METALWORKING NEWS

VOLUME 22.1

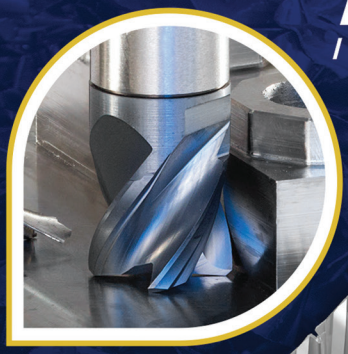
March 2023

40 000 Indexable Solid Carbide Endmill Options

MM

MULTI-MASTER

INDEXABLE HEADS



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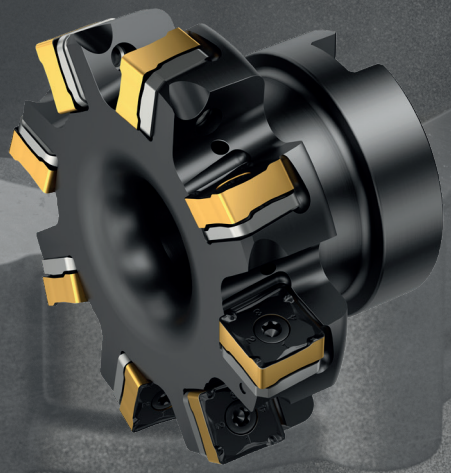

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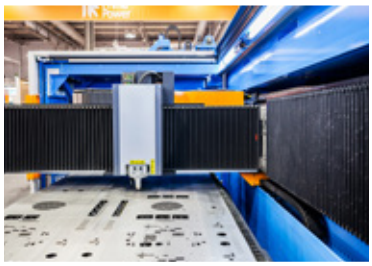
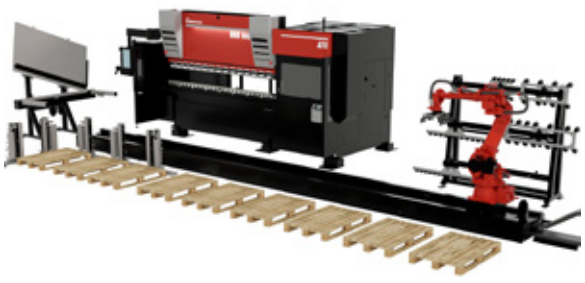




What an invasion of privacy! Scary! Very scary!

I 'subscribe' to a newsletter that talks about stuff on gadgets, phones and anything electronic that we use these days. I say 'we use' because many do make use of the many functions and features of these various products, apps and technology creations that everybody is hoping to get rich from in this fast-advancing electronic world that we live in.

I am not one that is interested in playing games on my computer or phone but there are many that do because it is a multi-billion industry. This is a personal choice as to what you do with your time and I am sure it is age related. I would rather be doing something constructive (my opinion) or enjoying the outdoors. But then that is what we did when I was young. There were no cell phones or computers. In the end it is how you experience life when you are in your formative years that will have a big influence on your thinking and activities for the rest of your life.

I am certainly not against all these electronic products and social media platforms. I have made them work for me in my career and family life.

I say that the more you become involved electronically, over and above what is necessary, the more vulnerable you become to fraud and an invasion of your privacy. My recent business trip, where I made use of a hired car, is an example. With no approval from my side, (it was probably in the small print) I suddenly started to get SMSs from the car hire company informing me that I was going over the speed limit allowable in the area. Firstly, I was puzzled because the car was a low cost, low engine power vehicle that was not capable of doing excessive speeds. But I was doing 50km/h in a 40km/h zone – the onramp for a the highway. At that speed you are barely moving and you are annoying many other road users. And who knows that there is a speed limit of 40km/h. It is not consistent because, now fully aware of all these SMSs that were invading my privacy, there was a speed limit sign (these are very sparce these days because most I suspect have ended up in a furnace) that I eventually found and it said 60km/h.

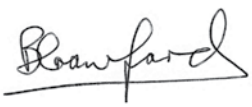
More alarming is, besides not being informed of the tracking, what does the car hire company do with all my data. They obviously could track and see wherever I went and who I visited. Scary!

Then I read a story where according to a document recently published on the United States Patent and Trademark Office website, Ford said it is considering a system that would allow a car to, on its own, leave you if you stop making your monthly auto payments. Don't worry, though. The patent hasn't been approved yet. And Ford insists it's just a thought.

But maybe some parts of Ford's 14-page application, filled with ideas for getting people to pay up, may be more patentable than others. Before getting to the point where the car would simply drive itself away, delinquent payers would be subject to a litany of annoyances. First, badgering messages on owners' smartphones and even on the screens inside the car. These messages would demand at least an acknowledgment or, better yet, on-the-spot payment. If the owner persists in ignoring these messages, the vehicle would, in the words of Ford's patent application, "initiate execution of a multi-step repossession procedure."

If the owner does not pay features like the air conditioning, cruise control, or the radio might stop working. If that doesn't work, the vehicle could become proactively irritating. The stereo might be programmed to "emit an incessant and unpleasant sound every time the owner is present in the vehicle," according to the patent. There would be just one way to turn off the noise. And there are many more listed.

What an invasion of privacy! Scary! Very Scary!



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STUDER

The Art of Grinding.

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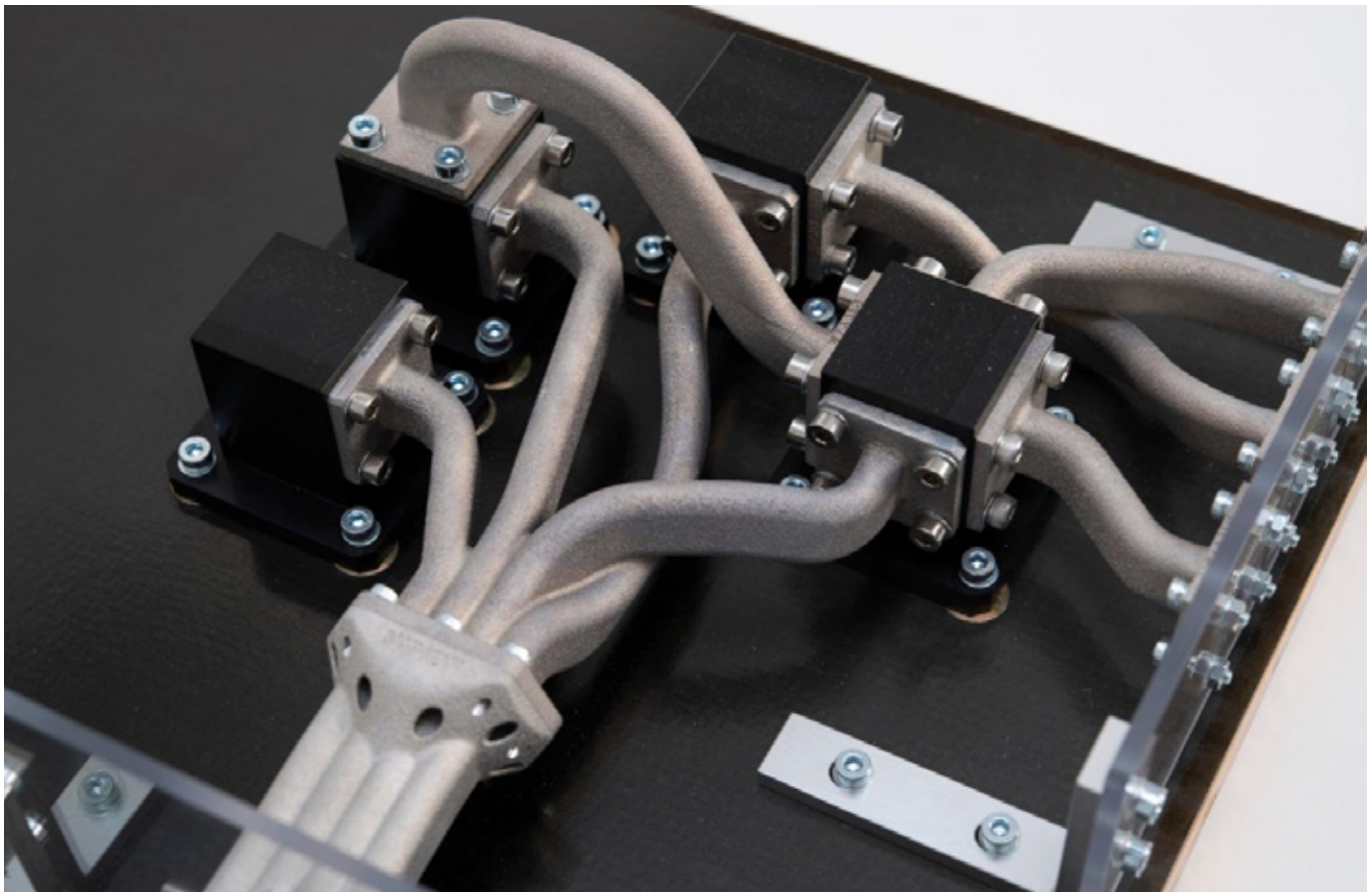
Additive Manufacturing:
State-of-the-industry rundown



Multiple waveguides consolidated into one 3D printed part.
(Provided by Swisstol2)

Additive manufacturing, also known as 3D printing, has continued to mature over the nearly 35 years since being introduced commercially. The aerospace, automotive, defence, energy, transportation, medical, dental and consumer products industries are adopting AM for an impressively wide range of applications.

With this vast adoption, it has become clear that AM is not a one-size-fits-all solution. According to the ISO/ASTM 52900 terminology standard, nearly all commercial AM systems fall into one of seven process categories. They include material extrusion (MEX), vat photopolymerisation (VPP), powder bed fusion (PBF), binder jetting (BJT), material jetting (MJT), directed energy deposition (DED), and sheet lamination (SHL). They are presented here in the order of popularity based on unit sales.

An expanding number of industry professionals, including engineers and managers, are understanding when AM can help improve a product or process and when it cannot. Historically, a large initiative to adopt AM has come from engineers who have experience with the technology. Management is seeing more examples of how AM can improve performance, shorten lead times, and create opportunities for new business. AM will not replace most forms of conventional manufacturing, but instead become a part of an arsenal of options for entrepreneurs in product development and manufacturing.

Business cases for adoption

AM applications vary widely, ranging from microfluidics to large-scale construction. The benefits of AM are different depending on the industry, application, and desired performance. Regardless of the use case, an organisation should have a good reason to adopt AM. The most common is for concept modelling, design validation, and fit and function testing. A growing number of companies are using it for tooling and series production applications, including custom product development.

For aerospace applications, weight is a major consideration. According to NASA Marshall Space Flight Center, it costs about $10 000 to put 0.45 kg of payload into earth's orbit. Reducing the weight of a satellite can save in launch costs.

AM is being used through the entire value chain in the energy industry. For some companies, the business case for using AM is to iterate designs quickly to create the best

possible product in the shortest time. In the oil and gas sector, a damaged part or assembly can result in a loss of thousands of dollars or more per hour in production. Using AM to help get an operation back in service can be especially compelling.

MX3D, a manufacturer of large-scale DED systems, released a prototype clamp to repair a pipeline. According to the company, a damaged pipeline can cost €100 000 to 1 000 000 ($113 157 to $1 131 570) per day.

Oil and gas pipeline clamp.
(Provided by MX3D)

In 2021, a 3D printed water bushing was installed on an oil rig from TotalEnergies in the North Sea. A water bushing is a safety-critical part that controls hydrocarbon kicks from wells under construction. In this case, the benefits of using AM were shorter lead times and a 45 per cent decrease in emissions, compared to a traditionally forged water bushing.

Another AM business case is a reduction of expensive tooling. Phone Skope designs digiscoping adapters, devices used to connect a phone camera to a telescope or microscope. New phones are released every year, requiring the company to release new lines of adapters. Using AM, the company saves money on expensive tooling that needs to be replaced when new phones are released.

As with any process or technology, AM should not be used because it is seen as being new or different. It should improve product development and/or the manufacturing process. And it must add value. Examples of other business cases are custom product and mass customisation, complex features, consolidating parts, less material and weight, and improved performance.

Increasing automation

For AM to reach its growth potential, challenges need to be addressed. For most manufacturing applications, the process must be reliable and repeatable. Automating part and support material removal and downstream methods of post-processing will help. Automation also improves throughput and lowers the cost per part.

One of the areas being addressed the most is the automation of post-processing, such as powder removal and finishing. By automating the process for series-production applications, the same technique can be repeated thousands of times. The challenge is that specific methods of automation can vary by part type, size, material and process. For example, automating the post-processing of a dental crown is very different than a part for a rocket engine, even though both may be produced in metal. ■

This is the viewpoint of Terry Wohlers and Noah Mostow, both of Wohlers Associates, an ASTM International company and it first appeared in Manufacturing Engineering

cover story

The promising segment – Iscar

It is apparent that 5-axis machining is becoming increasingly popular in modern metal cutting. 5-axis machining provides significant advantages such as machining complex-shaped parts by use of one setup without changing the location of the workpiece, high-machining accuracy and reduced cycle time.

Advanced technology of workpiece fabrication has led to increased capabilities of precise forging, casting and mainstreaming additive manufacturing (AM). This has resulted in the increased complexity of workpiece geometry, decreasing machining allowance and material by cutting operations and achieving end results which reflect the final shape of the workpiece. The requests for high-performance cutting tools intended for finishing and semi-finishing geometrically complex surfaces are now vitally important.

Ball-nose milling cutters are considered traditional tools for machining 3D surfaces. Ball-nose cutters are the most common tools for semi-finishing and finishing profile in milling operations. Progress in the field of 5-axis machining centers, and a significant step forward in modern CAM systems have emerged tools with a different cutting geometry, referred to as segment or barrel-shape endmills. Even though these tools are well known to machinists, they remain ignored. 5-axis machining combined with CNC software and computer modelling of complex tool configurations has re-emerged the use of circular segment endmill applications.

Fig. 1 – Oval solid carbide endmills are effective tools for machining curved shapes

Fig. 2 – The cost-beneficial Multi-Master concept has successfully adopted circular segment milling heads

The cutting edge of these endmills is an arc that represents a segment of a circle with a radius larger than the nominal radius of a tool. For comparison purposes, in ball-nose cutters the tool radius is the radius of the cutting edge. Machining surfaces using 'passes technique' segment-type endmills enables a substantially increased step size compared to ball-nose cutters, thus reducing the cutting time. A three-axis CNC controlled cutting process cannot guarantee the correct position of a barrel-shaped cutting tool when machining complex surfaces. The 5-axis machining concept allows taking full advantage of segment endmills.

Depending on the orientation of the cutting edge relative to the tool axis, segment endmills possess various configurations such as pure barrel, tapered barrel, lens, and oval or parabolic shapes. The form of the tool cutting edge determines the tool application. For example, lens-shaped tools are suitable for both five and 3-axis machines, while endmills with a tapered barrel profile are intended for 5-axis machines. Segment cutter designs appear in multi-flute solid endmills that deliver ultimate tool accuracy and maximise the number of teeth on the cutting tool.

The Iscar Neobarrel tool line includes several tool families. These are solid

carbide endmills (SCEM) in a diameter range of 8mm to12mm (Fig. 1). The 10mm oval-shaped solid carbide endmill has an arcuated peripheral cutting edge in a radius of 85mm. This endmill quadruples the step size repeatability compared to a 10mm ball-nose cutter and provides the same machined surface finish quality.

