmills are utilised for the semi-finish milling operation. The endmills feature 38° helix and variable pitch for chatter dampening with 3xD neck relief. ChamGroove internal grooving inserts are applied for semi-finish grooving. The inserts possess extremely small bore diameters starting at just 8mm (the other diameters are 11mm and 15mm) and incorporate internal coolant.

Semi-finish internal turning is performed by IsoTurn inserts with SwissTurn toolholders, while the cut-off operation uses Do-Grip twisted double-sided parting inserts which feature double-ended twisted geometry for no depth of cut limitation.

For rough turning, the SwissTurn ISO standard insert range with small shank sizes is used. Also available for this operation are standard geometry inserts with precision ground cutting-edges and small radii for manufacturing small and thin parts.

The semi-finish turning operation is performed by using Cut-Grip inserts. In addition to the large variety of general use precision ground and utility inserts in the Cut-Grip family, there is a vast range of inserts for specific applications and materials.

**Acetabular shell**
Machining of the acetabular shell component consists of rough internal turning, finish profile milling, shouldering, upper and bottom chamfering, drilling, thread milling, external rough turning, and external grooving operations.

Heli-Grip double-ended inserts are used for the rough internal turning operation, as the twisted design allows them to groove deeper than the insert length. Internal finish milling is performed by SolidMill three flute, 30° helix short solid carbide ball nose endmills. SolidMill endmills with 4 flutes, 38° helix, and variable pitch for chatter dampening, perform the finish shouldering operations, as well as the special-shaped endmill which performs the upper and bottom chamfering operations that follow the drilling stage.

SolidDrill solid carbide drills with 3mm to 20mm range and 3xD and 5xD drilling depths are used for the drilling operation. SolidDrill tools feature a right-hand cut with and without internal coolant nozzles and advanced TiAlN coating for optimum hole quality, high performance reliability and economical output.

Thread milling is performed by SolidMill solid carbide internal threading endmills, which integrate coolant holes for ISO thread profiles. ISO standard inserts with SwissTurn toolholders feature JetCut high pressure coolant are used for rough turning and external grooving is performed with Cut-Grip precision inserts.

SolidMill endmills with four flutes, 38° helix and variable pitch for chatter dampening with 3xD relieved necks and SolidMill three flute, 30° helix short solid carbide ball nose endmills perform the final milling operations.

**Femoral stem**
Machining the femoral stem involves slotting, spot milling, drilling, chamfer milling, turning, face and profile milling operations.

Multi-Master endmills with indexable solid carbide heads in the diameter range of 12.7mm to 25mm are used for the slotting operation. The endmills feature no setup time and a carbide thread connection for quick change, and conical and face contact for high precision and rigidity.

Spot milling is performed by means of SolidMill endmills with four flutes, 38° helix and variable pitch for chatter dampening with 3xD relieved necks. The drilling operation uses SolidDrill solid carbide drills. Chamfer milling is performed using Multi-Master endmills with indexable solid carbide heads in the diameter range of 9.1mm to 20mm. ISO standard geometry inserts with precision ground cutting edges are used with SwissTurn toolholders featuring JetCut high pressure coolant for the turning operation.

SolidMill three flute, 30° helix short solid carbide ball nose endmills with a 3mm to 25mm diameter range are employed for the profile milling operation, and SolidMill endmills with four flutes, 38° helix and variable pitch for chatter dampening with 3xD relieved necks with a 1.6mm to 8mm diameter range are utilised for face milling.

**Bone plate**
The machining required to manufacture a bone plate involves rough and finish milling, shouldering, drilling, and mill threading.

For rough milling, the FinishRed endmill geometries allow the tool to perform roughing and finishing operations at the same time. The result is the ability to apply roughing machining conditions, while obtaining excellent surface finish. Multi-Master interchangeable solid carbide tapered heads are applied to the finish milling operation, whereby the curved surfaces can be machined by tilting the tool and applying a large corner radius at small cutting depths. Shouldering is performed with ChatterFree endmills which enable high material removal rates, eliminate vibration, and reduce cycle time.

For the final milling stage, Multi-Master four flute, 30° helix short solid carbide ball nose endmills in the 5mm to 25mm range are employed, while SolidDrill solid carbide drills with no coolant holes and 4xD drilling depth are used to ensure stable and accurate drilling. SolidThread 55° or 60° profile solid carbide taper thread mills are used for the mill threading operation.

**Grades**
Grades specifically designed for machining applications on stainless steel and super alloys such as IC900, IC907, IC806, IC908, IC328, and IC928 are ideal for milling and turning titanium and nickel based alloys, such as Nitinol, commonly found in medical components. These grades are available for Iscar standard tools with specially designed positive and sharp edged chipformers.

It is no small challenge to manufacture miniature parts for dental and medical devices but Iscar has succeeded in developing highly effective cutting tools for this field that adhere to the stringent standards of quality and precision essential for medical industry applications.

For further details contact Iscar South Africa on TEL: 011 997 2700 or visit www.iscar.com
Sandvik Additive Manufacturing has created the first ever 3D printed diamond composite for a wide range of industrial uses. The newly developed process means that this super-hard material can now be 3D printed in highly complex shapes without the need for further machining.

Although a composite, most of Sandvik’s material is diamond. To make it printable and dense it needs to be cemented in a very hard matrix material, keeping the most important physical properties of pure diamond.

“Historically, 3D printing in diamond was something that none of us imagined was achievable. Even now we are just starting to grasp the possibilities and applications that this breakthrough could have,” explains Anders Ohlsson, delivery manager at Sandvik Additive Manufacturing.

“On seeing its potential, we began to wonder what else would be possible from 3D printing complex shapes in a material that is three times stiffer than steel, with heat conductivity higher than copper, thermal expansion close to Invar, and density close to aluminium. These benefits make us believe that you will see this diamond composite in new industrial applications ranging from wear parts to space programmes, in just a few years from now.”

Mikael Schuisky, head of R&D and operations, says: “The additive manufacturing process used is highly advanced. We are printing in a slurry consisting of diamond powder and polymer using stereolithography.”

The step after 3D printing is, however, even more demanding. Here, Sandvik has developed a tailor-made, proprietary post-processing method that makes it possible to achieve the exact properties of the super-hard diamond composite.

“This step was extremely complicated. However, after extensive R&D efforts and trials we managed to take control of process and made the first 3D printed diamond composite,” says Schuisky.

Annika Borgenstam, professor at the Department of Materials Science and Engineering at Stockholm’s KTH Royal Institute of Technology, says: “Rather than looking to actually develop completely new materials, the big push within today’s industry involves the often radical restructuring of existing materials. Using processes such as additive manufacturing will open up completely new ways of using the same types of materials that we have today, by building in the properties that we need.”

Another key advantage of additive manufacturing is that it allows engineers to minimise material waste, making the technology more sustainable. The diamond powder in Sandvik’s process can be extracted from the polymer in the slurry after printing, and then be recycled and reused in another print job.

Sandvik’s diamond composite has been tested and found to have extremely high hardness and exceptional heat conductivity, while also possessing low density, and very good thermal expansion and corrosion resistance.
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Engineers at the Fraunhofer Institute for Material and Beam Technology (Fraunhofer IWS; Dresden, Germany) have refined laser powder buildup welding over decades to allow more materials to be applied in additive manufacturing. In this procedure, a system feeds various filler powders into a process zone where a laser melts the powder and deposits it on a workpiece surface. As a result, the desired part is generated in a layer by layer process.

“One of the advantages of this additive procedure is that we can adapt the process very flexibly to the requirements of high-performance materials,” explains Michael Müller, Fraunhofer IWS project administrator. In this way, it is also possible, for example, to print nickel-based alloys that are difficult to weld and process using traditional methods. However, this only works if the temperature, powders, feed rate, and other parameters are correct.

Within the framework of Fraunhofer’s futureAM – Next Generation Additive Manufacturing project, Fraunhofer IWS engineers are recording numerous sensor data with very high sampling rates for this purpose. However, this generates large amounts of data (big data) that are difficult for people to understand.

AI learns to decide

Nevertheless, Fraunhofer experts use artificial intelligence (AI) and machine learning, which are also being studied in a working group led by Prof. Karol Kozak, head of image processing and data management at Fraunhofer IWS, to find hidden connections in these signal floods. For example, special analysis algorithms link the measured sensor values with the institute’s powder database and evaluate further process parameters and gradually the machines learn to make their own decisions. For instance, they can determine for themselves whether a slight rise in temperature in the welding process can be tolerated or whether they have to take immediate countermeasures before the entire component ends up as waste.