Iscar Multi-Master tool line refers to assembled tools that mount exchangeable carbide heads. This line offers new barrel-shaped heads that feature the same cutting geometry and diameter range as SCEM and provide a wide array of options within the Multi-Master line for 5-axis machines (Fig. 2). The exchangeable head concept featured in the Multi-Master tool line guarantees rational use of cemented carbide with a true economical advantage. Diverse tool bodies, extensions, and reducers enable the customisation of a modular tool assembly for complex machining projects.

Recently, Iscar unveiled a new family of segment endmills which utilise the single insert tool design principle (Fig. 3). It is a known fact that the accurate parameters of a single-insert tool are lower when compared to a cutter with exchangeable carbide heads, not to mention the solid carbide endmill. Precision can be compromised if we analyse how a single insert tool, with two teeth, can compete against a multi-flute SCEM or carbide head tool.

Fig. 3 – One insert barrel-shape cutters demonstrate high performance parameters when machining complex surfaces of vital components

To dissipate the arisen doubts about the reasonability of the single insert segment tool design, we should consider several aspects. The single-insert tool concept facilitates cost-effectiveness by expanding the diameter range of segment mills. These cutters feature nominal diameters of 16mm to 25mm. A durable insert structure and highly rigid insert clamping enable increasing the feed per tooth in comparison with the feed values that are recommended for solid carbide endmills and exchangeable heads. This ensures an appropriate level of feed and speed to machine productively.

When operational stability is poor, decreasing the number of teeth contributes to vibration control. Inserts mounted on the BallPlus tool family can transform the tool to a segment endmill by use of inserts only. Iscar BallPlus tools include a diverse choice of tool bodies, adapters, and extensions, which greatly simplify tool customisation. Choosing a single-insert segment tool design is now more logical and justified.

Fig. 4 – The segment of barrel-shaped endmills has organically incorporated various design concepts

In modern manufacturing, barrel-shaped mills have good prospects. The metalworking industry has found many uses for applying a multitude of cutting barrel designs. These include solid carbide endmills, cutters with exchangeable heads, and single-insert tools (Fig. 4), all of which have formed a complete segment of profile milling tools with a challenging future.

For further details contact Iscar South Africa on TEL: 011 997 2700 or visit www.iscar.com ■

Hallspeed navigates toward a new future

Toyota Gazoo Racing South Africa's winning car in the Dakar Rally 2023

It is pedal to the metal at Hallspeed, located close South Africa's famous Kyalami race track (Kyalami Grand Prix Circuit) in Midrand, as new owner Shameer Variawa gets behind the wheel of his new venture of steering the company who helps build the vehicles he so loves to race.

At the tender age of 16, Shameer Variawa embarked on a thrilling journey into the world of off-road racing, serving as navigator for his late father in a series of exhilarating events. With a proud family tradition spanning three generations, Variawa's passion for the sport would take him to unprecedented heights, culminating in his crowning as the South African National Off-Road Champion in the year 2000.

However, his most remarkable achievements were still to come. Variawa's name would become synonymous with the gruelling Toyota 1000 Desert Race, a challenging event that put even the most seasoned off-road racers to the test. In a stunning display of skill and determination, Variawa emerged victorious in this intense competition for three consecutive years, claiming top honours in 2008, 2009, and 2010.

Today, Variawa's legacy as a skilled and fearless competitor endures, inspiring a new generation of off-road racers to push themselves to their limits and beyond. His remarkable achievements serve as a testament to the enduring spirit of adventure and competition that lies at the heart of this thrilling sport.

Shameer Variawa has recently become the new owner of Hallspeed

Having himself competed in the Dakar, Variawa's sons Saood and Sa'aad have become the third generation of the Variawa family to start competing at the highest levels of their respective disciplines in the sport and just recently, Saood, who finished second in the 2022 GTC Championship in his debut season, won Race 1 of the first GTC event of the year in his Gazoo Toyota Corolla at Kyalami, making his intentions for the season obvious. Despite finishing fourth in the second race, having a mentor like his father and a fair amount of international racing experience already under the belt, this is a youngster worth

keeping an eye on.

Toyota Gazoo Racing South Africa

December 1978 marked the birth of an audacious idea by a French adventurer, Thierry Sabine, who sparked a thrilling expedition that continues to push the limits of human endurance to this day. Sabine opened a gateway to the world of adventure with the inception of the Paris-Dakar Rally, a gruelling race that traversed the arid expanse of the Sahara Desert, starting in Paris and culminating in the Senegalese capital, Dakar.

Since its inception, the rally has been a hallmark of extreme adventure, drawing enthusiasts from around the world to participate in its high-stakes challenges. Due to political instability, the race was temporarily relocated to South America between 2009 and 2019, but the rally's insatiable thirst for adventure led to yet another chapter in its storied history in 2020, with a move to Saudi Arabia in the Middle East.

Despite its move away from the original Paris-Dakar route, the Dakar name continues to be synonymous with "the world's most extreme rally," embodying the spirit of unbridled adventure. The race's fan base has only grown stronger over time, and its popularity endures to this day, with thousands of spectators and enthusiasts alike eagerly anticipating each new iteration of this epic event.

Demanding nothing less than the maximum from its competitors, pitting drivers and their vehicles against a relentless onslaught of heat, terrain, and the elements, over the course of just under two weeks, drivers must cover a staggering 5 000km, pushing themselves and their machines to the very limits of human endurance.

With temperatures soaring to 40 degrees Celsius and driving conditions that are anything but forgiving, the Dakar Rally is a true test of the competitor's mental and physical strength, as well as their navigational and mechanical prowess. It is no wonder that completing this challenging

Hallspeed's Machine Shop Manager Theon Rayner and General Manager Evan Hutchison

One of Hallspeed's new acquisitions to further streamline their processes of production is a DN Solutions (formerly Doosan Machine Tools) Puma DNT 2100MB horizontal turning center

event is considered a victory in itself, with the rallying cry being that "all drivers who cross the finish line are winners." Indeed, more than half of the vehicles that begin the race fail to complete it, a testament to the unforgiving nature of this iconic event.

Despite the daunting challenges that lie ahead, drivers from over 50 countries will converge on the starting line, ready to battle against the elements and each other for the ultimate prize. With more than one billion viewers tuning in from 190 countries, the eyes of the world are always on this remarkable display of skill, determination, and adventure. The Dakar Rally is a true celebration of the human spirit and a testament to the enduring appeal of off-road racing.

Toyota's vehicles embody the spirit of adventure and endurance that defines the Dakar Rally, and through it all, Toyota has remained a constant presence, dominating the competition with its legendary quality, durability, and reliability, competing in every Dakar Rally since inception.

Such vehicles require precision engineering and a team of dedicated specialists to ensure this reputation stands true.

Hallspeed

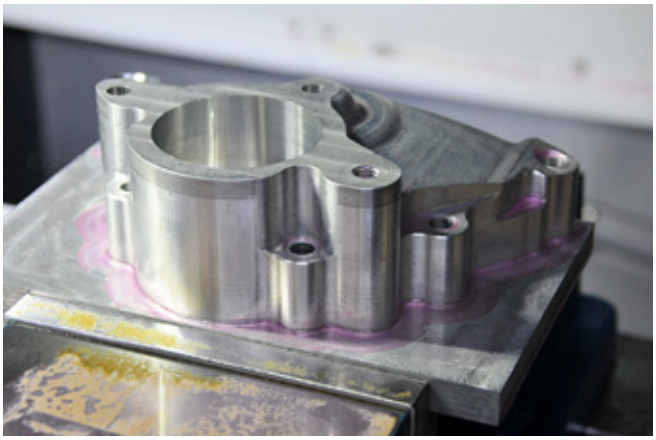
Born in Britain, Glyn Hall came to South Africa in 1980 and was crowned 1990 rally champion before becoming General Manager of Nissan Motorsport in 1993. Hallspeed was formed in 1996 as a subcontractor to Nissan and it is now responsible for Toyota's racing activities in South Africa. To get a vehicle ready for racing takes many hundreds of hours of labour and many rands.

Years of dedication and planning go into the manufacture of the Dakar-specification Toyota Hilux and Edgecam CAM software plays a pivotal role in swiftly producing the high precision parts for these top-performing motorsport cars developed in the high-tech 'garage' of Hallspeed. Each car must have between 4 000 and 5 000 components that make up the finished vehicle. Approximately 80% of these components are manufactured in-house.

While Variawa is taking over the helm, Hall will still be involved in developing and designing the race cars, explains Theon Rayner, a qualified fitter and turner, CNC programmer and machinist responsible for production milling and tool making for the mill/turn multi-task machining at Hallspeed. Along with his team, his knowledge of the software plays a vital role in being able to swiftly produce the many high precision components for the top-performing Toyota Gazoo Racing South Africa's rally entries and other vehicles that Hallspeed builds.

Amongst his new toys and Hallspeed's new acquisitions to further streamline their processes of production are a DN Solutions (formerly Doosan Machine Tools) Puma DNT 2100MB, a DN Solutions DNM 5700 vertical machining center and a DN Solutions Lynx 2100LSY high-performance compact turning center, all supplied by Puma Machine Tools. Both the Lynx 2100LSY and the DNT 2100MB are equipped with live tooling. All three machines run off Fanuc 0i Plus controllers. Another important acquisition has been a Cosen G300 CNC band saw.

Another important acquisition has been a Cosen G300 CNC band saw. Hallspeed cut-to-size most of their material that they machine



The first component to be machined on the Puma DNT 2100MB horizontal turning center was an aluminium gear housing

3M introduces the New 3M Cubitron II Resin Bond Grinding Wheels 92 BC

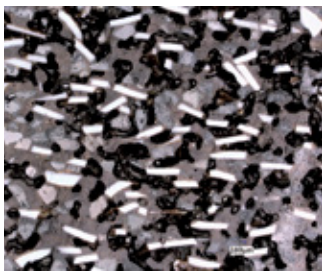
A Premium solution for Hot Mill Roll Grinding from 3M

Designed with the increasingly competitive steel market landscape, 3M introduces its new premium roll grinding solution: A wheel that cuts faster, lasts longer, runs cooler, and achieves substantial cost savings and productivity improvements. The 3M solution was built to meet the extreme challenges of narrow and tighter profile tolerances along with finer surface roughness expectations. Moreover, the total absence of defects such as feedlines or scratches require adapted grinding solutions. Compared to conventional wheels, 3M Cubitron II Resin Bond Grinding Wheels 92BC can complete up to 30% more rolls. Longer-lasting performance is combined with up to a 20% faster cut and 30% lower cycle time than standard grinding wheels.

3M considered several key market trends when designing its new Grinding Wheel such as process optimisation, process efficiency, harder materials to grind as well as the increasingly more demanding quality standards required. Increasing grinding wheels' durability and overall grinding performances is how the new 3M Cubitron II Resin Bond grinding wheels 92BC helps to achieve the industry's costs savings targets. The new grinding wheels, additionally, free up capacity while helping to reduce overall grinding times. According to Marco Lück, Product & Sales Manager at Maschinenfabrik Herkules, when asked why Herkules chose to partner with 3M: "By using 3M grinding wheels for applications specified by us, we have a reliable partner for repeatedly excellent grinding results. Our customers can therefore expect a consistent quality product and are better able to plan their production accordingly. Frequent intervention through (permanent) adjustments in the grinding process is therefore not necessary. This saves overall time, and our process reliability is significantly increased."

The most suitable grinding wheel specification will depend on the composition of the rolls. The content of chromium and other alloying elements is an important factor when selecting a grinding wheel's specification. Generally, the carbide-forming elements which generate these hard carbides in high alloyed steels, contribute strongly to how hard the specific steel grade is to grind. The harder the steel, the better the new 3M Cubitron II Resin bond grinding wheel 92BC outperforms other conventional solutions.

3M Cubitron II Resin Bond Grinding Wheels 92BC built to meet the extreme challenges of narrow and tighter profile tolerances along with finer surface roughness expectations.
Photo: 3M



3M Precision-Shaped Grains made with 3M Micro-Replication Technology enabling a more efficient grinding solution.
Photo: 3M

New Resin bond formulation with homogeneous pores forming and distribution drastically improves the overall cooling system resulting in substantial positive impact on performance.
Photo: 3M

3M Precision-Shaped Grains

Conventional grains tend to grind through the metal causing heat to build up in the workpiece and the abrasive, resulting in a slower cut with a shorter lifetime. Whereas the unique 3M Precision-Shaped Grains made with 3M Micro-Replication Technology, continuously form sharp peaks that easily slice through metal, thus cutting cooler, faster and lasting longer than conventional grains. 3M Precision-Shaped Grains can now be oriented into a specific direction, thereby, optimizing the usage of each single oriented grain. With the new 3M Cubitron II Resin bond grinding wheels 92BC, 3M observed that grains stacking into a specific zone is far reduced thus preventing mineral agglomeration and notably reach better grains anchorage into the bonding system. According to Rainer Trettenhahn, Process Engineer Roll Machining at voestalpine Stahl GmbH: "Our cooperation has been quite successful – with the new 3M Cubitron Resin Bond Grinding Wheels used, we were able to significantly increase the service life compared to the competitor, and with the same removal rate. Due to this new grinding solutions offered by 3M, there is a significant economic advantage that the Steel Division of voestalpine benefits from."

New Resin Bond Formulation

Having a more homogenously distributed pore structure helps to drastically improve the overall cooling system since the entire wheel's thickness is instantly flooded by the cooling fluid being captured by the wheel's opened structure. Even in extreme stock removal conditions, it does facilitate chips evacuation outside of the contact area preventing from generating heat which may lead to thermal damages. The grinding process runs cooler with substantial positive impact on performances such as wheel's durability extension and work parts quality improvements (free of burning marks). Finest surface roughness (Ra): down to 0.3-0.5 µm is easily achieved and maintained.

For further details contact 3M Abrasive Systems Division | Precision Grinding & Finishing E-Mail: 3m.pgf.emea@mmm.com or visit www.3m.com/3M/en_US/metalworking-us/applications/precision-grinding/industries/roll-grinding/ ■

Hallspeed is responsible for the design from scratch of Toyota Gazoo Racing South Africa's vehicles, developing the engine, the manufacturing and the vehicle testing

"The machines have been ordered for our purposes of the in-house machining of the majority of our components as well as the work we carry out for other production teams," says Rayner.

Materials and components machined consist of roughly 50% aluminium, 40% steels and the remainder being made up of special steels.

Behind the scenes

Evan Hutchison, himself a multiple South African Champion and race veteran, and Hallspeed's General Manager, reiterates that competing in the Dakar and rally sport in general is not just a driver/navigator test of endurance, but an entire team effort too. The rally itself may be even more gruelling for those that offer their support and expertise to the driving team – a team that easily consists of up to 32 in Hallspeed's case. Early mornings and late nights with very little sleep denote the experience.

"You shower when you can, likewise, you eat when you can. Some of the best times are around the fire late at night when it's freezing cold in the middle of the desert and you have a moment of respite from the daily tasks that include but are not limited to setting up the pits for the mechanics, erecting and deconstructing camp – and of course, making sure you have all this done and ready before the vehicle comes in at the end of the stage."

"Sometimes, you work through the night just to get the vehicle ready for the start of the next stage. Staying at the same location on a non-rally day is like a day off. But this is all part of the experience and the great sense of camaraderie that exists with such races. It's a team effort."