Better aircraft engines in sight

Aircraft engines, for example, could work more efficiently and at higher temperatures if most materials were not already failing at temperatures of around 1 200 °C. Admittedly, there are materials that can withstand such high temperatures, but they are very cost-intensive and difficult to process using traditional methods. Additive manufacturing is intended to solve this dilemma and could help to achieve a more cost-effective design.

“Using laser powder buildup welding, we can feed different powders into the process zone simultaneously or successively with precisely adjustable feed rates,” Müller explains. “Designing an entire component out of a singular material is not very effective since the component is not exposed to the same heat at all points.”

In the futureAM project, Fraunhofer IWS and five other Fraunhofer Institutes are pooling this technology and further expertise to push additive manufacturing to a new level. By summer 2020, they want to integrate all their expertise into the additive manufacturing process chain and demonstrate it on realistic components.

For more information, please visit iws.fraunhofer.de.
The United Grinding Group, one of the world’s leading manufacturers of precision machines for grinding, eroding, laser, measuring and combination machining held its celebrated Grinding Symposium in Thun, Switzerland over three days from 8 to 10 May 2019. This is only the fourth time in the group’s history that such a symposium has been held and it brought together over 1 500 international visitors, including customers of the Group and international trade journalists.

With its eight well-known brands Mägerle, Blohm, Jung, Studer, Schaudt, Mikrosa, Walter and Ewag, United Grinding offers a broad range of application knowledge, an extensive product portfolio and a complete array of services for surface and profile grinding, cylindrical grinding and tool machining.

The various companies within the group are split up according to the applications of the machines that they manufacture. Mägerle, Blohm and Jung form the surface and profile grinding technology group, while the cylindrical grinding technology group comprises Studer, Schaudt and Mikrosa. The tool grinding technology group includes the Walter and Ewag brands.

Within these companies the United Grinding Group manufactures 150 different types of machines, some being variants.

The tradition of the group companies goes back more than one hundred years, during which more than 150 000 machines were manufactured and delivered throughout the world. With a turnover of around 700 million euro the group has around 2 500 employees based at 20 branches and 10 production facilities. The newest of the production facilities was established at a greenfield site in the US in 2018.

Headquartered in Bern, Switzerland the group has its main manufacturing facilities in Switzerland and Germany but also manufactures its equipment in the US and China, amongst other countries. In June 2018 the United Grinding Group was purchased by a group of strategically oriented pool of investors organised by the Swiss BZ Bank Aktiengesellschaft.

The innovative technologies of the companies in the United Grinding Group have a broad range of applications, from single part production to mass production, from small businesses to large corporations, and are used in a wide range of industries.

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Key areas are the automotive and supplier industry, medical, aerospace industry, tooling, die and mould, transportation and heavy industry, machine manufacturers, energy and precision engineering.

Visitors to the symposium were able to see the latest products from the individual brands on display and attend the 13 technology presentations given by the company experts. The range of topics included the advantages of digital solutions for production machine operators, how user interfaces should be designed to enable ideal machine operation, and what role additive manufacturing can play in machine building.

Held in converted army barracks in the picturesque
town of Thun in Switzerland’s Bernese Oberland region with a backdrop of sweeping views of the Alps, one of the main attractions of the symposium and exhibits was the Future-Lab stand where United Grinding showcased current and future applications including additive manufacturing and laser micro-threading. The company is already using many 3D printed parts in its own machines including the universal cylindrical grinding machine Studer Favorit.

On the Favorit, Studer leverages additive manufacturing technology to build parts such as the hydraulic block, which is more efficient in materials handling, storage and assembly, because the overall number of parts was reduced from five to one. Moreover, flow paths can be made with cross-sections that are square instead of round, reducing turbulent flow by 20 per cent with the same channel width, says United Grinding.

In addition to the opportunities and challenges in the cooperation of human and machine or the potential of artificial intelligence and machine learning in the manufacturing industry, there were also practical production topics, such as experiences with the innovative WireDress® dressing technology.

“Our aim in presenting these future technologies is to create a dialogue with our customers and to discover more about their individual expectations and requirements,” explained Chief Technology Officer Christoph Plüss.

In his address to the press CEO Stephan Nell did not reveal any new machine developments or technology introductions. With the EMO 2019 exhibition around the corner it was not surprising. However, he did mention that 2018 was the group’s best year ever in terms of turnover but expected 2019 to be slightly down.

Running concurrently to the symposium was a colloquium, where invited international experts gave 16 presentations. A broad range of topics were covered including digitisation, AI, MEMS sensors for machine and process monitoring, trends in tool development and think laser in online tool manufacturing.

Among the machines on display was the Mägerle MFP 30 grinding center, a new compact 5-axis grinding center for machining aircraft engine blades. There were also the relatively new Studer S31 and S33 universal cylindrical grinding machines. One of the main features of the S31 and S33’s updated versions is the extended range of distances between centers. Both the S31, designed for grinding workpieces in individual, small-batch and high-volume production, and the S33, designed for medium-sized workpieces, are now available with distance between centers of 400mm and 1 600mm, respectively, complementing the existing 650mm and 1 000mm sizes.

Schaudt presented its compact and highly versatile ShaftGrind S cylindrical grinding machine with an integrated robot, Mikrosa had its Kronos S 250 centerless grinding machine, Walter displayed its two-in-one concept – eroding and/or grinding using one machine – and had two new Helitronic models on display, Ewag displayed its Profile Line, a high-precision, flexible 5-axis grading center, Jung presented the J600 surface and profile grinding machine and Blohm the Profimat XT production grinding machine.

For further details visit www.grinding.ch
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A look at EXPOMAFE 2019 – Brazil’s machine tool industry is fully embracing Industry 4.0 – looks to grow revenue both locally and abroad

Metalworking News was privileged to be invited by ABIMAQ – The Brazilian Machine Tool Builders’ Association – to attend the second edition of the highly successful and largest Latin American trade show for the machine tool and industrial automation industries in Brazil – EXPOMAFE 2019.

EXPOMAFE 2019 boasted more than 750 exhibitors

For the first time in nearly 10 years, Metalworking News received the prestigious honour of being one of only two international press representatives invited to attend Latin America’s largest machine tool show – EXPOMAFE 2019 – Brazil International Machine Tool and Industrial Automation Exhibition. This publication had previously visited FEIMAFE and MECÂNICA, two other well-known machine tool exhibitions that take place in that country. The biennial event – this year being only the second edition of the show – took place in one of the largest cities in the world, São Paulo, Brazil, from May 7 – 11 2019 at the São Paulo Expo Exhibition and Conference Centre in the south eastern district of Vila Água Funda.

ABIMAQ - The Brazilian Machine Tool Builders’ Association - founded in 1975, represents more than 7 800 companies from the different segments of the mechanical capital goods industries, whose performance has a direct impact on the other national production sectors. It is structured across a few Brazilian states and comprises of 10 regional offices with its headquarters in São Paulo.

Beyond the institutional representation of the sector, ABIMAQ has its professional management and its activities aimed at generating commercial opportunities for its associates, carrying out actions in political and economic instances, stimulating international trade and cooperation and
contributing to improving performance in terms of technology, human resources training and managerial modernisation. At a government level, where it has a powerful voice, ABIMAQ focuses on innovation and technological development, attracting investments, arranging competitive financing, creating incentives for exports, as well as areas of trade protection.

While some things have changed since our last visit, others certainly have not. One need only travel through downtown Sampa, as the locals refer to their vibrant and cosmopolitan city that is home to some 22 million people, during rush hour traffic to realise that everyone, including scooter riders, firmly believe that they are Ayrton Senna. While motorbikes and scooters bob and weave through the numerous lanes at alarming speeds, things seem to have some kind of order to them, and the traffic has a certain natural flow to it... Once you get used to the toot tooting of the almost constant hooting from scooters announcing their presence and intention to pass your vehicle with centimetres to spare, that is.

However, what hasn’t changed is the Brazilian lust to want to be the country of the future. There remains a certain desire amongst the population to want to realise their full potential and to tap into the wealth of opportunity that the country possesses. Unfortunately, for the most part, and similarly to here at home in South Africa, politics has interfered greatly since the 1980s and limited that conceivable progression.

Yet, there is hope, because now after five years of political crisis, social uprisings and economic woes, things can only get better than they were. Positive measures by the new right-wing populist president Jair Bolsonaro and his government to root out the rot began in earnest as of 1 January 2019 when Bolsonaro took office. These measures launched with what has now become the largest anti-corruption investigation in world history, and a good few of those responsible for graft – including past presidents – have been brought to book with significant terms of imprisonment being handed out.