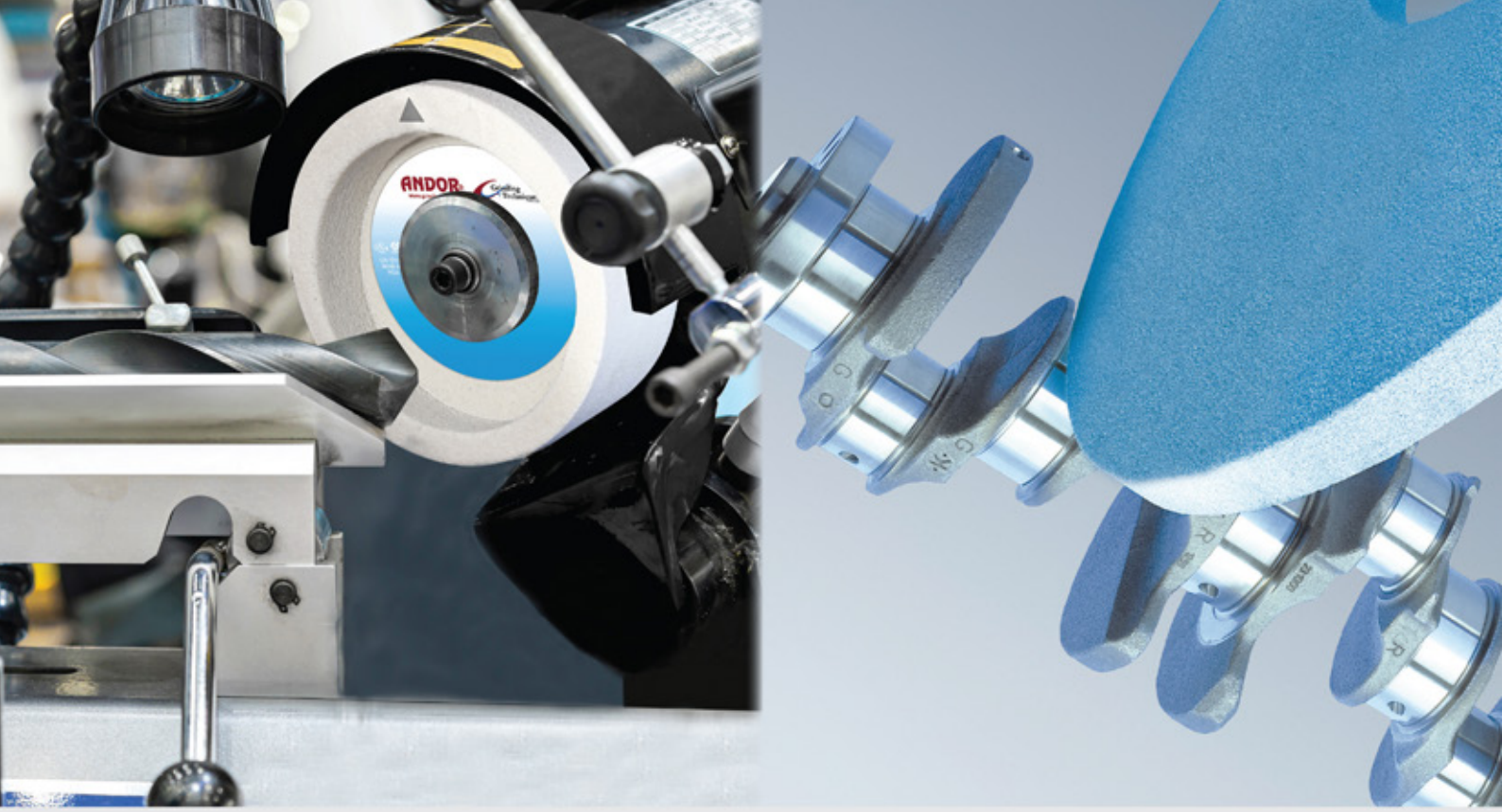
Hallspeed have plans to acquire more machines in the near future and there will also be a move to Toyota in Kelvin, Johannesburg, to better align with Hallspeed's growth strategies going forward.

At the time of publication, Hallspeed had two vehicles competing in the Abu Dhabi Dessert Challenge. Unfortunately Nasser Al-Attiyah and co-driver Mathieu Baumel had to withdraw at the end of Stage 3. "They had a comfortable lead of 18min 19sec going into Stage 3 of the 5-stage race, and managed to increase their lead marginally by the end of the day. But their performance was moot, as the pair were forced to withdraw from the race following a high-speed crash near the end of the stage, which damaged the roll cage of their mighty GR DKR Hilux T1+ beyond immediate repair." The pair of Henk Lategan and Brett Cummings came in third on Stage 3 but found themselves 32nd overall due to a boost-related issue during Stage 2.

For further details contact Hallspeed on TEL: 010 006 0356P ■

Another new machine delivered to Hallspeed is a DN Solutions DNM 5700 vertical machining center

The new Lynx 2100LSY turning center is equipped with live tooling



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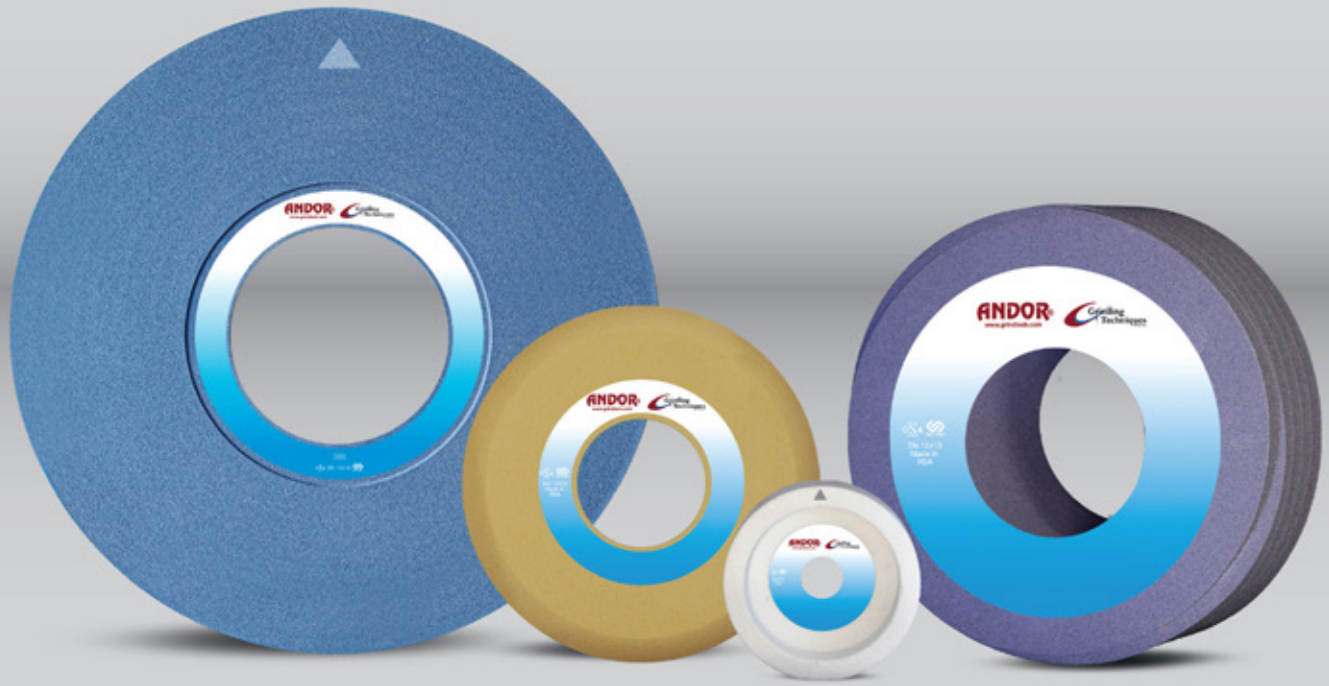

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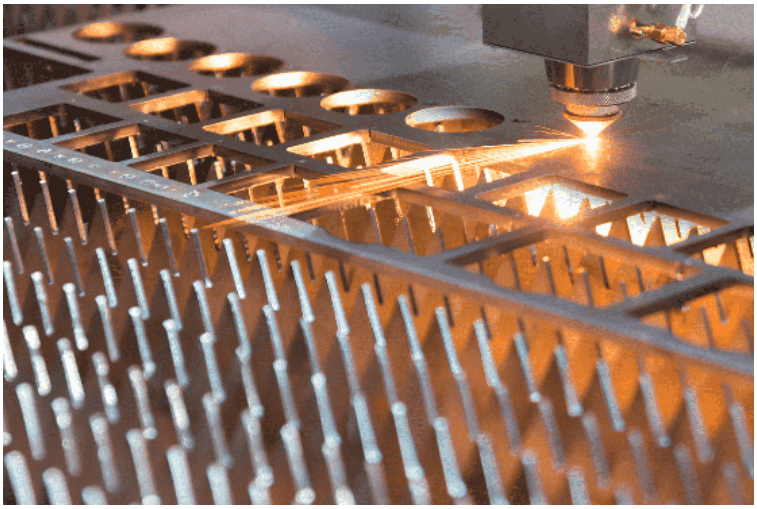
Grinding Techniques

SAHPRA gets tough on license regulations for the safe use of industrial fibre laser machines

All fibre laser machine owners have to register with the authority and obtain a license.



The benefits of fibre laser processing in manufacturing have been widely demonstrated over past decades and recently, fibre laser welding has received increased interest. Now more than ever, the concept and practice of laser safety is a moving target. More metal processing companies are embracing laser technology to produce or repair all sorts of parts, which means employers must protect laser operators and workers by ensuring they receive up-to-date training and the right protective equipment. They must also adhere to the regulatory requirement in licensing their unit(s) for use.

The South African Health Products Regulating Authority (SAHPRA) would like to inform importers of fibre laser machines that they have to register (license) their fibre laser machine models with SAHPRA and ensure that their clients also licence their units for use. This includes all machines that are already operating.

"We administer the Hazardous Substances Act, Act 15 of 1973 and Regulations relating to the importation and use of listed electronic products. This includes inter alia medical and non-medical X-ray, UV, IR and laser units, as well as electromedical devices," said Johan Uys, a senior scientist at SAHPRA and the person responsible to try to ensure that all machines in South Africa are registered and licensed.

"The reason we require users of laser machines to have it licensed is to try and ensure that products comply with standards for safety and quality."

"The focus with regards to non-medical lasers is the safe use of Class 3B and Class 4 laser systems."

"A licence (per model) is required for importation and for use (per unit)."

"You can obtain a licence application form for importation and for the use, as well as the document specifying the Requirements for the use of any (not just fibre) Class 3B or Class 4 laser system, from SAHPRA."

"There are about 700 non-medical laser models licensed with about 100 importers. We have about 3 700 licensed Class 3B and Class 4 laser units (medical and non-medical). I can't say how many are used in the metalworking field but would guess that currently about 90% of the licensed units are used in the medical field."

"The regulations apply to all Class 3B and Class 4 laser systems so a laser welder falls into this category and will have to be licensed."

"About 10 of the 20 importers of machines used in the metalworking field have responded. These importers did supply applications from their users but we don't know how many machines are being used in South Africa."

Actions to take if you are currently operating an illegal / unregistered laser

"The laser operator is not required to register with any controlling body. If a Class 3B or Class 4 lasers is used, the machines must be registered with SAHPRA (https://sahpra.org.za/"

"SAHPRA regulates both medical and non-medical lasers."

"A Laser Safety Officer (LSO) must be registered for each machine. One person can be the LSO for various machines. The LSO can either be the owner or an employee or any person that takes responsibility for the safe use of the machine."

"To be able to register the machine with SAHPRA, as mentioned above, the machine must have a valid import licence from SAHPRA. It is of utmost importance to confirm with SAHPRA that the machine you are about to buy has an import licence, since you cannot register as a user without this licence number. If you want to import your own machine, see 'requirements to import and sell' for steps to obtain this licence."

The safe use of Class 3B and Class 4 laser systems

"It is all about the safe use of Class 3B and Class 4 laser systems. Unfortunately, the Act (Hazardous Substances Act) and Regulations

require a licence application form for import and use."

"Depending on the size of the equipment any device, appliance or even a vehicle may be seized (or sealed/disposed of) if there is reasonable ground to believe that an offence or suspected offence is committed. There are fines and/or imprisonments ranging from two years to 10 years. Seizure of devices may be done in collaboration with the SAPS."

"The device may be sealed, as indicated above, with penalties according to the Act if a seal is broken. It may be released if it no longer contravenes the requirements, and any costs will be recovered from the "owner of the object" seized under specific sections of the Act."

"If the correct information is submitted we usually issue a licence within a week or even less depending on the work load. The licence stays valid for an "indefinite" period (depending on the type of product). A licence can be cancelled if it is found at a later that untrue or misleading information was supplied, or the licensee no longer complies with the licensing conditions."

"There is currently no fee for a license but it is specified in the Act that a licence fee may be required."

"Unlicensed lasers in operation can be confiscated at any point in time. It is therefore of utmost importance to register your equipment to protect your investment."

"IPL's and LED-devices are excluded from this regulation and do not require any licensing for use. These devices can be purchased and operated freely by anyone."

"The objective of these requirements is to provide reasonable and adequate guidance for the safe use of laser systems. A practical means for accomplishing this is to use the classification of laser systems (according to their relative hazards) to specify appropriate controls."

"A separate licence must be obtained for each model of device. If a distributor sells three different models from the same manufacturer, (s)he requires three separate SAHPRA licences."

The contact person for registration of laser devices at SAHPRA is Johan Uys and can be contacted at johan.uys@sahpra.org.za. ■

TRM Supplies install 40 fibre laser welders in the last 14 months

Advancements in laser welding have made hand-held laser welding viable for businesses in ways that were not possible before.

A few years ago TRM Supplies recognised the potential of the fibre laser welder and began importing the Hugong HGLW fibre laser welders, which are available in 1kW, 1.5kW and 2kW power source and have a maximum thickness weld of 8mm. The machines are a compact design and are fully assembled before shipment.

Advancements in laser welding have made hand-held laser welding viable for businesses in ways that were not possible before

We asked Thys de Villiers, Sales Manager of TRM Supplies why the company has been so successful in the metalworking market. TRM Supplies recently passed the sales mark of 40 fibre lasers.

"Besides offering an extra finishing fabricating service, once you have cut, punched or bent sheet for a client you can now offer a welding service. It is quick and easy to use, faster than the traditional welding processes and the finish is better."

"For years, manufacturers across the industry have used traditional welding techniques like MIG or TIG. But along the way, these traditional techniques have created constraints," said Thys de Villiers, Sales Manager of TRM Supplies.

"TIG welding, for example, is a time-consuming, two-handed welding method that requires an experienced, highly skilled operator. It generates extreme heat that deforms thin materials, has difficulty welding copper, and is limited when welding metals of different thicknesses," continued de Villiers.

"Meanwhile, MIG welding requires a consumable wire, material precleaning, and bevelled joints for full-penetration welds on thick materials. Travel and work angles are limited, and vertical positions can be challenging."

"With the industry constantly changing, manufacturers are looking for new ways to stay competitive. They've come to realise this requires cost reductions, efficiency gains, and repeatable part quality. There's also a new challenge: Enabling new welders to be productive in a timely manner without sacrificing quality."

"This is why more manufacturers are switching to newer welding methods, such as hand-held laser welding, which can increase welding speeds up to four times faster than MIG and TIG welding, to improve productivity and precision."

What are the benefits of laser welding?

"For years, lasers were seen more as scientific instruments than industrial tools, mainly due to the traditional use of optical elements and mirrors requiring careful alignment and handling."