But, the greatest recurring challenge remains: How to successfully address the large disparities of wealth and abundant poverty amongst the population. While an overall economic recovery is nowhere in sight, there are optimistic examples such as the manufacturing industry, which has seen growth.

Perhaps this industry will be able to experience further growth as the trade wars between the US and China continue to affect economies worldwide. Brazilian machinery and component exports to the US have been growing steadily and while sales into Latin America have declined, there are improved trade relations between another big consumer of Brazilian machinery and components – Mexico.

What also hasn’t changed of course, is football, or futebol in Portuguese, the most widely spoken language amongst the diverse cultures found across Brazil. You want to talk about futebol? Just ask anyone. It is, as you have heard, a religion in that country. And when there is a big game on, like there was during our visit – top-of-the-table of the top-tier Brazilian league Brasileirão Série A, and São Paulo-based Sociedade Esportiva Palmeiras, or just Palmeiras, were playing at home – you can feel the city reduce its perpetual pace as patrons congregate at cafes and bars and indulge in some futebol. It really is a way of life for Brazilians.

A resounding success
By all accounts the second edition of EXPOMAFE was a resounding success with much business being concluded there and then at the show – Trumpf reported that it finalised sales for at least 13 machines including 10 TruLaser 1030 fiber machines.

The 2019 edition was 25% larger in exhibition area than the inaugural EXPOMAFE in 2017, with more than 55 000 visitors attending the exhibition to view the more than 750 national and international exhibition stands and pavilions. More than 40 companies from nine different countries chose to exhibit including those from Germany, China, Korea, Spain, France, Italy, Japan, the Czech Republic and the United States. That figure is almost double the number compared to the 2017 edition.

Exhibition space sold out 60 days before the event took

São Paulo is home to some 22 million people
place and the event itself was attended by Brazilians of all walks of life as well as people from more than 30 other nations. Many exhibitors reported on the quality of the attendees and these were made up of buyers, engineers, technicians, executives and coordinators, specialists in products and processes, suppliers of all segments of the metalworking sector, logistics technicians, machinery and equipment manufacturers and other professionals of engineering involved in the industrial, maintenance, production, quality and manufacturing fields.

Many young people and students also visited the show and this is encouraging to see as Brazil faces the massive uphill task of creating jobs for its people. The local manufacturing industry just so happens to be one of those industries that is currently creating jobs as it begins to visualise glimmers of hope and opportunity post the political turmoil.

On show were the latest innovations from manufacturers of accessories (devices and components), quality control procedures integrated with manufacturing and measurement devices, industrial automation, robotics and the integration of manufacturing cells, hydraulic and pneumatic equipment, valves, pumps and compressors, handling and storage equipment, hand tools and cutting tools, machinery and general equipment for the metalworking industry at large, machine tools, welding and cutting equipment, additive manufacturing machinery including devices for prototyping and 3D printers, as well as the latest software.

The theme of interconnectivity
The theme of the exhibition was to embrace industry 4.0 and bring together young and old by showing visitors what the potential of modern manufacturing has to offer in the now very present and happening fourth industrial revolution: That of the relationship between man and machine. One of the main attractions at EXPOMAFE was the Demonstration of Technologies pavilion. The pavilion has been in use since 2016 at other shows such as at the first FEIMEC - International Machinery and Equipment Fair.

Essentially, “The Demonstrator brings together a set of clusters with technological solutions that demonstrate, in practice, the possibilities for small, medium and large companies to advance in areas of industry 4.0. The project counts on the participation of machinery and equipment companies, automation and control, business management software, production and processes, startups, universities, agencies and development banks,” states the official EXPOMAFE description. It is designed and arranged in such a way that it allows an individual to physically and visually interact with the various processes and technologies that have evolved and led to the modern smart factory’s development.

These clusters included: Predictive Maintenance - Pneumatic Systems; Secure Robotics - Interaction with Man-Machine; Intelligent Production Systems; Quality 4.0 - Autonomy and Artificial Intelligence in Processes; Additive Manufacturing - Generative Design; Digital Management;
Technological evolution

One of the many exciting attractions and extensions to the Demonstrator pavilion was the Space Technology in Evolution theme, created to illustrate the evolution of industrial technology. Present was a life-size replica of the 14-bis and Demoiselle aeroplanes, originally conceptualised and manufactured by Brazilian-born Alberto Santos-Dumont (1873 – 1932) at the beginning of the 20th century. He was the son of a large coffee plantation owner and was granted economic freedom and independence and encouraged to move to Paris during the twilight of the 19th century. It was his love of literature such as Around the World in Eighty Days,
20,000 Leagues Under the Sea and Propeller Island that fuelled his fascination and passion for technology, and which ultimately led to him designing and manufacturing the 14-bis.

In order to be as accurate as possible and to remain conscious of the importance of preserving the history of aviation, the replicas have been constructed using the same materials as the originals - Japanese silk, Indian bamboo and piano cable. The replicas – which can actually take to the air, believe it or not – are also symbolic of Brazil’s long associated history with technology and manufacturing.

Also connected to this was KUKA’s RoboCoaster - the first licensed industrial robot to carry people. Shrieks and gasps for air could be heard as visitors got their chance to ride the robot. Its presence was not only to attract attention, but also to show the symbolic relationship between man and machine, and the evolution of this symbiotic relationship through time. We are now, after all, in the age of the cobot, an age where man and machine must interact in the same workspace.

Signs of recovery and growth in certain areas

As far as the current economic climate is looking for the industry, it was reported that year on year to March 2019 net equipment revenue was stable, however the first quarter of this year experienced growth of 6%, largely fuelled by an 18% increase in local demand for manufacturing equipment. While growth is expected to slow and stabilise during the course of the year, net revenue is still expected to be higher than that of 2018. February figures also indicated positive growth in industries exporting machines and components.

Machines for logistics and civil construction saw growth of 57%, while a 42.8% increase in sales for the capital goods industry was observed, and particularly noteworthy was the 141% increase in the sales of industrial valves. Total exports of machinery and related components have

Trumpf had a variety of machining solutions on show and reported that it finalised sales for at least 13 machines including 10 TruLaser 1030 fiber machines at the show alone.

José Velloso, Executive President at ABIMaq

João Delgado, Director of Technology at ABIMaq and President of IPDMAQ
decreased year on year by about 12%, however exports to the US have increased by 17% for the same period. Sales into Latin America have been at their lowest in 10 years. Around 50% of all machinery and component exports have gone into the US and Europe, with sales into China dipping. While imports remained relatively similar to 2018, March 2019 saw a spike of roughly 12%. Imports of machines into the agriculture and capital goods component sectors have increased significantly year on year, growing 21.1% and 11.6% respectively.

China remains the main source of these imports, both in terms of value and volume. Imports from the US remain on the decline amid a renewed positive preference for domestically produced products, as well as for those produced in China. Employment growth has also been experienced across various sectors of the manufacturing industry year on year with some 6 000 new jobs created.

Not only does this indicate that there is positive and increased interest in Brazil’s manufacturing economy, but it may also signify further growth for the industry and that the internal market is making a recovery post the country’s political turmoil. While the storm is not over, everyone Metalworking News spoke to expressed positive sentiments about the possible recovery of the internal market.

Romi

Among the local exhibitors present was the well-known multinational Industrias Romi S.A., or Romi as it is more colloquially known. Founded in 1930, Romi is the market leader in the Brazilian machinery production market and manufactures a variety of machine tools such as mechanical lathes, CNC lathes, turning centers, vertical and horizontal milling machines, heavy duty and extra heavy duty lathes, as well as plastic injection moulding and plastic blow moulding machines. Romi’s products are consumed globally and are used across a variety of industries ranging from light and heavy automotive products, to agriculture, capital goods, tooling, hydraulic and wind power. The group also has its own modern foundry based outside of São Paulo at its industrial complex. The foundry is extremely capable of producing superior quality castings and can deliver them already machined.

Metalworking News met with Fabio Barbanti Taiar - CFO and Investor Relations at Romi, and who is also President, Sectorial Chamber of Machine Tools and Integrated Manufacturing Systems at ABIMAQ, and Edmerquis Marchesini, International Sales Manager (Latin America) for Romi. Both expressed optimistic attitudes regarding the current growth potential in the market locally and abroad, and what a resounding success the show was. “It’s about automation and productivity, that’s what we are trying to bring to the customer. The customer is prepared to invest more when seeking advances in their productivity levels,” said Taiar.