"Pioneered in the 1990s by IPG Photonics, fibre lasers were introduced to the market for industrial applications. These laser sources are entirely solid state. The simplicity of the fibre laser accounts for its efficiency, compactness, robustness, and low cost, which drive its success in the industrial applications. Compared to legacy laser systems, fibre technology provides higher output powers and a quality beam at a lower cost with minimal maintenance required."

TRM Supplies staff celebrate that the company has installed 40 fibre laser welders in the last 14 months

"Laser technology improvements have made laser welding an increasingly popular technique in industries where high weld strength and repeatable weld quality are important. The quality and brilliance of fibre laser light precisely controls material heat input, which allows for welding thin materials. Lasers are

not limited just to steels; they also can weld aluminium and copper. Even bimetallic welding is a practical reality."

"Fibre technology simplifies beam delivery technology, opening up even more opportunities for process improvements. Modern beam delivery technology such as wobble welding, where the beam oscillates back and forth, allows for the stabilisation of the melt pool, enhancing the process window (the ranges of weld parameters) and minimising poor or variable part fit-up (within limits). In many cases, this eliminates the need for postprocess grinding, reducing labour costs."

"Laser welding also can be automated for high-productivity, high-yield manufacturing. Its high-precision accuracy allows for joining small parts with low heat input and minimal distortion."

"In the beginning, the price limited its potential and was a barrier to entry. In industrial applications, lasers were expensive, required periodic refurbishment, and were used only on high-value parts, typically integrated to a robot or a dedicated laser workstation."

"These early lasers consumed significantly more power than modern fibre lasers, which now offer up to 50% wall plug efficiency. This offers cost savings on the bottom line. This efficiency also may eliminate the need for chillers, making laser technology more portable than ever before. Finally, when compared to traditional manual MIG and TIG welding, laser welding is typically faster, improving production output and boosting profits."

"By consistently driving down the cost of the laser source, improving the quality of light, and offering unique beam delivery options, laser manufacturers now can offer systems with a higher value proposition, making them more accessible and no longer reserved for premium applications."

How does hand-held laser welding work?

"Economical laser sources combined with the flexibility of fibre laser delivery provide unprecedented access to hand-held laser welding."

"But how does it work? In simple terms, the laser power density melts the metal, eliminating the need to strike an arc. The wobble function eliminates the need to weave the bead manually and in many cases wire feed is eliminated completely. The high-power density results in a smaller, more controlled weld pool. With precise control of laser parameters, heat distortion effects are reduced, making the process accessible to unskilled operators and allowing organisations to upskill their seasoned employees to more value-added roles."

"Equipment reliability was at one time a concern with hand-held laser welding. The building block of the fibre laser is the single-emitter diode, which has a lifetime an order of magnitude longer than the lifetimes of diode array or bar-stack alternatives. The pumps are hermetically sealed to telecom standards and are unaffected by humidity, dust, vibration, and the most aggressive industrial environments."

"With hand-held laser welding's industrial robustness, fibre lasers can be used to complement basic factory automation, further improving efficiency in production. With the relatively recent explosion in collaborative robot technology (cobots), basic levels of factory automation are within reach of many production floors. Cobots are inherently synergistic with hand-held laser welding technology because they are cost effective and simple to use and deploy. The robot's flexibility combined with the capabilities of hand-held laser welding technology make it suitable for lower-volume, high-product-mix environments. If it can be welded by hand, it likely can be welded with a cobot. This can further improve laser welding productivity by allowing you to preload a part fixture while the cobot performs a weld on a separate fixture."

Do I need to be a laser expert to run a hand-held laser?

"Not at all. Hand-held laser welding systems are typically provided with presets for common material types and thicknesses. Simple controls allow you to select the correct preset by choosing the material type and thickness from a table and setting the controls to the identified settings. In the case of a cobot integration, the cobot can be configured to select the correct settings automatically for the project at hand."

What else can I do with my hand-held laser?

"Depending on the system, hand-held laser welding is available in configurations enabling up to 6mm, full-penetration welds. Furthermore, some system configurations can also be used for part cleaning. This can be beneficial in part preparation to remove any residual oils or debris from the workpiece. A hand-held laser's cleaning capability also can be used to prevent corrosion and passivate the material after welding."

"If you're looking to reduce your costs, improve weld quality, and simplify the weld process, hand-held laser welding will give you the best path to both success and improved profitability, all while allowing someone with no professional welding experience to weld like a pro."

For further details contact TRM Supplies on TEL 011 974 7744 or visit www.trmsupplies.co.za ■

The X'trapolis Mega Train being produced at Gibela for PRASA, is made from 30% lighter steel than trains made of carbon steel. The stainless steel translates to less energy consumption, which results in lower greenhouse gas emissions. In addition, 99% of the train components are recoverable and 96% of them are recyclable, thus decreasing the likelihood of end-of-life impact

Alstom has supported over 9 000 jobs in South Africa, according to EY report

Alstom, a global leader in sustainable and green mobility solutions, has released a report in collaboration with Ernst & Young (EY) capturing the company's socio-economic contributions from April 2021 to March 2022. It highlights the support of over 9 000 jobs and R3.9 billion injected into South Africa as Alstom continues to grow its local presence.

"We have been in South Africa for at least 10 years now and our commitment to South Africa goes beyond the manufacturing of trains or railway components. We are a reliable local growth partner and are actively participating in the development of an inclusive and sustainable rail industry through localisation, job creation and skills development. This report creates a baseline understanding of the impact of our work to-date and acts as a tool to measure our progress moving forward," said Bernard Peille, Managing Director, Alstom Southern Africa.

Alstom's strategy in South Africa is illustrated by significant investments in the country, which include Alstom Ubunye, Gibela Rail Consortium and most recently with Bombela Maintenance and Alstom Rolling Stock South Africa.

Local economic development

According to the report, Alstom South Africa purchased R3.6 billion of goods and services over the reporting period, 79% of which are from South African suppliers. The company's dedication to local economic development has resulted in increased partnerships and support for local business enterprises. Alstom collaborates with over 500 suppliers in South Africa, who provide components for Alstom trains and services to projects across the country.

Considering South Africa's high unemployment rate, empowering historically disadvantaged individuals, specifically Black women and the youth of today are a key driver. 99% of Alstom's new employees have been local hires in South Africa, of which 90% are Black Africans and 45% fall into the youth category. The company is committed to gender diversity and inclusion. Women compete equally for all roles, and as a result 35% of the workforce is now female and this number will grow in the coming years through deliberate efforts.

Alstom is committed to developing greener, smarter, and safer mobility for its customers but more importantly to build local capability. In terms of skills and rail expertise development, Alstom invested in multiple skills transfer programmes and sent South African employees to various Alstom sites around the world including France, United Kingdom, Sweden, Australia and India among others. Alstom's South African employees regularly undergo technical and behavioural skills training to ensure they operate at the same level as any Alstom employee at any site globally.

In addition, Alstom also supports educational initiatives in South Africa focusing on Science, Technology, Engineering and Maths (STEM) subjects in high school and up to university level. Through its joint ventures, partnerships with universities are in place to advance railway-specific skills development, expand scientific and research capacity, and attract and retain excellent researchers, students and scientists.

"When we started our journey 10 years ago, the rail industry in South Africa was dormant and significant effort was put into building Gibela's supply chain which now consists of over 90 South African suppliers and 65% of the train's content is supplied locally. Gibela also has over 1 000 talented employees and has delivered over 100 locally made trains to the Passenger Rail Agency of South Africa (PRASA)," said

Andrew DeLeone, President of Alstom in Africa, Middle East, and Central Asia.

Energy-efficient transport solutions

Rail transportation is one of the most energy-efficient transport modes and will remain the backbone of mobility in a sustainable world. The average passenger cars in South Africa emit 148 gCO2e/km which is 18.9 times more than riding a train.

The X'trapolis Mega Train being produced at Gibela for PRASA, is made from 30% lighter steel than trains made of carbon steel. The stainless steel translates to less energy consumption, which results in lower greenhouse gas emissions. In addition, 99% of the train components are recoverable and 96% of them are recyclable, thus decreasing the likelihood of end-of-life impact.

"Alstom's commitment to eco-design is centred on minimising the environmental footprint of its solutions throughout the lifecycle. This approach is already applied to more than 50% of Alstom products globally with a target of having 100% of all new products by 2025," says Peille.

Alstom's actions also extend to freight; they are contracted to supply electric Traxx locomotives to Transnet. Locomotives contribute to reducing heavy vehicle traffic on South Africa's roads.

"In 2022, we expanded our manufacturing capabilities and can now produce locomotive car body shells in South Africa. Growing these unique locomotive skills locally is in line with our long-term growth strategy to introduce much needed state-of-the-art freight solutions to the rest of the Southern Africa market.

Reduced heavy vehicle/truck traffic on our roads also leads to less carbon emissions and improved safety," added Peille. ■

ArcelorMittal South Africa says profit fell 62% on weak steel prices, demand

ArcelorMittal South Africa's full-year profit declined by 62% due to weaker steel prices and demand at a time when costs were driven up by significant price increases of key inputs such as coal, the company said at the release of its latest financial results.

The unit of Luxembourg-based ArcelorMittal, the world's No.2 steelmaker, said its headline earnings per share (HEPS) - the main profit measure in South Africa - fell to R2.34 per share in the year to December 2022, from R6.15 the previous year.

"Globally, steel prices declined at a faster rate than raw materials as particularly evident in the second half of the year," ArcelorMittal South Africa said.

On the other hand, it added, international prices of coking coal, a key ingredient in steelmaking, had gone up by 62% year-on-year in dollar terms.

Steel consumption declined by 12% to 4 million tons last year in South Africa, reflecting low market activity in key steel-consuming sectors, high market inventory levels the required destocking, project delays due to rising interest rates and overall weaker business confidence, the company said.

Therefore, the company added, it was adjusting production by idling plants, consolidating production at the most productive facilities and reducing fixed costs.

One blast furnace at Vanderbijlpark was idled in November 2022 and only restarted in early February 2023 once it was commercially supported by the order book. In the long steel business, following the restart of the Newcastle blast furnace, the Vereeniging electric arc furnace was idled in October 2022 as the combined production of Newcastle and Vereeniging is way more than current demand. Further strategic asset footprint optimisation will take place in 2023 within the long steel business as certain operations in Pretoria and Vereeniging are idled and consolidated, with products from these mills moved to rolling operations in Newcastle to improve mill capacity utilisation and productivity.

Vanderbijlpark 200MW renewables project

AMSA expects initial construction work on a 200MW renewable-energy plant in Vanderbijlpark, to begin during the fourth quarter of 2023, with a feasibility study into the solution nearing completion.

The solar photovoltaic project is expected to cost the company R4 billion to construct and the facility will be built and operated by a special purpose vehicle (SPV) owned by AMSA and the ArcelorMittal Group, which has agreed to support the funding of the project.

Besides investing in its own electricity supply, AMSA is also studying the viability of pursuing a third-party rail solution, given that its operations are continuing to be negatively affected by the collapsing performance of Transnet Freight Rail (TFR). ■

PFERD's Dennis Phillips gives his top five trends for the metalworking industry in 2023

"As metal–working industries develop, so do associated industries and products. One such industry is abrasive manufacturers, and it is expected that numerous new initiatives and developments will be seen throughout 2023. These are my five predictions for the year ahead," commented Phillips who is the National Sales Manager at PFERD-South Africa.

South Africa's ongoing electricity crisis will require manufacturing businesses to prioritise the development and training of their workforce as well as the effective allocation and use of available resources, to further improve their overall operational efficiency and productivity

More efficient utilisation of resources in the face of load shedding

"South Africa's ongoing electricity crisis will require manufacturing businesses to prioritise the development and training of their workforce as well as the effective allocation and use of available resources, to further improve their overall operational efficiency and productivity."

"All indications are that load shedding has already had a negative impact on manufacturers. According to Financial Mail, the local motor manufacturing industry is "bleeding money and jobs because of load shedding"."

"A National Association of Automotive Component and Allied Manufacturers (Naacam) study into the effects of load shedding found that the biggest impact is to small and medium component suppliers and if the current high levels of load shedding continue, losses to volumes of assembled vehicles will become commonplace. The study found that 30% of Naacam members had to suspend production at various times between October and December 2022 putting exports and new business opportunities at risk."

Continuous research and development

"Research and development will be particularly important for abrasive manufacturers in 2023 as it will enable the improvement of existing products and create new tool solutions with enhanced capabilities. The advancement of technology enables abrasive manufacturers to develop modern and ergonomic abrasives that offer improved performance and longevity."

"Innovative abrasives can help manufacturers streamline their manufacturing process by reducing the number of processing steps and consumables required for a specific application. By reducing processing steps, not only do manufacturers improve productivity, but occupational health is also improved within the production environment. This is done by reducing an operator's exposure to noise, dust and vibration."

Leveraging experience and expertise

"Industry-specific application, equipment, and material knowledge are highly important considerations when manufacturers select a suitable abrasive supplier, especially when they are faced with new challenges or projects."

"Sales representatives play a vital role in addressing unique challenges faced by customers. Their expertise and industry specific knowledge can help manufacturers identify and resolve application problems faster by offering tool solutions that meet the customer's unique requirements."

Innovative abrasives can help manufacturers streamline their manufacturing process by reducing the number of processing steps and consumables required for a specific application

Increased uptake in 4IR technology

"The use of robotics and automation in the industrial manufacturing industry will continue to gain traction as a means of improving efficiency, productivity and output. In South Africa, the implementation of this technology is particularly relevant due to the disruption caused by the

ongoing electricity crisis to the regular operations of companies. These novel abrasive applications offer several benefits, including:

"Increased efficiency: The integration of automation in the manufacturing process allows machines to handle basic, routine tasks quickly and efficiently, freeing up human resources to focus on higher-value activities that require human expertise, ultimately leading to increased productivity and improved operational efficiency."

"Increased precision: The implementation of programmable automation in manufacturing can improve precision as it enables machines to execute tasks with a high degree of accuracy, making it ideal for producing componentry that have tight tolerances."

"Improved safety: The integration of automation and robotics promotes a safer working environment by reducing the risk of injuries. By allowing machines to perform dangerous tasks or work in hazardous environments, it minimises the exposure of human workers to these risks, thus improving safety in the workplace."

High-performance abrasives are a cost-effective solution for South African manufacturers looking to improve their operational efficiency and reduce costs

"As the technology becomes more widely available and cost-effective, manufacturers will be looking to adopt these applications in order to gain a competitive edge."

Reducing costs by using high-performance abrasives

"High-performance abrasives are a cost-effective solution for South African manufacturers looking to improve their operational efficiency and reduce costs. The durable nature of these abrasives allows manufacturers to complete tasks with greater speed and accuracy with the added benefit of reducing costs."

"With South African manufacturers facing the challenge of loadshedding and subsequent loss of production hours, a range of high-performance abrasives can assist them to be as productive as possible and ensure efficient usage of available resources such as electricity."

For further details contact PFERD South Africa on TEL: 011 230 4000 or visit www.pferd.com ■

Matthew And Son Engineering links into transport industry

Six new DN Solutions CNC machines have been purchased.

Matthew And Son Engineering's recent impressive growth can mostly be attributed to its success in the rail transport industry. "We have had clients in this sector for a number of years and they have been very good to us. However, we are also machining components for some large corporates that are involved in the mining, automotive, water and paper industries and we have some very decent contracts with these clients. The number of components that we machine has now more than trebled as compared to five years ago. However, the new projects that we are getting involved in are what really interest us," said Matt Mayhew (Matthew Mayhew Jnr.).

Opportunities are never guaranteed. However, specific strategies and technology investments can help you to capitalise on them when they do present themselves. Matthew And Son have recently invested in a DN Solutions Puma 2100 LSY and a barfeeder

"The resultant increase in component machining forced us to take a serious look at our capabilities, capacity, services and operational systems and equipment."

"At the time we purchased a DN Solutions (Doosan) Puma 5100 XLMB CNC turning center that can accommodate components up to 3 000mm in length and 650mm turning diameter. The machine also has a milling function and a bigger motor than what is normally supplied with this machine. Besides other components we are machining components that make up the new contract from solid bar. When the bar arrives on the floor, they weigh 205 kilograms and once we have finished machining, the component has been reduced to 47 kilograms."

The company subsequently purchased another four new DN Solutions CNC machines, which included a new Doosan DNM 750 II machining centre, a Lynx 2100 LSY II horizontal turning machine with a sub-spindle and Y axis, which joined an existing Lynx 2100 SY that the company had just acquired.

What is remarkable is that these purchases were made during Covid as was the development and manufacture of a range of soft jaws for use on lathe chucks and a range of hand tap wrenches. The South African designed and manufactured products are marketed by sister company King Bull Industrial Supplies and Sales, an importer and distributor of threading tools (taps and forming taps) manufactured by German specialist manufacturer Schumacher Precision Tools GmbH.

"The South African manufactured range of soft jaws for use on lathe chucks come in sizes from 5″ to 24″. As far as we know we are the only manufacturer of these jaws in South Africa and what makes us stick out from the importers is that we carry a full range of sizes and don't just have the popular sizes on the shelf. We will also manufacture any specials that are required. All we need is the drawing."

Replacing existing CNC equipment

"Opportunities are never guaranteed. However, specific strategies and technology investments can help you to capitalise on them when they do present themselves."

"Breathing new life into tired metalcutting equipment already on the shop floor is one way of doing it. Savvy shops endeavour to upgrade their processes during an economic ebb so they're primed and ready for the flow. Restoring machine tools to OEM performance levels in the 'off season' is a good example of prepping for prosperity. For the right piece of equipment, it offers new-machine performance at a fraction of new-machine cost."

"But there comes a time when your existing equipment, even though they are CNCs and they have been faithful to the business, cannot keep up with the demand and capacity. The discerning desired performance and accuracy levels are just not there for the new wave of high-tech components that you are throwing at them."

"Decision made. We began the exercise a year ago and in the last 12 months we have installed a further three DN Solutions machines and there are a further three that will be installed later this year."

"The machines have been chosen for their versatility and their ability to perform more than one machining process. In other words, they complete our required operations on one machine by combining the functionality of two or more traditional standalone machine tools to form one multitasking machine. In their most common form, multitasking machines combine one or two lathes with a machining center. They offer you 5-axis cutting conditions."

"Of course we also took into account the capacity, size and lengths offered and they give us a bigger machining footprint whereas our existing range of machines were from a few generations back. All of them are in very good condition and when we put the word out that we were selling them we had to fight with the new owners just to allow us to build up stock before they removed them."

"The three latest machines are a Puma 4100, a Puma 2100 SY and a Puma 2100 LSY which gives us extra length. Arriving soon are a Puma 3100 XLY, a Puma 2600 LM and a Lynx 2100 LMA. All of them supplied by Puma Machine Tools."

"We have standardised on the DN Solutions brand as we did before with the Hyundai brand before it became Hyundai Wia. Choosing a single brand of machine tools enables our

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Another new investment is the DN Solutions Puma 4100

There comes a time when you have to replace your existing equipment. A new DN Solutions Puma 2100 SY2 has recently been installed

operators to be self-sufficient. They can quickly learn to set up and programme virtually any machine in the shop. Another benefit of this strategy is that the shop can quickly get new machinists up to speed not only running machines but also setting them up and programming them."

The company celebrated its 40th anniversary as a company after being established by Matthew Mayhew Snr in 1981. Mayhew is one of five brothers, all of them involved in engineering manufacturing or distribution of engineering products. Mayhew's son, who also goes by the name of Matthew, joined the company in 2009 and is now managing the company.

The family-run company that is in its fifth decade in business has seen change in more ways over the last 24 months other than just on the operational side. Matthew Mayhew Jnr's vision of taking the company to new levels of efficiency and the resulting quality improvements, has seen the company grow substantially with investment in new equipment and alterations to its factory space so as to improve the flow of material handling and product despatch. As a result, the whole factory needed some attention, from the floors to the workflow.

For further details contact Matthew And Son on TEL: 011 609 5603 or visit www.matthewandson.net ■

Approval given for Trident Steel's buyout of Aveng subsidiary

The Competition Commission has approved the proposed transaction whereby Trident Steel subsidiary Trident Steel Africa (TSA) intends to acquire Aveng subsidiary Aveng Trident Steel (ATS), with conditions.

The commission says it is of the view that the proposed transaction is unlikely to substantially lessen or prevent competition in the steel processing market within South Africa. However, to promote the greater spread of ownership, the merging parties have agreed to implement a transformation initiative within 12 months of the implementation date.

TSA is involved in the provision of professional transaction and corporate advisory and related services; the manufacture and supply of recreational watercraft; the supply of building products and materials to professional contractors within the agricultural and residential building markets; the manufacture and distribution of on-and off-road utility terrain vehicles and power sport vehicles; the provision of property development and management services as well as the provision of services to designers and homeowners in the custom and luxury home interior market.

ATS is a wholly owned subsidiary of Aveng, a steel service centre business that provides steel processing and related services, including platework such as laser, plasma and oxy gas cutting, structural steelwork, coil processing, tube laser cutting, and other services.

Through these operations, ATS produces automotive blanks, special steel, structural and plate steel, as well as pipe and tube steel products. The majority of ATS' services are provided to the automotive sector, primarily to original-equipment manufacturers.

Outside of the automotive sector, ATS provides steel processing services to produce steel products to the specifications of customers in the rail, mining, energy and engineering sectors. ■

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Neasa says the steel industry is dying a slow death: Some might differ

In a recent communication to members and industry Gerhard Papenfus, Chief Executive of NEASA (The National Employers Association of South Africa) said the steel industry is dying a slow death.

"The contribution of South African manufacturing to our GDP has declined, from its peak around 23% in the early 1980s, to its current level of approximately 12%."

"Although all of South Africa's manufacturing sub-sectors are subjected to the same adverse influences (weak domestic demand, electricity shortages and high prices, and a hostile political climate), the steel (metals) sub-sector, which comprises 20% of the manufacturing sector, has performed worst of all the sub-sectors."

"There are more than one reason for the decline, among others Government's perilous collective bargaining framework. Tim Cohen's article, 'The siren song of downstream beneficiation', absolutely hits this nail on the head. It is a must read."

The siren song of downstream beneficiation: Tim Cohen – Daily Maverick

"If you are an avid reader of the speeches of African presidents, as I am because I often struggle to sleep, you might notice a word that comes up with extraordinary regularity: beneficiation."

"Beneficiation, at least downstream beneficiation, seems like such an obvious target for governments to set their sights. Currently, the Mining Indaba is happening in Cape Town, and I'm willing to bet, the word "beneficiation" hangs in the hallways like a bright star. Every mining minister of every African country seems likely to be captured by the siren song of downstream beneficiation. President Cyril Ramaphosa, just for one, mentioned it in both his 2022 and 2021 speeches to the Indaba."

"And in a way, it's easy to see why beneficiation has such a strong lure. If you are a big seller of raw materials, as many African countries are, and you are keen to develop your country, it's just a hop, skip, and jump to the idea that you should turn those raw materials into a competitive advantage. I mean, for god's sake, it's like you are halfway there already. And it's perplexing to you that mining companies don't share your jones for this obvious advantage."

"And, to be honest, I too have been tantalised by the idea, particularly since many minerals in SA are, to a lesser or greater extent, beneficiated, most notably PGMs. Yet, the partial success of the beneficiation effort is its own worst enemy because it encourages governments to push harder."

"So why does the idea work so badly? To answer this, I think the history of the Australian iron-ore industry is one of many great examples."

"Iron ore is by far Australia's biggest single export, and it constitutes about a third of global production, and about half the sea-borne trade. Australia produces around 900-million metric tons of iron ore a year. SA, by the way, produces around 60-million tons, just inside the world's top ten, and it's been that way for almost a decade."

"So, you might think, here is a country that is the world's biggest producer, it's a sophisticated, first-world country with great universities and a very active business sector, why don't they take the next step and produce steel? Australia does have some steel works, but produces only 0.3% of global production, despite being a huge seller of metallurgical coal, a crucial component of steel production. And this number declined from a peak of 1.2% in 1994. The disparity between the country's iron ore production and its steel production is just extraordinary."

"The simple answer is that Australia did try, extremely hard, to establish a steel industry, to the extent that the export of iron ore was actually banned for decades. We are going back a bit here, but after the First World War, the Australian government passed the Iron and Steel Products Bounty Act of 1922 to protect the steel industry with import tariffs."

"The country's biggest miner, BHP became a monopoly producer in the steel industry and, basically to deprive Japan of steel during the second world war, iron ore exports were restricted between 1938 and 1960."

"BHP expanded its steel production after the war and behind the tariff wall, the company's steel business prospered, right through into the 1970s. But in the 1980s, BHP's industry started making losses. To shore up the industry, the government imposed numeric quotas that guaranteed 80% to 90% of local production to local producers. Wowzer. How could the company not succeed in these circumstances?"

"And even with these in place, even with lots of local

ore, even once the Iron Ore Beneficiation Agreement Act was passed in Western Australia, the industry still struggled. Eventually, in 2011, the Aussie governments, both national and regional, just walked away from it all, and the act was scrapped."

"So that was a pretty long road. How did it turn out after that? Well, and this is weird, things got a lot better. In 2011, Australia was selling about 400 million tons of iron ore, and that doubled over the next five years, massively outperforming - and out-earning - the now-defunct steel industry."

"If you think about it, all of this makes perfect economic sense. Producing a metal locally isn't necessarily a big advantage (outside of transport costs) for local buyers because there is no reason for the local miner to charge local customers less than international customers - even when that customer is part of the same company! To change this equation, the government had to intervene, but intervention to create an industry is almost certain to be a reason for its rise - and fall. I'm willing to bet that if the Australian government had done nothing to encourage the formation of a local steel industry, it would today have a thriving steel industry - and a thriving iron ore industry."

"Like water rising to the point of its overflow, industries gravitate towards business in context. When governments change that context, they unwittingly build in a lack of international competitiveness into the equation. It's obvious. So should governments just do nothing? There is that argument, but I do think there is a lot the government should do: focus on productivity issues, maintain competition, create positive business conditions, seed projects carefully, be conscious of the actual skills base available, and the actual competitive advantages. And of course, maintain stable, facilitative tax regimes. Often concentrating on downstream issues will help more than supporting upstream initiatives, because you are focusing on what already works."

"Interestingly, during this year's speech, Ramaphosa didn't mention beneficiation. Maybe there is just too much else going on. Is the penny dropping? I'm not sure; to be honest, I don't think so." ■

China Baowu Steel Group Corporation Limited acquires Sinosteel Group Corporation Limited

During the early part of 2016 and latter part of 2017, Samancor Chrome successfully acquired the ferrochrome smelting assets and chrome mining assets from the business rescue practitioner of International Ferrometals, and likewise the smelting assets from the business rescue practitioners of ASA Metals through a series of transactions, the latter together with Sinosteel

The Competition Commission has recently approved the proposed transaction whereby China Baowu intends to acquire Sinosteel, without conditions.

The primary acquiring firm China Baowu is a company incorporated in accordance with the laws of the People's Republic of China (PRC). China Baowu is wholly owned by the State-owned Assets Supervision and Administration Commission of the State Council of the PRC (Central SASAC), an agency of the Central Chinese Government. China Baowu controls several firms worldwide.

In South Africa, China Baowu controls the following firms: Aquila Steel (S Africa) (Pty) Ltd; Aquila Steel Thabazimbi (S Africa) (Pty) Ltd; Baosteel Mining South Africa (Pty) Ltd; and Baosteel Resources South Africa (Pty) Ltd (Baosteel Resources). China Baowu and all its subsidiaries shall collectively be referred to as the "Acquiring Group".

Globally China Baowu focuses on the development of projects in the iron and steel industry along with projects in the new materials industry, smart service industry, industrial services industry, urban service industry and industrial finance industry. Relevant to the proposed transaction are China Baowu's activities in South Africa relating to the supply of ferrochrome, chrome ore, and mill rolls markets.

Sinosteel is a company incorporated in accordance with the laws of the PRC. Sinosteel is also wholly owned by the Central SASAC. Sinosteel has several subsidiaries worldwide.

In South Africa, Sinosteel controls Sinosteel International South Africa (Pty) Ltd, Sinosteel South Africa (Pty) Ltd (Sinosteel South Africa), Deen Holdings Corporation Limited and Samancor Chrome Holdings (Pty) Ltd.

Worldwide Sinosteel is mainly engaged in the development and processing of metallurgical mineral resources, trading and logistics of metallurgical raw materials and products, and related engineering technical service and equipment manufacture. In South Africa Sinosteel is active in the mining and trading of chrome ore. Additionally, Sinosteel, through Sinosteel South Africa, is active in the trade of chrome ore and ferrochrome from South Africa to China. The Target Group also supplies mill rolls into South Africa.

The Commission found that the proposed transaction is unlikely to result in a substantial prevention or lessening of competition in any relevant markets. The Commission further found that the proposed transaction does not raise substantial public interest concerns. ■

Chart Industries Inc acquires private company that owns Howden Group South Africa

The Competition Commission has also approved the proposed transaction whereby Chart Industries intends to acquire Granite Holdings II B.V., without conditions.

The primary acquiring firm is Chart Industries, a public company incorporated in accordance with the company laws of the State of Delaware, USA. Chart Industries is listed on the New York Stock Exchange and is not controlled by any single firm or shareholder. Chart Industries has several subsidiaries in countries such as Canada, India, Mexico, Italy, France, and Germany. Chart Industries does not directly or indirectly control any firm in South Africa.

Chart Industries is a global manufacturer of cryogenic ▸

storage and liquefaction equipment servicing multiple market applications in the industrial gas and energy industries. Chart Industries provides technology, equipment and services related to liquefied natural gas (LNG), hydrogen, biogas, carbon dioxide (CO2) capture, and water treatment, among other applications within the energy sector.

Relevant to the proposed transaction, Chart Industries provides heat transfer systems that facilitate major natural gas, petrochemical processing, petroleum refining, power generation, and industrial gas companies in the production or processing of their product.

In South Africa, Chart Industries is a supplier of liquid gas distribution and storage products, namely cryogenic storage, cryogenic transport trailers, packaged gas, LNG ISOs and trailers, and LNG stations. Regarding the industrial fans, the largest customers of Chart Industries are Baltimore Aircoil Company SA (Pty) Ltd and Evapco South Africa.

The primary target firm is Granite Holdings II B.V. (trading as Howden), a private company incorporated under the laws of the Kingdom of the Netherlands. Howden is ultimately controlled by KPS Capital Partners L.P. (KPS), a limited partnership established in accordance with the laws of the USA. Howden has subsidiaries in countries including Brazil, Canada, Germany, Mexico, and the Netherlands.