“We have a presence all over Latin America and parts of Europe like the UK, Spain, France, Italy and Germany, and our goal now is to consolidate and further improve our presence in these regions. Not only are we strategically growing our technical support in these regions, but we are also opening new showrooms. Globally the consumption of machines and tools has grown, and should there be a crisis, even a recession, and investments fall, for example in the US or China, we are ready for that global market,” continued Taiar.

Marchesini explained: “We want to offer complete machining solutions to our customers. The Mexican market is strategic for us, and we are entering and growing new markets such as the automotive and service suppliers’ markets as well as those of the aerospace and oil industries. I recently actually sold two machines into Mozambique, and they’ll be used in the rail industry there.”

Potential for growth in exports

José Velloso, Executive President at ABIMAQ, reiterated what Taiar said in that there had been signs of recovering growth in the industry and that there had been an increase in exports to places like the US. “In Europe, there is a crisis starting, and a good result will be the stabilisation of sales there. Exports to Argentina have been falling, but the mining sector in Chile has been good, and things have been positive in Peru and Columbia too.”

“We are the 10th main machinery manufacturer in the
world, and only second to India in terms of emerging countries. We are able to integrate technology the way they do around the world, and if Chinese machines face barriers to entry into the US, the market opens up further for us. On the new government’s agenda are constitutional changes that we believe will allow Brazil to grow again, perhaps 1% this year and 2% in 2020.”

The adoption of Industry 4.0 in Brazil

Metalworking News also sat down for a frank conversation with João Delgado, Director of Technology at ABIMAQ and President of IPDMAQ, on where the industry and Brazil is on the spectrum of Industry 4.0. An animated man and a man very passionate about his country and work said: “We have implemented programmes to take the industry forward. The technology is available and we are implementing it here in Brazil. Integration is the key and so too is the importance of connecting everything inside the company. It’s about showing the entrepreneur how to improve production. Despite there being a talent crisis, we have the engineers and the minds for Industry 4.0 – even small-scale farmers can benefit from the advances in technology. We have the ability to skip phases, if you are in Industry 2.0, you can skip to Industry 4.0.”

“You will have found the most up to date technologies here at EXPOMAFE and this is evidence of Brazil’s commitment to Industry 4.0. We now need to grow the necessary skills needed to feed the industry – analytics, data, artificial intelligence – that’s what we need now. Public policy in these matters is delayed and we need to requalify the workforce for these new jobs that are being created. We need people to start looking at the processes of production differently. And we need to change the face of the factory floor and make it more attractive to the youth.”

“Training facilities like SENAI – the National Service for Industrial Training – exist and are offering training solutions, but long-distance and online learning also need to be solutions for requalifying the workforce. It is an advantage that we have always had a big industrial workforce but how to implement these changes is the dilemma. The machine is not the secret, it is what you do with the data. Connectivity is the key, and we have a culture of integration in Brazil. We need less workers working with products and more working with programming. But this takes time, and is a problem all over the world.”

Standardisation and quality control for Industry 4.0

Amongst the many roadshows and presentations at the exhibition was one by the Brazilian arm of the VDI: The Association of German Engineers. They presented the German Standardisation Roadmap to Industry 4.0, fundamentally a system of standard best practices for industry 4.0, by using various case studies conducted on businesses in different stages of implementing new technologies.

Johannes Klingberg, Executive Director of VDI Brazil said: “There are more than 12 000 VDI members in Germany, including those from industry, academia and government, actively working on the construction of these guidelines. Among them is the VDI / VDE 4000 directive, which specifically deals with the implementation process of Industry 4.0. The goal is to produce a document that establishes a common concept for all users of digital technology.” This is to be applied around the world.

About the new standardisation document to be published later this year

“With the digitisation of industrial production, it is essential for extremely divergent systems from various manufacturers to interact reliably and efficiently. The Standardisation Roadmap for Industry 4.0 is one of the pivotal communication media for Industry 4.0. It enables the national and international exchange of information between standardisation, industry, associations, research and politics. It is a guide showing the way for individuals and organisations active in various sectors of technology and presents the outcomes from current work and discussions, as well as an overview of standards and specifications relevant to Industry 4.0. It sketched out the requirements placed on standardisation and lays down effective measures for their successful implementation.”

“A key element of the Standardisation Roadmap is the role that humans play in “smart factories”. The document also addresses the harmonisation of smart manufacturing components, reference and data models in Industry 4.0, as well as communication technologies, service robotics and legal issues. Experts from the areas of business, research, science and politics have contributed to the development of the Roadmap.”

“It’s a “living” document that is continually being developed and anyone interested in Industry 4.0 is welcome to participate in this work.”

Metalworking News would like to extend a special thanks to Júlia Meriqui for her hospitality during our visit to the show, as well as to the entire team at ABIMAQ. EXPOMAFE next takes place from 4 – 8 May 2021. If Brazil is not on your radar, it should be. For more information visit: https://www.expomafe.com.br/en/
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Fanuc to build new plant to harness 5G and self-driving demand

Robot maker to invest $28 million.

Japanese industrial robot maker Fanuc plans to spend 3.5 billion yen ($28.3 million) on a new plant it hopes will help it capture business opportunities related to 5G smartphones and self-driving cars.

The company intends to increase production of what is known as nano-level processing equipment, in an effort to meet demand for moulds for high-precision camera lenses used in the phones and vehicles.

Fanuc plans to consolidate two production facilities for high-precision processing equipment at its headquarters in Yamanashi Prefecture, west of Tokyo, and start up the new plant in October. The company makes about two units a month at its existing plants but plans to boost the new factory’s capacity to 10 in three years.

Domestic and overseas rivals also make the advanced nano-level processing equipment, priced at up to 100 million yen. Fanuc intends to sharpen its own technology as it steps up production, enhancing the accuracy of key products including numerical control equipment.

Car-mounted cameras are set to spread as part of autonomous driving systems, while 5G mobile networks will allow users to send high-quality videos 100 times faster. These trends have convinced Fanuc that demand for moulds for high-precision lenses will surge.

Fanuc expects its net profit will drop 59% to 62.3 billion yen for the fiscal year through March 2020, dragged down by a decline in global factory investment resulting from the U.S.-China trade conflict as well as sluggish demand for processing equipment for smartphones. The company is under pressure to raise output of high-value products.

Renishaw and Wenzel collaborate on shop-floor co-ordinate measurement solutions

Renishaw’s Equator gauging system is to be controlled with Wenzel’s WM Quartis metrology software for programming and evaluation purposes. The move comes as part of a co-operation deal between the two companies and will be incorporated into the Wenzel product portfolio.

“Several thousand Equator test units are already in use throughout the world, enabling high repeatability and thermally robust process monitoring on the shop floor. A direct connection to the Wenzel software is an import extension of our solutions for users within the shop-floor area,” said Rainer Lotz, vice president EMEA of Renishaw.

Renishaw product manager Bastian Luithardt adds: “Workpiece data recorded by Equator is used for automatically updating the tool offset of the respective machine tool. The Equator concept, which enables flexible and newly programmable measurements, is optimal for use in an automated environment. A stable manufacturing process and continuous documentation therefore results for every workpiece.”

At the same time, Wenzel is launching another compact portal measurement machine for direct production use. The SF 55, like the bigger SF 87, offers high travel speeds and acceleration, while its corrosion-free guideways are made of high-precision, hand-finished granite. Indeed, the guideways are completely covered and protected against contamination, while the controller and PC are integrated in the machine for a minimal footprint.

The SF55 has passive vibration damping and can be equipped with active vibration isolation. Due to the good accessibility and ‘Wenzel automation interface’, the shop-floor measurement system is suitable for automation and integration into the production line.

“After the success of our SF 87 CMM, the more compact SF 55 is the logical response to the requirements of the shop floor,” said Dr Heike Wenzel, managing director of the Wenzel Group.

“Both user-friendly concepts, SF from Wenzel and Equator from Renishaw, cover very different application areas within the shop floor sector and complement each other. We are therefore able to offer further turnkey solutions in addition to the hardware, which make us a flexible partner for our clients.”

In addition to extending the product range, Wenzel and Renishaw will also continue their joint development of the REVO 5-axis measurement system.
Manufaturing technology leader Yamazaki Mazak Corporation has announced that President Tomohisa Yamazaki will become the company’s chairman while Vice President Takashi Yamazaki has been named the new president. The transition, which will take effect June 24 and coincides with the company’s 100th anniversary, is the result of a long-planned leadership evolution designed to position the company for continued growth while cementing its ability to provide support to manufacturers around the world.