In South Africa, Howden controls (directly and indirectly) the Howden Group South Africa Limited, Howden Africa Holdings Limited, Howden Africa (Pty) Ltd (Howden Africa), Howden SA Holdings (Pty) Ltd, Howden Donkin (Pty) Ltd, and James Howden Holdings (Pty) Ltd.

To address the issue of a greater spread of ownership, Howden Africa will allocate additional shares to the employee share ownership plan (ESOP) share allocation.

The Commission is of the view that the proposed transaction is unlikely to substantially lessen or prevent competition in any market in South Africa. The Commission further found that the proposed transaction does not raise substantial public interest concerns. ■

US Treasury secretary visits the upgraded Ford Motor Company's Silverton assembly plant in Pretoria

US Treasury secretary Janet Yellen recently visited the upgraded Ford Motor Company's Silverton assembly plant in Pretoria. The plant is one of two in the country. Earlier that day, she met the Finance Minister Enoch Godongwana.

Yellen's stop in Pretoria was part of her three-country tour of Africa that began in Senegal. South Africa is the United States' largest trading partner on the continent.

"We know that a thriving Africa is in the interest of the United States. A thriving Africa means a larger market for our goods and services. It means more investment opportunities for our businesses, like this Ford plant, which can create jobs in Africa and customers for American businesses."

Ford Motor Company of Southern Africa is a wholly-owned subsidiary of US multinational Ford Motor Company. In 2021, Ford Motor Company invested R15.8 billion in the Silverton plant and supplier tooling to produce the next-generation Ford Ranger. The plant currently employees about 4 500 people.

"The US is South Africa's third-largest trading partner and a major destination for South African investment. In turn, South Africa is our largest trading partner in Africa. In the coming years, we intend to build on that strong foundation to promote even deeper economic integration here, as well as with other African countries," said Yellen.

She said the US saw considerable potential in the continent, including in its burgeoning population and increasing connectivity.

Ford Motor Company Africa president Neale Hill said that, with the company celebrating its centenary this year, it was looking forward to growing further in the next 100 years, with the aim of developing and contributing positively to the South African economy and new business in the country, as well as continuing to serve as an example of a good brand for the continent and for the export of its products.

About 600 US companies operate in South Africa, employing about 220 000 people and generating revenue equivalent to about 10% of South Africa's entire gross domestic product, US Ambassador to South Africa Reuben Brigety said at the event.

Ford, a major US investor in South Africa, is investing $1 billion to expand output at the plant by 20%, adding 1 200 new jobs, and aims to develop a freight rail link with a seaport 1 120kms away.

US Secretary of Treasury Janet Yellen has described the Ford Motor Company's Silverton assembly plant, in Pretoria, as a strong example of how deepening economic integration between the US and South Africa, and the continent more broadly, can produce good jobs and boost economic growth for both regions. ■

West Rand Engineering (WRE) and Malleable Castings swallowed up in acquisition by the Baobab Industrial Group

The Competition Commission has approved another proposed transaction whereby Holdco intends to acquire DLM and WRE, without conditions.

The acquiring firm HoldCo (Baobab Industrial Group), a newly incorporated private company, does not conduct any business operations and is not directly or indirectly controlled by any other firm.

The first target firm is DLM. DLM wholly controls the following firms: Metermatic (Pty) Ltd (Metermatic), Dupleix Liquid Meters Madagascar SARLU, and MDF Engineering (Pty) Ltd (MDF Engineering).

Through three divisions (valves, flow, and instrumentation), DLM provides solutions for over-pressure protection, flow, level and density measurement, automation, and control requirements. These products and solutions are consumables in the greater materials manufacturing sector including mining, petrochemical, and other industries.

The second target firm is WRE. The shares in WRE are wholly owned by Pillans Investments (Pty) Ltd (Pillans). Apart from WRE, Pillans does not hold interests in other firms. WRE is a diversified manufacturer with three main divisions namely West Rand Engineering, Malleable Castings, and Africa Thermal Insulations. WRE also supplies finished products to Klambon Water, its wholly owned subsidiary in the Commonwealth of Australia.

The Commission is of the view that the proposed transaction is unlikely to substantially prevent or lessen competition in any relevant market. In addition, the proposed transaction does not raise any other public interest concerns. ■

RAPDASA Conference will again be joined by the Robotics and Mechatronics, PRASA and Advanced Materials Initiative conferences

Joint conferences to be held at CSIR in Pretoria.

The Rapid Product Development Association of South Africa (RAPDASA) has announced that it will be joined for its 24th Annual International Conference by the 16th Robotics and Mechatronics (RobMech), the 34th Pattern Recognition Association of South Africa (PRASA) and the 4th South African Advanced Materials Initiative (CoSAAMI) conferences for its annual conference that will be held later this year.

"Following the success of the 2022 RAPDASA-RobMech-PRASA-CoSAAMI Conference hosted by Stellenbosch University in November 2022, we are pleased to announce the first call for papers for the 2023 RAPDASA-RobMech-PRASA-CoSAAMI Conference to be held on 30 October to 2 November 2023 at the CSIR International Convention Centre in Pretoria, South Africa."

"This conference will bring together experts from industry, R&D institutions, academia and students in additive manufacturing, materials engineering, rapid product development, pattern recognition, robotics and mechatronics to present research, network and expand the fraternity that has been built by the previous conferences."

"The theme of the 2023 conference is Advanced Manufacturing Beyond Borders, which is a call to everyone involved with advanced manufacturing in its various forms. Our collective aim is to accelerate Africa's manufacturing industry for inclusive economic growth, increase the competitiveness of its economies and improve the livelihoods of its people."

Amongst others conference papers on the following topics are welcomed: Additive Manufacturing; Rapid Prototyping; Advanced Manufacturing; Computer-aided Design; Product Engineering; Reverse Engineering; Design, Simulation and Modelling; Robotics; Process Modelling; Structural Analysis; Materials Selection for Design; Materials Engineering; Materials Processing; Tooling Design and Development and Classifiers and related topics.

Companies, individuals or organisations that wish to attend the conference may contact Rynette Coetzer at info@rapdasa.org. ■

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Naamsa's review of automotive business conditions: New motor vehicle manufacturing industry for 4th quarter 2022

The National Association of Automobile Manufacturers of South Africa (Naamsa) recently released its new vehicle sales report.

Key features for the fourth quarter of 2022 are:

New vehicle sales increased by 16% compared to the corresponding quarter 2021 but only by 0.1% compared to the previous quarter 2022 highlighting the above expectations performance in 2022 but at the same time the impact of supply chain disruptions and economic pressures on the new vehicle market.

New energy vehicle sales by 15 industry brands increased by 66% from 953 units in the third quarter to 1 583 units in the fourth quarter 2022 and year-on-year by a significant 431.7% in 2022.

Fourth quarter 2022 industry employment reflected a decline of 823 jobs to reach 33 477 positions at end December 2022 but still reflected an overall positive performance for the full year.

Average industry capacity utilisation levels during the fourth quarter 2022 continued to recover from the severe impact of the KwaZulu-Natal flooding disaster earlier in the year despite a Transnet strike and consequent force majeure declared along with persistent loadshedding during the quarter.

Aggregate capital expenditure by the major vehicle manufacturers in 2022 amounted to R7.1 billion, linked to new generation model investments.

Fourth quarter 2022 domestic vehicle production reflected an increase of 25.7% compared to the corresponding quarter 2021, with all segments reflecting growth in line with higher domestic demand and export growth.

During the fourth quarter 2022 vehicle exports increased by 31.1% to 88 394 units compared to the 67 410 units exported in the corresponding quarter 2021, despite a deteriorating global economic environment.

The Naamsa CEOs Confidence Index, as an in-house leading business confidence indicator of current and future developments in the domestic automotive industry, reflects the sentiment expressed by the Naamsa CEOs for the fourth quarter 2022 compared to the fourth quarter 2021 as well as automotive business conditions and the country's economy in general for the next 6 months.

Despite the drop in exports, however, domestic sales were up. The industry reported total sales of 45 352 vehicles, comprising dealer sales, rental industry sales, and sales to government and industry corporate fleets.

The breakdown of these four segments is as follows: Dealers represented 83.6% of sales, with an estimated 37 091 units sold; The rental industry represented 9% of sales; Government sales represented 5.1% of sales and industry corporate fleets represented 2.3% of sales.

The automotive industry contributes 4.3% to South Africa's GDP, said Naamsa. ■

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Only one of the South African Navy's four frigates operational. No submarines serviceable

The majority of the South African Navy's primary combat vessels are not operational, with the frigate SAS Mendi's seaworthiness prioritised for Armed Forces Day and Exercise Mosi II, writes Guy Martin of Defenceweb.

This is according to an Armscor presentation to the Portfolio Committee on Defence and Military Veterans (PCDMV) on 15 February, which detailed the maintenance status of the SA Navy's frigates and submarines.

The presentation explained that the frigate SAS Amatola is currently in a Docking and Essential Defect (DED) period, but work was temporarily suspended to prioritise the SAS Mendi, which was required for Armed Forces Day operations. The Mendi took part in AFD and Exercise Mosi II off the coast of Richards Bay along with the hydrographic survey vessel SAS Protea, and the first new inshore patrol vessel, SAS King Sekhukhune I.

Work on the SAS Amatola will resume in March, with a current estimated completion date of three months after receipt of outstanding spares and subject to the completion of repairs on the SAS Spioenkop. The latter is currently undergoing "ad-hoc maintenance and repairs of the hull and structure." Completion of this work is dependent on the SA Navy providing customer furnished spares (CFS). Maintenance will be completed within one month from the receipt of spares.

It looks like the SAS Mendi is the only operational vessel for the SA Navy

The fourth and final frigate, SAS Isandlwana, is currently undergoing ad-hoc maintenance and repairs of the mast and flight decks. Armscor stated that the masts will be completed within six months. "This is part of the continuous refurbishment activities to keep the sub-systems serviceable, as the vessel will be in a perpetual maintenance phase."

With regard to the submarines, the SAS Mantatisi is currently undergoing Docking and Essential Defect (DED) maintenance, which is due to be completed in March subject to successful approvals of all post-maintenance trials.

The SAS Queen Modjadji is currently undergoing preservation and pre-refit planning activities, in preparation for a refit. The procurement process for services is currently underway, with a requirement received from the Navy on 6 February 2023. Armscor estimates the contracting process will take approximately 140 days.

Funding to complete the refit of the SAS Charlotte Maxeke is available and the submarine is currently "in refit process" with Armscor providing project management. "Armscor Dockyard is currently going through a procurement process to contract a local supplier for support services. Bids are currently being evaluated and contracting will be completed within the next month."

The defence budget allocation states that the SA Navy will defend and protect South Africa and its maritime zone by providing three frigates, one combat support vessel (the SAS Drakensberg), two offshore patrol vessels, and three inshore patrol vessels per year as well as two submarines a year. The Navy will conduct four coastal patrols and spend 8 000 hours at sea a year.

Budget cuts mean there is no funding for mid-life upgrades/refits of the SA Navy's three submarines and four frigates. These vessels will have to wait until at least 2033/35 before sufficient funding becomes available for this.

Defence minister Thandi Modise, in response to a question on SANDF maintenance backlogs from the Economic Freedom Fighters, stated in a recent parliamentary reply that, "within the SA Navy environment, the frigates and submarines of the SA Navy are being maintained in accordance with the available budget. Maintenance contracts to enhance maintenance on these vessels are extended as and when funding becomes available. There is currently a delay in availability of the logistic supply vessel of the SA Navy as a result of unavailability of spares and non-performance by the appointed maintenance contractor. These delays have been addressed and mitigating steps have been implemented." ■

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Concentrating on quality and efficiency at Donnees Engineering

One of the Mazak CNC machines, which was manufactured in 1987, is still producing components for Donnees Engineering today

Donnees Engineering are capable of machining components from small to large. 73 000 components were machined last year

The Mazak Quickturn 200M lathe

Cutting hardened steel, titanium and other difficult materials requires picking the right tools, eliminating spindle runout and relying on best practices to achieve tight part tolerances. Of course there is the 'small' matter of investing in the right equipment that can perform the metal processing tasks that you require while also giving your workpiece a more precise finish and not break down during machining.

Steel, cast iron and aluminium are the workhorse metals most industries rely on and are generally machinable on most machines. However, working in the aerospace, defence or medical industries often means working with difficult metals. These shops rely on hardened steel, titanium, heat-resistant nickel alloys and other materials that are notorious for the difficulties they present to machinists.

When working with exotic and difficult to machine metals, following correct practice is key. Machining hard metals is a delicate process. There is a lot of room for error, machining takes more time, and you have to fine-tune every aspect of your process. When you're dealing with expensive, exotic materials, preparation is critical.

When cutting difficult materials, one of the most important considerations is the cutting tool itself. Getting the tools to last is one of the biggest challenges. Harder metals can eat through the wrong inserts almost as quickly as you can replace them, and some materials warp and bend in ways that can keep heat trapped in the cutting tool.

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Donnees Engineering owner Johan Koen

"Having been trained on Mazak machines and then acquiring them for my business I certainly do have a love affair with them. When it comes to technology, the shop's philosophy is to acquire the very best-built machines, in our opinion," said Donnees Engineering owner Johan Koen

right coating. "Coating is very important, especially with harder materials. If you use a standard coating on a carbide end mill, you're going to burn through that quick. If you use the proper coating, with the proper speeds and feeds from your supplier, you're going to be able to fly through the material, you won't burn up your cutters, and you will hold to tolerance."

Machining shops will have a good idea of whether to use cutting tool fluid, which tool geometries work best for a given material and under what circumstances, and which coatings will work best for a given material.

Machine tools designed for machining titanium are generally characterised as having heavy, rigid structures with spindles designed for high torque at low spindle speed. Large spindle tapers and high-pressure coolant are also typical. For multi-axis work, a beefy trunnion and rotary table may be provided as well.

However, users need to learn about the difficult to machine materials such as titanium, understand their characteristics and apply basic principles knowledgeably. And any serious effort to master the machining of these materials must follow this call earnestly.

"There is just something about machining parts on CNC machines - the ability to manufacture precision, good looking parts and making thousands of them - all within the tolerances given by our clients," expounds Johan Koen of Donnees Engineering, a precision machining company based in Paarl in the Western Cape.

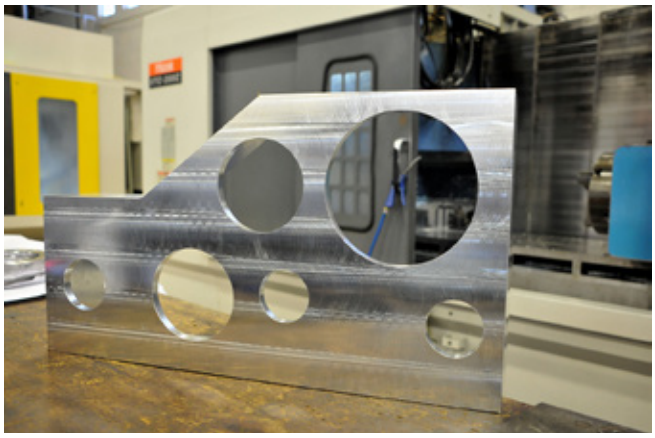
Donnees Engineering is a relatively young company, having only officially opened its doors for business in March 2006 as an after-hours business. But sole owner Koen had been machining precision components for many years prior to starting his own business.

Koen worked for a global company that was also based in Paarl but it was not in the business of manufacturing components but rather one of supplying product to the retail industry and had been doing so since 1904.