During a June 4 press conference in Nagoya, Japan, Takashi Yamazaki described the approach he would bring as president: “Many evaluate the company’s virtue with the revenue figure, but I won’t be just pursuing that. With 100 years of company history, we would like to continue providing customers in the world greater technologies and better products.”

Tomohisa Yamazaki’s appointment as chairman is the culmination of his dynamic career as a longtime leader of one of the world’s largest machine tool companies. In addition to continuing to act as the vice chairman of the Japanese Machine Tool Builders’ Association (JMTBA), he said, “I will stay involved in making decisions regarding medium and long-term plans and support the new leadership from a broader perspective.”

“On behalf of the entire team in North America, I would like to offer our thanks to Tomohisa Yamazaki, who will continue to lead the company to further success in his new role, and our warmest congratulations to Takashi Yamazaki,” said Dan Janka, president of the Florence, Kentucky-based Mazak Corporation.

“The enduring stability of the Yamazaki family’s stewardship of the company and the seamless leadership transitions taking place on both sides of the Pacific serve to demonstrate Mazak’s Rock Solid approach to serving customers and advancing technology.”

Prior to joining Yamazaki Mazak Corporation in 1990, Takashi Yamazaki earned his bachelor’s degree in business from Xavier University. After garnering experience in numerous departments across the company, he became a managing director in 1999 and a vice president in 2013. In his remarks to reporters, he discussed the company’s role in an increasingly globalised manufacturing market and his plan for promoting new technologies and products to further strengthen the company’s legacy of Together Success.

For more information contact Hi-Tech Machine Tools on TEL: 011 608 0088 or visit www.hitech.co.za
Extension of steel milling grades to additional Sandvik Coromant milling concepts brings increased tool life to more users

CoroMill 300, CoroMill 245 and CoroMill QD cutters among those to benefit from GC4330 and GC4340.

Following the successful introduction of its latest-generation GC4330 and GC4340 steel milling grades in 2018, cutting tool and tooling systems specialist Sandvik Coromant is now extending the range of application for these advanced insert grades to additional milling concepts. For instance, the grades are now available for selection with the CoroMill 300 round-insert face and profile mill, the CoroMill 245 multi-purpose face milling cutter, and the CoroMill QD cutter, which is optimised for deep and narrow grooving and parting off.

GC4330 and GC4340, which feature a specially developed substrate, Inveio coating and enhanced post-treatment technology, allow users to enjoy substantially increased tool life and process security. Now, the extension of these grades to additional Sandvik Coromant milling concepts brings their advantages to even more machine shops looking to optimise the milling of steel workpieces.

“GC4330 and GC4340 have been purpose-designed to overcome certain issues when machining steel components. For instance, some hard and abrasive steels can promote wear along the insert’s flank face, particularly at elevated speeds and longer time in cut. What’s more, machining in unstable conditions as a result of compromised fixturing or long overhang increases the risk of chipped inserts. A further risk is thermal fluctuation during machining which, especially in wet conditions, can lead to crack formation and sudden breakages,” states Karl Emil Holmström, Global Product Application Manager Grades at Sandvik Coromant.

Among the many design attributes of GC4330 and GC4340 is the optimised Inveio coating. Inveio is the technical breakthrough of uni-directional crystal orientation in the alumina coating layer that gives inserts a new level of wear resistance and tool life. Furthermore, the substrate of the grades delivers highly controlled grain size distribution for more reliable and predictable insert behaviour.

GC4330 is a medium-hard grade for roughing to semi-finish face milling, with the tough GC4340 grade preferred for rough shoulder milling and groove milling. Both grades are now extended to the aforementioned CoroMill 245 and CoroMill 300, as well as the CoroMill 360 heavy-duty face mill, CoroMill 419 high-feed mill, and LPMH-PM plunge-cutter inserts.

In addition, GC4330 is available for the CoroMill 365 high-security face mill, while GC4340 can be applied to the CoroMill 216 ball-nose end mill and CoroMill 415 small-diameter high-feed face mill, along with the CoroMill QD cutter.

This list adds to the existing availability of both grades for CoroMill 390 and CoroMill 490 shoulder mills, CoroMill 345 face mills, CoroMill 210 high-feed cutters, CoroMill 200 profile mills and CoroMill 331 for grooving and parting off.

For more information visit www.sandvik.coromant.com/en-gb/products/pages/customised-tools.aspx
You can also contact Sandvik Coromant on TEL: 010 500 2295 or Mary-Ann Haylett on TEL: 011 570 9615, or email: mary-ann.haylett@sandvik.com or visit www.sandvik.coromant.com
With the Yaskawa Cockpit Yaskawa has developed a central software platform for networked production environments. The standard OPC UA interface is one of the company’s focal points.

Yaskawa Cockpit is an innovative Industry 4.0 software that integrates robots and other factory level assets into a complete systems management and visualisation solution. Yaskawa Cockpit provides insight into device information and production rates, identifies appropriate preventive maintenance, predicts the life span of components, and automatically distributes system alarms to the appropriate personnel, leading to improved system uptime and reduced cost of ownership.

Relevant process and system data from networked production systems are collected and analysed in real time in a scalable database, or prepared for external further processing. The procedure is visualised directly and comprehensibly in the software platform.

Intelligent use of data
In addition to visualisation functions, the current status of each machine can be mapped in real time in the Yaskawa Cockpit and correlated with other data sources, e.g. for planned production volume.

“The data can be easily forwarded to existing ERP, MES, Big Data or AI environments in accordance with the most stringent safety standards as a basis for making sound decisions. Simultaneously, data can be restored to the system for optimisation,” explained Bruno J. Schnekenburger, CEO Robotics Division of Yaskawa Europe.

The functionalities of the Yaskawa Cockpit can be experienced in practice, both in the interplay of robotics live cells and with Yaskawa drive and control technology.

For example, the software platform detects and reports a blocked air filter without the installation of additional sensors, solely by monitoring the current flow.

Uniform communication standard
“For the networking of components and structures with the software we consciously opted for OPC UA,” says Andreas Waibel, Chief Developer of the Robotics Division of Yaskawa Europa GmbH.

“After all, there must be a reason that this communication standard is preferred by VDMA for the implementation of machine-to-machine communication (M2M) and other Industry 4.0-specific applications.”

OPC UA stands for Open Platform Communication Unified Architecture, an architecture that enables platform and manufacturer independent communication via various levels of the automation pyramid, thereby breaking down the strictly hierarchical dataflow. The VDMA working group Robotics + Automation is dedicated to the realisation of this vision. One result of this inter-company development initiative is an OPC UA demonstrator that underlines the potential of the standard in the practical application.

“i³-Mechatronics” solution
The Yaskawa Cockpit is a key element of the Industry 4.0 “i³-Mechatronics” solution. Here Yaskawa has combined classical mechatronics, information and communications technology with digital solutions such as artificial intelligence, Big Data and the Internet of Things. “i³” stands for integrated – intelligent – innovative.

For more information contact Yaskawa Southern Africa on TEL: 011 608 3182 or visit www.yaskawa.za.com
The introduction of a specific 5-axis ‘Tilt’ control strategy, combined with a barrel cutter, is the most significant enhancement in the latest release (2020.0) of Edgecam from Hexagon Manufacturing Intelligence’s Production Software division.

Brand manager John Buehler says barrel cutters are recognised as one of the fastest tools when performing 5-axis machining, and are now fully supported in the Edgecam Toolstore. As well as ‘side tilt by contact point’ capability, the ‘Advanced 5-axis’ cycle also offers further gouge checking in the ‘swarf’ command, along with extra ‘ink’ control in all strategies.

A number of newly developed and enhanced features in Edgecam 2020.0 provide increased productivity for both milling and turning users, while the recently introduced Edgecam Inspect module includes 13 upgrades.

Firstly, mindful of the need to generate quick tool paths and reduce production costs, Edgecam 2020.0 offers a performance boost when either roughing or profiling a solid model. Essentially, the machining engine will only compute data constrained within the boundary, ignoring the rest of the model. This functionality decreases the cache size, while generating faster tool paths.

Formerly introduced in the ‘Hole’ cycle in the 2018 R1 release, the ‘Deep Hole’ strategy has been enhanced, justifying the creation of its own individual cycle. The original modifiers have been improved, and further control tabs have been added to the cycle, giving greater control over the tool path.