"I joined a company that is now known as BAT South Africa but was previously known as Rembrandt as an apprentice. I qualified as a fitter and turner with them through Northlink College. Once I had completed my internship with them, I received my recognised and accredited qualification, which would have given me access to the world of work in South Africa."

"I stayed on with them because of the work that I was involved with at the company. Its main focus was of course the manufacture of cigarettes but the company had a stringent high-quality manufacturing policy and as a result the manufacturing equipment had to match these high standards set. We therefore were exposed to some high-quality, top-end CNC equipment in the company's machine shop."

"It was not the company's policy to shop out the maintenance and servicing requirements of the manufacturing equipment and all the auxiliary and add-



This aluminium gear box cover started off as a 40kg block and after final machining it weighs 5kg

When Donnees Engineering purchased the machine shop from BAT 16 years ago this lathe was part of the deal

Components that have been machined

Components ready for delivery

on services that were required in the manufacturing and packaging processes."

"However, the company's requirements could not keep the machine shop running at full capacity so work was acquired from other companies that required machining of components. This filled most of the spare capacity and kept myself and other colleagues busy with producing high-tech components. We had four Mazak CNCs on the floor so we were more than capable of producing the required components."

"One of the more interesting projects we were involved in was components for the second South African satellite known as SumbandilaSat ('pathfinder' in Venda), a satellite that was created by start-up company called Sun Space and Information Systems (SunSpace). The South African Department of Science and Technology to Stellenbosch University were also involved and the satellite was launched in September 2009."

"However, 16 years ago Paarl was shocked when one of its economic giants, the company I worked for, decided to close the BAT factory in Lady Grey Street and consolidate all its manufacturing and operational activities to their Heidelberg plant in Gauteng."

"As they say there is always a positive that emerges from a negative and this was certainly my case. I had seen what was happening at BAT and decided already in 2006 to register a company – Donnees Engineering – and also put together a business plan. As soon as it was official that the Paarl operation would close, I put my proposal in and it was accepted, thank goodness."

"I acquired four Mazak machines, some conventional equipment and 12 staff. One of the Mazak CNC machines, which was manufactured in 1987, is still producing components for me today."

"Fortunately, I was able to continue with all the outsourced work, including the Sunsat components, as well as acquiring work from BAT. The BAT work continues today and it includes refurbishment of existing machines and manufacturing of new machines to produce cigarettes."

"Since then, we have grown year in and year out to where we are today, manufacturing components for various leading companies and working with many different industries. Combining efficiency and accuracy we keep moving forward, always keeping up with the latest technology and strategies from across the globe, to produce quality components and keep our clients happy."

"We do work for the canning factories and there are plenty around in this area of the country, the wine industry, filling industry and various aerospace companies, and many others."

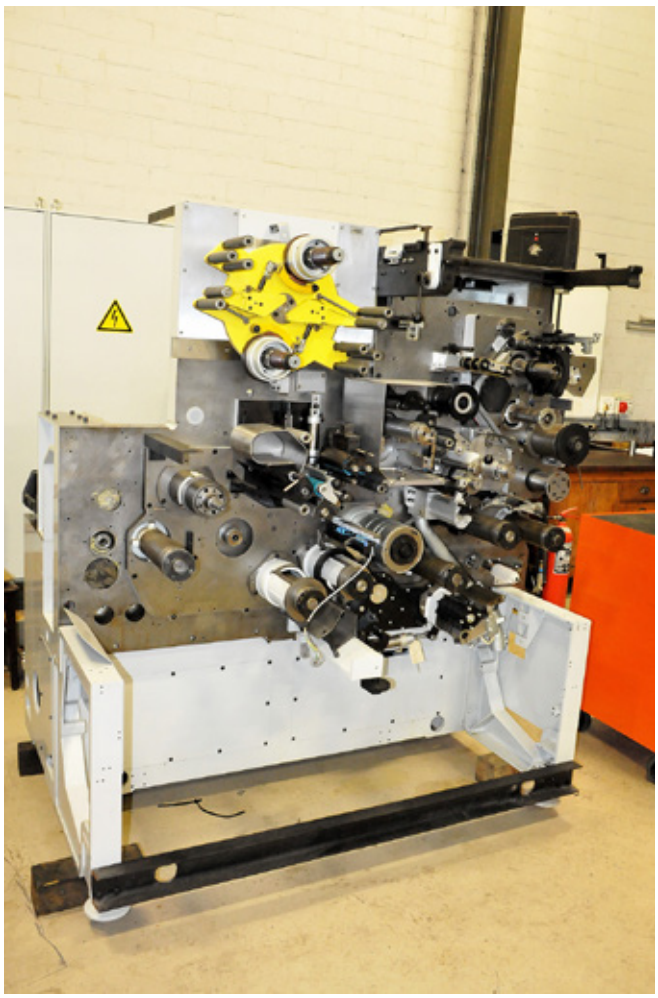
"Last year we machined 80 469 different components from one-off orders to multiples of the same."

"Most of the machining is done from solid materials but where it is required, we will machine castings. This includes

One of the newer Mazak machines on the floor is the Quickturn Smart 200

The company has some bar work to do and it relies on an Okuma Genos L200E-M

The company's Fanuc Robocut EDM can cut hardened materials up to 310mm in height



The company also has contracts to manufacture new machines to produce cigarettes

all types of material. We are not concentrated on difficult to machine materials but do regard ourselves as specialists in this area."

"Many companies find niches supplying single industries, especially when those industries have an outsized local footprint. However, supplying components to one end market can turn a niche into a rut if that market experiences economic hardships. Many shops have learned to diversify their customer bases over the years, and this we have done."

"But I have to admit that we are in a rut when it comes to the CNC machines that we purchase."

Love affair with Mazak

"Having been trained on Mazak machines and then acquiring them for my business I certainly do have a love affair with them. When it comes to technology, the shop's philosophy is to acquire the very best-built machines, in our opinion. Additionally, choosing a single brand of machine tools enables our operators to be self-sufficient. They can quickly learn to set up and programme virtually any machine in the shop. More importantly they are not just operators. They are all qualified artisans that set up, programme and

The grinding department

Donnees Engineering also trains their own apprentices and currently they have four employed

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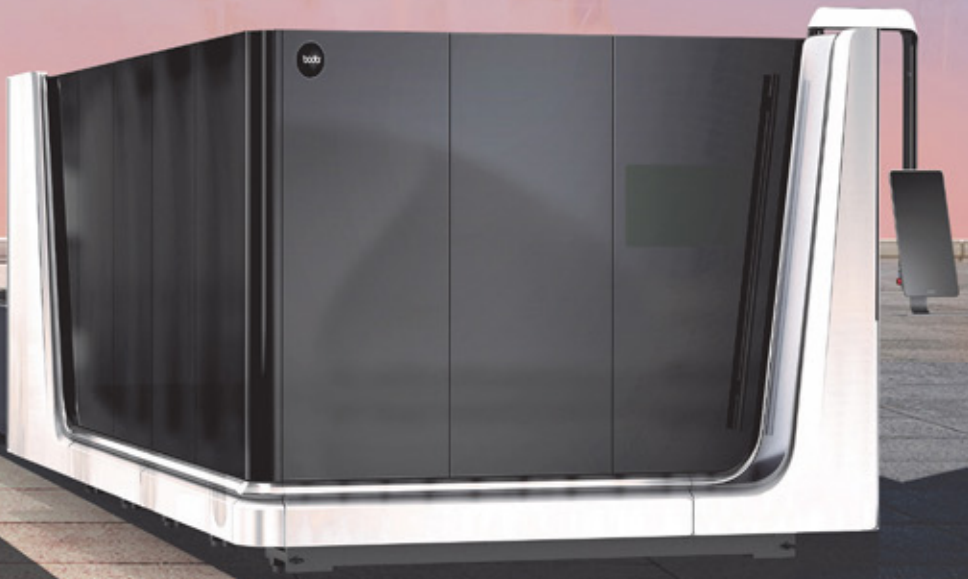


Contact:
Johann Nel - Cell 064 396 1273
sales@integralmachines.co.za

Integral
Machine Tools

The BAT work continues today and it includes refurbishment of existing machines

"However, it is not just our Mazak machines that provide accurate and efficient results "Done-in-One". Our fifth Fanuc Robodrill CNC machine is a 5-axis machine and also completes machining operations "Done-in-One".

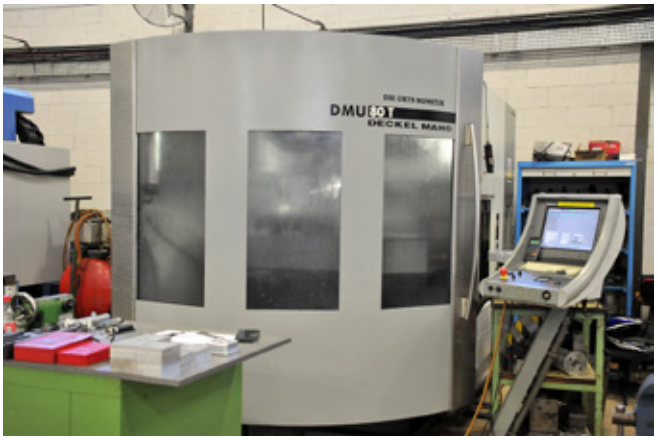
operate and in most cases more than one machine at a time. They are the heart of Donnees Engineering."

"We also train our own apprentices and currently we have four employed. They learn the hard way, as I did. From the beginning of just using a file, for example. They don't move on unless they are experts at using that file."

"We now have eight Mazak machines on the floor. They include four vertical machining centers, three lathes and one Integrex j-200."

"The Integrex j-200, our most recent purchase, is a compact machine designed for large workpieces – maximum machining size is 500mm and maximum machining length is 500mm. Additionally, a large machining area is provided thanks to long strokes: X-axis – 450mm, Y-axis – 200mm, Z-axis – 550mm, B-axis indexing range of 220° and C-axis of 360°. The orthogonal Y-axis machine construction allows face milling, end milling, and drilling to be performed in the large machining area without C-axis indexing thanks to long Y-axis stroke: 200mm."

Donnees Engineering now have eight Mazak machines on the floor. They include four vertical machining centers, three lathes and one Integrex j-200. All machines have been supplied by Hi-Tech Machine Tools. The Integrex j-200, the most recent purchase, is a compact machine designed for large workpieces – maximum machining size is 500mm and maximum machining length is 500mm. Additionally, a large machining area is provided thanks to long strokes: X-axis – 450mm, Y-axis – 200mm, Z-axis – 550mm, B-axis indexing range of 220° and C-axis of 360°. The orthogonal Y-axis machine construction allows face milling, end milling, and drilling to be performed in the large machining area without C-axis indexing thanks to long Y-axis stroke: 200mm



Donnees Engineering also has a DMG MORI DMU 80T on the shopfloor

A general view of the immaculately clean and well laid out machine shop

The company also offers a UV Printing as a service

Fanuc Robodrills

"Mazak have coined the term "Done-in-One" with their Integrex machines. This is a term in 5-axis machining that means you cut a part from start to finish, all in one operation. This is an extremely accurate way of machining and a time and cost saving operation."

"However, it is not just our Mazak machines that provide accurate and efficient results "Done-in-One". Our fifth Fanuc Robodrill CNC machine is a 5-axis machine and also completes machining operations "Done-in-One". Besides the five Fanuc Robodrills we also have a Fanuc Robocut EDM that uses wire to cut parts. This machine has so much to offer and it can even cut hardened materials up to 310mm in height."

"At Donnees Engineering we use Mastercam to generate the most efficient code and toolpaths necessary to cut complex parts. Our seats involve lathe, mill 3D, multi-axis and wire. Every year we update our maintenance to always stay sharp and up to date with the latest technology. Mastercam is a very powerful tool in manufacturing, allowing us to reach the efficiency and accuracy needed to complete the job."

"We use Solidworks in our design department."

"In the quality department the company has a Brown & Sharpe CMM, shadow graph and hardness testers as well as a Sisma laser marker."

UV Printing

"Not through design or planning we now offer UV Printing as a service. A client needed some aluminium covers that we manufactured and machined for them – 100s of them – printed with their logo and some other text. We did some research, invested in a machine and staff and the result is we now offer this as an extra service. It is a thriving business that we have developed."

"Our business is not just about making chips. We are running lights out to keep our clients happy. Dodging the load shedding with an investment in a generator has kept our 36 staff employed. We intend to keep ahead of the game."

For further details contact Donnees Engineering 082 789 3818 or email johan@donnees.co.za or visit https://www.facebook.com/donneesengineering/ ■

Metal fabrication, machining and assembly: Better together

Jovi Engineering and Red Hot Profiles feed off each other. Find growth in metalworking process diversity.

Go and visit nearly any metal fabricator and you'll probably see some level of machining being done on the shopfloor. Many don't have much, perhaps a manual mill or lathe or maybe a vertical machining center (VMC). How much milling and turning a shop has depends largely on how the company was launched in the first place.

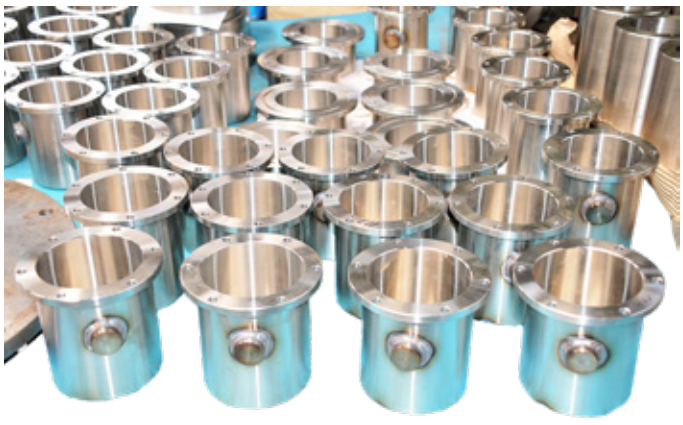
In many cases, the machining is there to support the metal fabrication, with machinists building custom tools and fixtures and perhaps creating small parts that go into larger sub-assemblies.

These days many fall somewhere in between the two extremes. They never expect machining to dominate the business, but their machinists do a little more than just support the primary metal fabrication operation. Trends are changing though. Metal fabrication companies are now increasing the size and the capabilities of their machining departments.

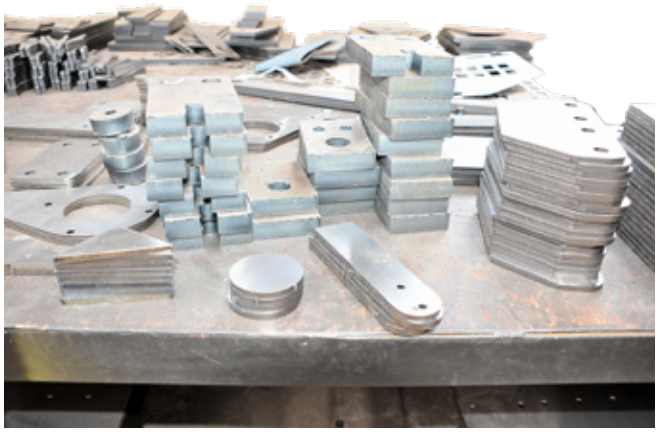
Most fabricating companies got into machining the same way a lot of custom fabricators did: Customers asked for it. As customers ramp up their demand for milling and turning, it makes sense to bring these processes in-house, for many reasons. Companies either build up the machining department by making their own equipment purchases or they acquire their supplier or similar machining business and end up with an 'off-the-shelf', ready to operate machine shop. This is normally the better strategic decision that eliminates many of the start-up stresses.