In the ‘Turning’ environment there is a newly devised machining cycle – ‘Thread Profiling’. Reacting to a high frequency of enhancement requests from customers in this area, Edgecam 2020.0 allows users to machine complex form threads such as VAM and Acme. The cycle provides both roughing and finishing strategies, allowing users to specify their own thread forms.

‘Waveform Machining’ has been enhanced with ‘Chip Prevention’ control. Under certain conditions, a tool path can generate a thin island of material (chip) which, as it gets thinner, can cause machining stresses and potentially break the tool.

“We’ve found that to compensate for this risk, users tend to sacrifice productivity by reducing feeds and speeds,” says Buehler. “So we’ve introduced the ‘Chip Prevention’ option, which alters the tool path pattern by machining across the island of material, removing the possibility of machining stresses and allowing users to maintain optimum feeds and speeds.”

Supporting the growing number of machine tools possessing an auxiliary Z (quill) axis, Edgecam 2020.0 introduces a code wizard enhancement, letting users add a secondary working spindle. This addition supports multi-task machines, along with any combination of table/head milling machines.

Furthermore, a new ‘Quill’ command offers greater control when controlling the second working axis.

When using the ‘Finish Grooving’ cycle, users can now control the break-edge angle, whereas in previous Edgecam releases, the break angle was set at 45°. A further enhancement in the ‘Finish Turning’ cycle means a stand-off value can now be defined when using ‘Up Cut’ control.

Two tool types

Two tool types – ‘Dovetail’ and ‘Double Angle’ – have been added to the Toolstore. This move does away with the need to create custom graphics, saving time and programming costs. Moreover, the tools work automatically with the ‘Slot’ cycle.

Moving to Edgecam Inspect, the overall interface has been upgraded to adopt the work-flow ribbon toolbar, improving interactivity. Meanwhile, the ‘Probing Options’ menu has been split into two separate dialogues, meaning users can concentrate on ‘output’ and ‘inspect’ preferences individually.

‘Safe Retract’ controls have been added to the inspection cycles, for users to state multiple positions while controlling the probe’s movement. What’s more, the ‘Index’ command now contains the ability for further positional manipulation, where an alternative angle may now be specified in order to view the components on the machine tool.

A newly developed ‘Angle to Line’ feature merges three previous commands into one function, allowing the angle direction to be specified in the data report. Among other enhancements to the Edgecam Inspect module, constructed features have been updated, so that ‘Straightness’ can now be specified while editing the ‘Constructed Line’ feature. And both the ‘Circular’ and ‘Arc’ features can now be converted and re-specified when edited.

Finally, around 50 enhancements have been made to the optional Edgecam Designer module, which is said to bridge the gap between CAD and CAM, focusing on the specific needs of programmers.

For further details contact Stillam CNC Programming Solutions on TEL: 011 663 2600 or visit www.stillam.com
A flat-bed laser-cutting machine has been introduced by Bystronic that is aimed at sheet-metal processing companies wishing to exploit the productivity of fiber technology and its broad range of applications. The competitively priced BySmart Fiber can be supplied with a laser source of 2, 3, 4, or 6kW, as well as optional automated material handling solutions.

The 6kW source enables users to achieve the maximum increase in cutting speed, for example up to 70% more than a 4kW fiber laser when cutting 3 mm stainless steel. This advantage is even greater in comparison with a 6kW CO2 laser, as productivity is trebled.

Fiber lasers are able to process a range of materials, from steel and stainless steel to aluminium, copper and brass, with operating costs and maintenance requirements that are relatively low. For manufacturers with applications that lie in the thin to medium sheet thickness range, it means faster cutting, lower costs and higher profit per part. Additionally, Bystronic offers its Power Cut Fiber function to extend the range of applications to thicker sheet, delivering quality cuts in material up to 30mm.

Bystronic has equipped the BySmart Fiber with the latest generation cutting head, which can be adapted to maximise quality when profiling different metals. Users choose between two focal points of the laser beam depending on sheet thickness and material type. In addition, the 6kW version of the BySmart Fiber offers the ‘Cut Control’ function, which monitors the entire process. If a tear occurs, laser cutting is automatically stopped, reducing the risk of miscuts and rejected parts.

Operators control the BySmart via a 22” touchscreen. With the ByVision Cutting user interface, the process is controlled with a few swipes of the finger. The control accesses an extensive database that includes the parameters for all common types of sheet metal. Taking the material, sheet thickness and part geometry into account, the control generates the optimum cutting process. During operation, all processes on the machine are tracked and the most important data appears on-screen, including the current cutting plan, the position of the cutting head and machine status.

Bystronic’s loading and unloading solutions, and third-party automation equipment, can be integrated. Depending on the order situation, the system organises material flow fully or semi-automatically, while also offering flexibility at the machine to process smaller orders manually.

For further details contact Bystronic South Africa on TEL: 010 410 0200 or visit www.bystronic.co.za.

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**NEW!! COSEN G300**

The Cosen G300 is a rigid dual-column, fully automatic, high production machine which incorporates a massive base, sturdy saw frame, with an extremely heavy duty gear box, a 5 HP (3.75 kW) drive motor and a user friendly programmable control.

The Smart NC-100 technology is programmable up to 100 different jobs including quantity and length of cut with Automatic Multiple Indexing & Automatic Kerf Compensation. Cutting information such as blade speed, downfeed speed, cutting rate, blade life and error message is clearly displayed for ease of use.

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For More Information
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Trumpf releases offline programming software for laser-welding cells

The newly developed TruTops Weld programming software from Trumpf allows users to create welding programmes offline while the laser-welding cell is producing parts. Users then transfer the program to the machine where the TeachLine sensor system undertakes automatic adjustment to match the actual position of the part, thus minimising the need for teach-in processes.

Trumpf’s TruTops Weld has been designed to work with the TruLaser Weld 5000 laser-welding cell. Offering an intuitive, user-friendly interface, the software incorporates a broad range of the company’s accumulated technological expertise, including welding parameters and information on processing angles. The software also integrates all of the TruLaser Weld functions, such as the rotary module and TeachLine sensor system.

TruTops Weld increases machine availability by allowing users to create welding programmes on a PC rather than in the laser-welding cell. This capability means the machine can keep producing parts during programming, while also making it much faster to create programmes.

With teach-in programming, machine operators have to individually programme every point to which the robot will travel during processing. In contrast, TruTops Weld calculates these points on the robot’s path automatically.

The programming process consists of four steps. The first step focuses on the part: The programmer defines the points to be welded by clicking the corresponding part edges. Welding parameters can then be selected from a comprehensive database. Alternatively, programmers can choose to use parameters they have calculated themselves. At this early stage, the software automatically calculates the paths of motion and creates a preliminary programme.

TruTops Weld then finalises the programme in what is known as ‘system mode’, which enables the user to virtually place the part on the positioner inside the laser-welding cell. The software detects any potential collisions and helps the user to find a position and path of motion that the robot can follow without meeting any obstructions. This simulation is particularly helpful for complex parts.

Finally, the programmer transfers the programme to the welding cell. The TeachLine sensor system then checks the exact position of the part and compares this information to the simulation. If TeachLine identifies any discrepancies, it automatically adjusts the programme accordingly. Users still have the option of carrying out a conventional teach-in process.

For more information contact Retecon Machine Tools on TEL: 011 976 8600 or visit www.retecon.co.za
Sumitomo Electric Carbide’s TSX-series tangential milling cutter is designed for stable, efficient shoulder milling at high feed rates. The TSX is engineered with a tough and sharp cutting edge, and provides the strength required for increased depths of cut ranging from small jobs to heavy-duty roughing applications.

With the TSX series, a highly efficient solution combining an extremely stable milling body and tangentially mounted inserts provide excellent results in shoulder milling, face milling and side face milling. The TSX cutters are available as TSX08 and TSX13 series with a maximum cutting depth of 8mm and 12mm.

The LNEX type four cornered inserts with tangential adjustment enable cost-efficient machining and are available across a wide range of grades with two insert sizes and three different chip breakers. The cutting edge geometry, which has been optimized with regard to sharpness and cutting ability, considerably reduces the cutting forces, so that the TSX series enable reliable machining even in unstable processes.

Other features of the competitively-priced TSX include reduced cutting force, surface roughness of less than 0.5 micron Ra, squareness less than 0.05mm and long-term wear resistance.

For more information contact Carbide Solutions and Innovations on TEL: 011 392 2000

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We also offer fiber laser cutting of sheet, CNC bending, plasma cutting, robotic welding, CNC machining, welding and surface finishing
Amada has released its latest high-power fiber laser cutting machines, the ENSIS-AJ 6 and 9 kW, which are aimed at any manufacturer needing fast piercing and cutting across a range of materials. These high-power fiber lasers offer a host of specially developed technologies designed to overcome common laser-cutting challenges.

Ease-of-use, reliability and a high level of modular automation options also feature.

Central to the advanced capability of ENSIS-AJ high-power fiber lasers is Amada’s Variable Beam Control technology, whereby the laser beam is automatically adapted to deliver stable cutting across all material types and thicknesses. Variable Beam Control can also change instantly between a high-power density beam for piercing and a high-speed, high-quality beam for cutting, thus reducing cycle time. Regarding setup times, only a single lens is required to process thin-to-thick materials, helping to maximise machine uptime and eliminate costly operator errors.

Amada’s Auto Collimation technology is a further standout feature of the machines as it delivers beam diameter and focus-point control for high cutting speeds and surface quality, reducing the need for secondary finishing operations. Auto Collimation also produces a wider cut kerf on thicker materials, making for easier part removal from the sheet to reduce handling time.

“By combining our proven Variable Beam Control technology, which we have used since 2014, with our Auto Collimation technology, the high-power ENSIS models give new and existing customers a significant advantage in a competitive market,” says Matt Wood, senior product manager at Amada Europe. “In fact, 25mm mild steel can be pierced in as little as one second on the 9 kW version, saving significant processing time.”

The ENSIS-AJ 6 and 9 kW machines, which can process mild steel, stainless steel and aluminium up to 25mm thick, offer a number of advanced Amada functions designed to bring about higher productivity and lower cost per part. By way of example, ECO Cut provides users with low gas consumption during the oxygen cutting of mild steel, while CFC (Clean Fast Cut) offers high speeds in combination with low gas usage when cutting with nitrogen. Amada’s WACSII (Water-Assisted Cutting System) is also included, enabling users to reliably cut thick mild steel with smaller part spacing on poorer quality materials.

Ease-of-use is facilitated by Amada’s AMNC 3i controller, while reliable production is said to be assured thanks to functionality such as the 16-station automatic nozzle changer with auto cleaning and calibration unit, an air-blow system that prevents dust from adhering to the underside of the sheet, and a monitoring system which checks piercing is complete before cutting begins.

There are many automation options available for the ENSIS-AJ 6 and 9 kW machines to help users maximise productivity and save on labour costs. For instance, ASF-EU/ASLUL tower systems will automatically load and unload sheets, offering a sheet changeover time of less than 90 seconds (for the ASF-EU). Also available is the TK-L part-picking system for the automatic collection, sorting and stacking of laser-cut parts without interrupting the machine.

For further details contact Amada JHB South Africa on TEL: 011 453 5459 or www.amada.com
Kennametal has released the next generation of its Mill 4-12KT tangential shoulder mill, which is designed to produce high-quality surface finishes in nearly all steel and cast-iron applications.

"The Mill 4-12KT uses 15% lower cutting forces, an important consideration with today’s lighter duty, 40-taper machine tools," says Tim Marshall, senior global product manager. “That allows customers to feed faster without putting additional stress on the spindle. And in long overhang situations, or where the part fixture is less than optimal, lower forces equate to less chatter, reduced edge chipping and smoother surface finishes.”

Tangentially mounted inserts with four cutting edges per insert deliver reduced tooling costs. Seven corner radii from 0.4 to 3.1mm are available, as well as medium and coarse pitch cutter bodies from 50 to 200mm in diameter (with through-coolant). Offering an axial depth of cut range from 0.5 to 12mm, the tool covers most shoulder milling applications.

Multiple factors contribute to significant performance increases, even in aggressive cutting conditions. For instance, the tangential ‘on-edge’ insert design allows the insert to take advantage of the strength of the carbide thickness, more so than radially mounted inserts found on traditional milling cutters. In addition, a shallow pocket design permits the core size of the cutter body to be sufficiently robust.

For more information contact Kennametal South Africa on TEL: 011 748 9300 or visit www.kennametal.com.
New AgieCharmilles Laser S Series texturing solutions reduce the risk of human error

The AgieCharmilles Laser S series, available from GF Machining Solutions, provides a solution to what the company sees as the limitations of conventional and manual surface texturing methods, reducing quality deviations without additional machining processes. Laser S machines can be equipped with 30W and 50W FlexiPulse sources as optional replacements for the standard 50W and 100W lasers. FlexiPulse enables engineers to shorten or lengthen the laser pulse duration, adjusting the laser instability time depending on the application and material used to find the ideal quality-to-speed ratio.

The ExcelliShift system features a 600mm per second mechanical travel rate and 30 000mm per second optical travel rate at the 254 focal length for reductions in required machine movement. The system enables true 3D scans for optimal productivity.

Smartpatch, a software module included in the GF Laser Workstation Software package, analyses jobs to generate the optimal patching strategy. According to the company, the latest grain geometries and complex patterns can be created without common errors in suboptimal patching strategies.

As part of the digital transformation in manufacturing, the AgieCharmilles Laser S series provides a fully digital solution to the limitations of conventional and manual surface texturing methods to reduce quality deviations without additional machining processes. On the tenth anniversary of the introduction of the AgieCharmilles Laser family, the new AgieCharmilles Laser S makes difficult-to-realis designs easy to generate for more creative freedom and faster time to market, especially in industries such as automotive, information and communications technology (ICT) and packaging.

For more information contact Retecon Machine Tools on TEL: 011 976 8600 or visit www.retecon.co.za

Fit 5-axis machining into any shop – Mazak

Mazak offers its 5-axis VC-300A/5X vertical machining center (VMC), "Suitable for the aerospace and medical industries as well as job shops, the VC-300A/5X brings advanced technology and production value to high-precision small parts processing in a space-saving package designed to fit into any manufacturing environment," said a company spokesperson.

The VC-300A/5X comes standard equipped with a robust, high-performance CAT 40, 10 000rpm spindle designed to deliver enhanced metal removal capabilities in all common materials, including steel, aluminium and cast iron. A 12 000rpm spindle is additionally available to address an even greater range of part-production requirements. An optional 35kW, 20000rpm integral spindle is also available for increased metal removal.

Axis travels for the VC-300A/5X measure 300mm in X, 300mm in Y and 510mm in Z, all with rapid traverse speeds of 24m/min. The machine can accommodate workpieces up to 100mm in diameter, 155mm in height and 155kgs in weight. The machine comes standard with an 18-tool drum-style magazine or optional 24-tool magazine for redundant tooling to allow for unmanned, uninterrupted operations. Its automatic tool changer (ATC) provides fast tool exchanges for an overall reduction in non-cut times.

To minimise thermal displacement, Mazak incorporates an oil chiller that cools the VC-300A/5X's headstock and spindle. The machine's trunnion-style rotary/tilt table is constructed with durable high-speed roller gear cam drive technology for high torsional rigidity and positioning accuracy. The table tilts from +20° to -120° in the B-axis and rotates 360° in the C-axis.

Mazak’s Mazatrol SmoothX CNC on the VC-300A/5X is designed to easily generate programmes for highly complex parts production. It has several advanced functions that allow the shortest possible machining cycle times, especially in fine increment programmes for simultaneous 5-axis operations and free-form die-mould machining. These functions include High-Gain Feed Forward Control, Fast Rotary Axis Speeds, Variable Acceleration Control and Intelligent Pocket Milling.

Ergonomics also play an important role in the functionality of the Mazatrol SmoothX CNC. A large 19" display presents all of the critical machine data within a single page view, while the tilt control panel allows for optimum positioning based on operator height. An intuitive multi-touchscreen, which is similar to that of a smartphone, enables fast and smooth programming operations. An SD card allows the CNC to store up to 32 GB of data.

For more information contact Hi-Tech Machine Tools on TEL: 011 608 0088 or visit www.hitech.co.za
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Feeler’s 5-axis machining centers are designed to offer a cost-effective entry into 5-axis operations. The Feeler U600 vertical machining center and U800-5AX gantry-type machining center offer speed, precision and performance based on an intelligent machining platform and a host of novel innovations.

By way of example, the Feeler U600 offers a patented configuration whereby the machining capacity allows a workpiece diameter larger than its axis travel. Furthermore, the machine offers access to the working area via sliding doors on two sides of its periphery for ease of operation, monitoring and load/unload.

Intelligent machining is at the core of the U600. For instance, a ‘Chatter Lobe’ programme is deployed to predict and prevent the occurrence of chatter during machining based on a few simple input parameters. In addition, due to the separation of the axes of linear and rotary movement, any curve tolerance or error that occurs during 5-axis machining can easily be controlled and adjusted. Among those set to benefit are manufacturers in the automotive, telecommunications, medical, aerospace and mould making industries.

The compact Feeler U600 offers travel in the XYZ axes of 460 by 520 by 400mm respectively. A-axis rotation is possible from -40 to +110°, with full 360° rotation in the C-axis. Also featured is a 600mm diameter table that can support workpieces weighing up to 250kg. The BT40 direct-drive spindle rotates at 10 000rpm (12 000 and 15 000rpm options), although a 20 000rpm built-in spindle is also available.

Rapid traverse rate in the linear axes is 30m/min, while an arm-type 24-station (30-station and 40-station options) ATC offers a tool-to-tool change time of 2.5 seconds. Among the options is linear scales and thermal compensation on all five axes.

Also released in the UK is the new Feeler U800-5AX gantry-type 5-axis machining center, which is designed for where ultra-high precision and extra-fine finish are required. This is facilitated by the machine’s gantry structure together with U-shaped base and column, helping bring stability to new levels. Furthermore, the 800mm diameter swivelling/rotary table is capable of supporting loads up to 1 200kg. Tilt in the A-axis extends from -120 to +120°, with full 360° rotation in the C-axis.

Like the U600, the U800-5AX is configured to offer a separated design of the linear and rotary axes, thus making it easy to compensate for errors of radius in the rotating axes, for example.

A rapid traverse rate of 48m/min in the linear axes is supported by a 12 000rpm direct-drive spindle, although an 18 000rpm built-in spindle is also available. Efficient chip removal, THK roller-type linear guides and a horizontal-type 32-tool (48-tool and 60-tool options) magazine offering 2.5 seconds tool-to-tool time, are among additional features of the Feeler U800-5AX. Travel in the XYZ axes is 800 by 935 by 640mm respectively.

For further details contact Craft Machine Tools on TEL: 011 845 2030 or visit www.craftmachinetools.co.za

KASTOwin fully automatic band sawing machine

The KASTOwin tube A 5.0 is a fully automatic band sawing machine which has been specifically optimised for machining tubes. It features a cutting range of 500mm for round materials and a shortest possible cutting length of 10mm. The most important innovation: Compared to the other KASTOwin models, the direction of movement of the saw feed is rotated through 180 degrees and sawing is performed upwards from the support surface. This ensures efficient, precise sawing that considerably improves chip flow and reduces wear on the cutting tools.

Using the frequency-controlled drive, it is possible to adjust the cutting speed continuously between twelve and 150m per minute. Carbide saw bands, of the type required for various tubular materials, can be used with the KASTOwin tube A 5.0 without the need for any further accessories. The saw band is clamped in position hydraulically and is cleaned using a replaceable, electrically driven chip removal brush. The vice and saw feed are equipped with zero-play linear guides, and ball screw spindle drives ensure controlled cutting and material feed movements.

The SmartControl sawing machine controller ensures easy operation. It contains all the material data, and automatically sets all the necessary parameters. The KASTOrespond system, which was developed specially for this system, continuously records the forces at the tool and uses an intelligent algorithm to convert these into feed movements. When special requirements have to be met, KASTO can offer a wide range of accessories for the KASTOwin tube A 5.0, such as a heating and cooling device for operation at temperatures over 40 or below zero degrees Celsius.

For more information contact Retecon Machine Tools on TEL: 011 976 8600 or visit www.retecon.co.za
DMG MORI offers the NHX 4000 3rd Generation horizontal machining center (HMC) for horizontal machining of complex workpieces. The NHX is equipped to provide flexible and economic production due to its range of automation options.

The NHX series features sturdy construction for stable and high-quality machining. The X- and Z-axis guides are arranged to maximise rigidity of the bed, column and spindle. DMG MORI has increased the stability of the NHX 4000 3rd Generation even further, primarily with dynamics in mind. Acceleration rates of 1.2g in all axes and 60m/min rapid traverses contribute to high overall performance.

The speedMASTER motor spindle provides high chip removal rates. It offers a speed of 20,000rpm and a power rating of 37kW.

Hydraulic fixtures mean the NHX 4000 3rd Generation is easy to automate. It is equipped with a pallet changer when it leaves the factory, which moves the workpieces weighing anything up to 400kgs to the work area after setting up parallel to machining. Users achieve a higher level of productivity due to intelligent automation solutions. These range from a pallet handling system with up to 21 stations for a stand-alone machine and 99 pallets in a linear pallet pool for several machines and on to include direct workpiece handling using a robotic system. The product range is designed for both experienced users and those entering automated production for the first time.

With 60 tool pockets, the NHX 4000 3rd Generation offers a large magazine to meet the high productivity demands. The cooling system includes a coolant tank with a filter unit and spindle cooling. Direct path measuring systems from Magnescale, laser measuring probes and a sensor package that includes machine protection control round off the available options. The Fanuc NC control and Celos operator interface provide an integral digital process that encompasses job preparation and monitoring right through to documentation.

For more information contact Retecon Machine Tools on TEL: 011 976 8600 or visit www.retecon.co.za
EOS offers the EOS M 300-4 system, which is part of the broader, modular metal 3D printing platform EOS M 300 for digital industrial additive manufacturing (AM) production.

The EOS M 300-4 expands the portfolio of Direct Metal Laser Sintering (DMLS) systems, among them the EOS M 290 system. The EOS M 300 series is an automation-ready, future-proof platform that is configurable, scalable and secure, said a company spokesperson. It comes with a build volume of 300mm x 300mm x 400mm and serves a variety of manufacturing fields, including aerospace, industry, medical, tooling and automotive.

This modular platform comes with a configurable and scalable equipment architecture, which enables full flexibility and customised system configurations.

For better production flexibility and automation - and depending on system configuration - customers can choose between different solutions: One, two or four lasers, multi power laser configurations (400W or 1 000W), fixed or variable focus, different types of recoaters, new and expanded exposure strategies, part handling (manual or automated), monitoring options and three different clamping systems (3R, Delphin, Erowa). Customers can also flexibly choose between two powder dosing options for full build jobs without refilling: Bottom-up dosing to become independent of materials particle size distribution and automated, top dosing to enable a closed loop solution.

The system will be compatible with the EOS Shared Modules in which manual or automated peripheral modules and transport logistics supply several EOS metal AM systems. As a result, all setup, unpacking, transportation and sieving actions will be carried out independent of, and parallel to, the AM build process.

The system will be compatible with the EOS Shared Modules in which manual or automated peripheral modules and transport logistics supply several EOS metal AM systems. As a result, all setup, unpacking, transportation and sieving actions will be carried out independent of, and parallel to, the AM build process.

The EOS M 300-4 with four lasers will be able to offer variable laser power sources in the future - from 4 x 400, to a mixed setup of 2 x 400 and 2 x 1 000 up to 4 x 1 000W laser power. The system also offers full field overlap with four scanners, meaning that lasers can reach all spots on the build plate, enabling full flexibility with regards to build orientation. The system enables an increased productivity by factor four to 10 compared to the EOS mid-frame system EOS M 290, reducing cost per part.

The robust cast frame enables 24/7 process capabilities. A permanent filter system has been integrated to eliminate the need to open the system up periodically for filter changes. The new lifetime recirculating filter system offers automated cleaning, with residue collected in a bin beneath the build chamber. Longer jobs can be processed without job interruption.

At the same time, the system line offers automatic job start procedures. Depending on the needs of the user, the system line also includes powder contact-free solutions for demanding health and safety standards. EOS offers fully integrated remote service and consulting for the EOS M 300 series.

“With its modular set-up and its scalable and flexible concept, the new system line clearly focuses on the high customer demands for AM production. It sets a clear focus on productivity, and lowest costs-per-part and was developed for automation and (software) integration in current and future factories. The EOS M 300 series is the only 3-D printing solution for digital industrial production and specifically meets the demanding requirements in a production environment. It offers industrial-grade and integrated data, powder and part flow and can be easily incorporated into production facilities. We bring this technology into smart factories,” said Tobias Abeln, Chief Technical Officer.

The EOS M 300 series come with software solutions for all AM process steps, from the preparation of CAD design data and build job preparation to quality control. As such it will be offered with the company’s existing EOSPRINT 2, EOSTATE and upcoming EOSCONNECT software platforms, for build preparation, production and monitoring respectively.

For further information contact Rapid 3D on TEL: 087 802 0604 or visit www.rapid3d.co.za
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