"The most recent addition to our equipment line-up is a 12kW Bodor fibre laser, installed earlier this year. The new Bodor P4020 fibre laser, supplied by Integral Machine Tools, has a table size of 4 000mm by 2 000mm and will provide the company with a significant boost in productivity and allow us to offer better laser cutting lead times. Every increase in power delivers a cleaner cut edge, especially on mild steel, which forms the majority of our throughput. We can now cut mild steel up to 30mm thick."

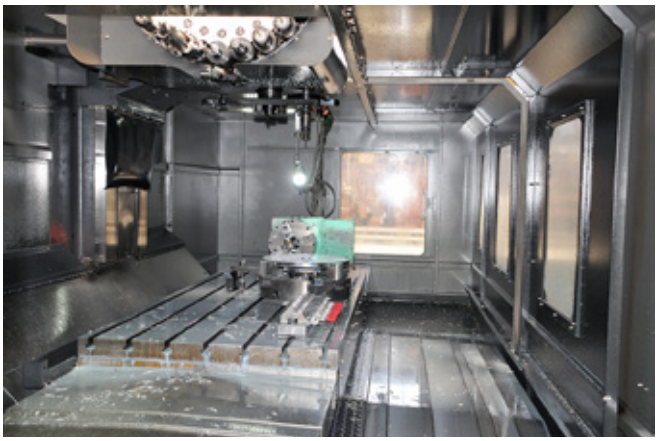
The biggest asset any company can have right now is experienced people, and your people are what's going to help you survive and make the future. So figuring out how to utilise everybody's skill levels and continuing to develop and enhance those skill levels is the biggest challenge. Anyone can buy equipment. Equipment is easy to buy. It's hard to get the skill level to run the equipment to the efficiency it's designed for. This is a challenge when starting from scratch in ▸



Components from the Jovi Engineering machine shop



Components cut on the new Bodor 12kW



A plate being machined

The Kafo VMC is the largest CNC machine in the Jovi Engineering machine shop

an area of metal processing that you are not familiar with.

Amongst many other considerations that need to be taken into account are whether the machine shop is just going to do in-house work or is it also going to seek outside work.

However, you will still find many companies that only do metal fabrication and outsource their machining work. At the other end of the spectrum, some companies do sell themselves as being a true one-stop shop, with both extensive machining and fabricating capacity. Having a wide range of machines enables the company to work for a wide range of industries and meet most of its customers' manufacturing needs. And having open capacity to quickly respond to customers ensures the company has the ability to take on new opportunities to drive growth. A harmonious marriage of CNC machining and sheet-metal fabricating equipment depends on identifying the right process and the right price for every part.

Adding metal fabricating to machining services

Adding metal fabricating and assembly services to existing machining services is not a common occurrence from what I have seen while visiting metalworking engineering companies around South Africa. I have seen many companies that have added extra services and equipment to their existing machining or fabricating services but very few that have added the full service offering of the various processes required for metal fabrication.

That is until I visited Jovi Engineering and sister company Red Hot Profiles & Laser Services, based in Elsburg, Gauteng.

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The 9 kW variant introduces AMADA's Auto Collimation system, to provide unrivalled beam spot control - this allows very high speed piercing, fast cutting rates and vastly improved bevel angles on thicker materials – 1 second pierce on 25mm mild steel.

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LCG 3015 AJ
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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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Components either get refurbished or are manufactured new at Jovi Engineering

The company has three Takisawa lathes

Jovi Engineering was established in 1984 by two brothers, Victor and Jose Da Silva. Life for the Da Silva family started in Portugal before their Dad decided to immigrate to South Africa, first spending a few years in neighbouring Mozambique. Dad was also a mentor to the two boys before deciding to return to Portugal.

Jovi Engineering is your typical company that started off in a garage situation and through hard work and determination has grown into a respected company. Sometimes the business might be a dream of the owner/s or it is started through force of circumstances. Usually there will be one or even two clients if you are lucky. Victor is the driving force and leader of a company that will reach the 40-year milestone in 2024. Brother Jose left the company to run his own business some years back and only returned back to the family-orientated business two years ago.

Base plates that have been cut at Red Hot Profiles & Laser Services and then machined and welded at Jovi Engineering

Other family members include Victor's sons and daughter Richard, Jean-Paul and Sonia, nephew Tristan and fiancé Cindy. All play vital and supporting roles in the company.

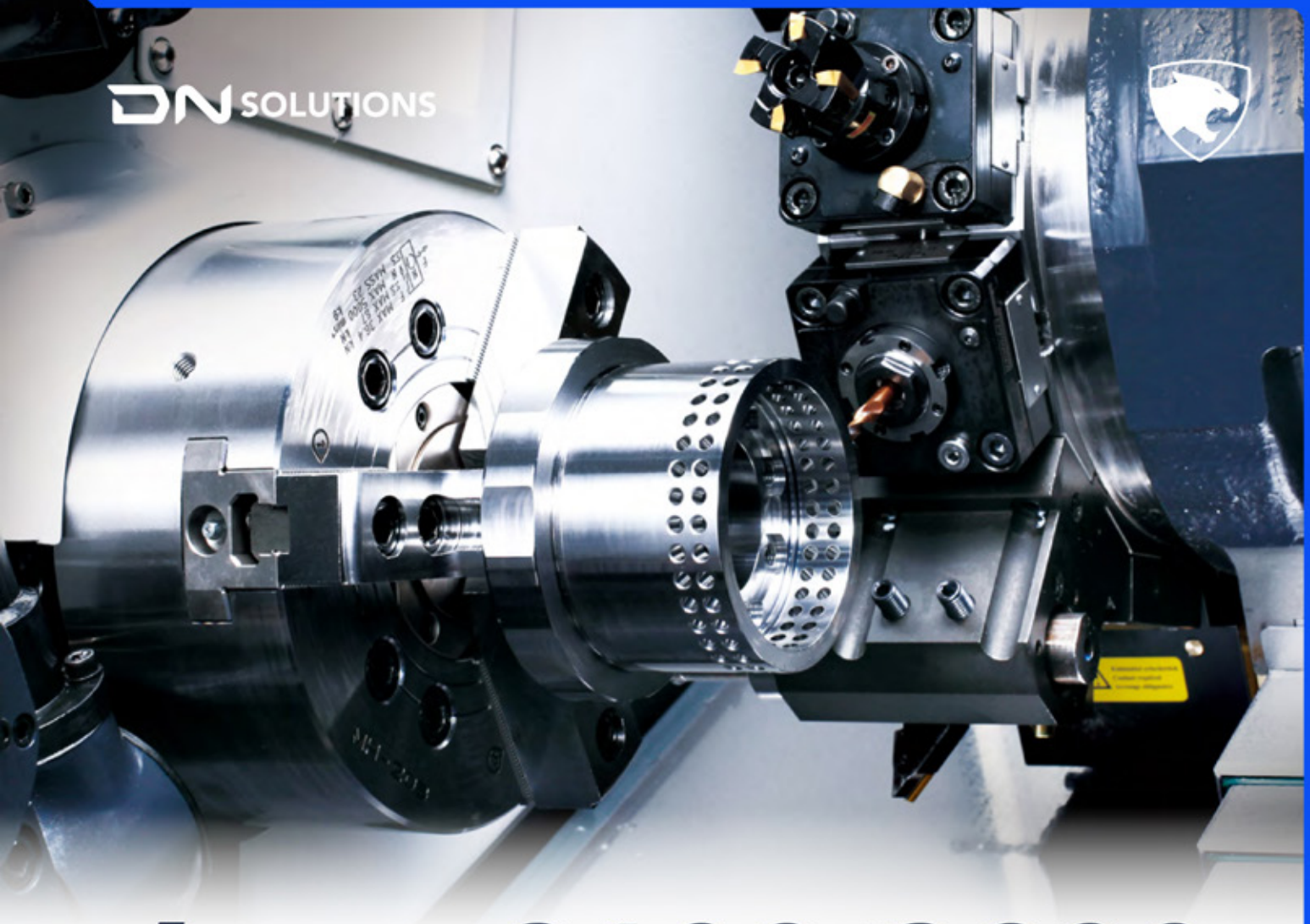
Victor is a qualified fitter and turner and still has a hands-on attitude to the CNC machining side. While visiting he was measuring components, carrying out visual inspections, explaining processes to staff and of course delving into the CNC machines with the operators. No doubt operating the machines and setting up is also second nature to Victor. His vast knowledge of machining and things 'machine shop' and general engineering has seen Jovi Engineering grow from strength to strength.

"Jovi Engineering is a vibrant mechanical engineering company operating in accordance with international quality management system standards. Over the years Jovi Engineering has progressed and grown dramatically, and is now considered to be one of the most respected engineering companies operating in the East Rand."

"This can be directly contributed to Jovi Engineering's use of innovation, technology and the need to continuously find better ways to improve the quality of Jovi Engineering's products and the services offered to our customers."

Components ready to be assembled

Pedestals cut, machined and welded between the two companies



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"Initially only specialising with pneumatics and general mechanical engineering, we now offer a wide variety of general engineering products including the manufacturing of pneumatic linear actuators, fabrication repairs to earth moving equipment, CNC machining, multi-surface machining, full 4-axis machining and manufacturing of moulds."

"Our customer base includes companies such as De Beers, Macsteel, Trident SA, as well as many other well-known and established organisations in the mining and other general engineering industries. Our products are used in both the local and international markets including areas such as Zambia, Zimbabwe, Mozambique and Botswana."

"One of the main products we produce for a client are the pneumatic linear actuators that are used in mining operations and not limited to one raw material that is excavated or mined. We manufacture all the components for this product that range from a 100ml actuator to a 550ml size. This includes the pedestals and cleavers. The only component used on the product that we buy in is a fibre glass sleeve. We have a dedicated assembly area for this product and a large storeroom so that we can supply the customer off-the-shelf."

The company now has three CNC milling machines, all with 4-axis capabilities, and three CNC lathes. All sorts of components are machined on them including plates, bushes, shafts, slides, barrels and valve bodies.

"One of the main products we produce for a client are the pneumatic linear actuators that are used in mining operations and not limited to one raw material that is excavated or mined. We manufacture all the components for this product that range from a 100ml actuator to a 550ml size. This includes the pedestals and cleavers. The only component used on the product that we buy in is a fibre glass sleeve. We have a dedicated assembly area for this product and a large storeroom so that we can supply the customer off-the-shelf."

"The actuator does comprise of a top and bottom plate and the lengthy delivery time of these plates from suppliers was an influencing factor in us starting up our metal fabricating business."

New company offering metal fabrication services

Established in July 2005 Red Hot Profiles & Laser Services is a business offering laser cutting, profile cutting, high-definition plasma cutting, guillotine cutting, press brake bending and fabrication services. Sister company to Jovi Engineering and located on the same factory site the company was established not only to create the opportunity to seek new clients and increase turnover but also to take the frustration out of long delivery times of plate components needed for its pneumatic linear actuators.

"You soon get a bad name if you cannot deliver as promised. The top and bottom plates would be profile cut and then drilled and chamfered on our CNC machines before assembly. Our first metal fabrication machine that we purchased was therefore a profile cutter. The Burney CNC controlled machine can cut metal thicknesses between 6mm and 300mm and the bed can accommodate plates of 11 000mm by 2 300mm," explained Richard Da Silva, Victor Da Silva's eldest son and who is responsible for running the metal fabrication business.

"I joined the company in 1999 shortly after leaving school and Dad has been my mentor. Initially I was a 'helper' in the CNC machine shop but as time progressed I learned to operate and programme the CNC machines," continued Richard.

"Our decision to go into metal fabrication was exciting but also stressful for all of us. We had metalworking experience but none on the fabrication side. The learning curve was big but if we look at where we are today it was a wise decision."

"Equally decisive in our decision making has been that we have covered all the main processes needed for metal

The company has invested in a Fanuc robot welder

Profile and plasma cutting is offered by Red Hot Profiles & Laser

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fabrication and not limited ourselves to profiling or laser cutting, for example. We now have equipment that covers cutting, bending, profiling, guillotining and rolling. We have also invested in a Fanuc robot welder. The time that this robotic welder saves us on the fabrication of the pedestals needed for the actuators, is amazing. But it is not only doing this work. It welds other fixtures and housings that we require."

"It is also remarkable to note how many fabrication orders also require machining and welding processes as well. A weldment frequently requires precision machining for critical features. The two businesses synergise more than they are separate, and this is seen most clearly during a walk through the CNC machining shop."

"After the installation of the profile cutter we then invested in a Trumpf CO2 laser and a press brake followed by an Amada 4kW CO2 laser and then a Bystronic laser. We now have two further Durma press brakes and the working range is from 80 tons up to 220 tons and a width of up to 3 200mm."

"Our high-definition plasma cutting covers material thicknesses from 2mm up to 75mm and guillotining is 1mm to 12mm up to lengths of 2 500mm. We also have CO2, TIG, ARC and spot welding machines so we are very well equipped."

New 12kW Bodor fibre laser

"The most recent addition to our equipment line-up is a 12kW Bodor fibre laser, installed earlier this year. The new Bodor P4020 fibre laser, supplied by Integral Machine Tools, has a table size of 4 000mm by 2 000mm and will provide the company with a significant boost in productivity and allow us to offer better laser cutting lead times. Every increase in power delivers a cleaner cut edge, especially on mild steel, which forms the majority of our throughput. We can now cut mild steel up to 30mm thick."

The company has three press brakes and the working range is from 80 tons up to 220 tons and a width of up to 3 200mm

The Da Silva family

Two of the older laser machines

"We cut all the different materials but mild steel is by far our biggest metal type that we cut. Approximately half of the mild steel tonnage is stainless steel. We should be increasing our monthly tonnage with the introduction of the Bodor. An added advantage, because of the advanced technology used in fibre lasers these days as compared to more than 10 years ago when we purchased our first CO2 laser, is that we can now laser cut thicker material faster. This will also shorten our delivery times."

However, what truly sets this company apart cannot be found in the equipment itself. Diversification and expansion of machining and fabricating capabilities have been driven in part by adhering to one central idea. Whether you work as a job shop service centre, custom fabricator or OEM, your business grows and shrinks within the market it represents.

It is therefore all important to spread the portfolio of clients and the industries that they operate in. This lessens the burden or risk of relying on one industry or client.

For further details contact Jovi Engineering / Red Hot Profiles & Laser Services on TEL: 011 824-0439 or visit https://www.redhotlaser-jovieng.co.za ■

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Making a 3D printing and simulation connection

Advancements in both technologies are opening possibilities for manufacturing and product development.

Digital simulation tools are often used to evaluate and improve numerous processes, including many for manufacturing applications. 3D printing is used in tandem, enabling simulations to be aided with tools and models that bring a virtual design to a physical reality.

3D printing can be applied in many ways, and together, 3D printing along with advanced digital simulation tools are providing a new facet of engineering design that can improve innovation and the final design of so many products in so many industries.

So how are companies leveraging 3D printing along with simulation and modelling tools to expedite manufacturing and bring more efficiency into processes?

First the part, then the process

Ashley Eckhoff is a project manager with the additive manufacturing (AM) team at Siemens Digital Industries Software. He says that over the past few years, there has been increased interest in the 3D printing process, especially from companies that print expensive metal parts.

"Regardless of the additive process used, there are many variables that can affect the final quality of a printed part," he says. "Anything from scan path to laser power to ambient humidity can have an effect on the end result of a print. This is especially true for companies printing metal parts, which can cost tens of thousands of dollars, so print mistakes are costly. This has driven a rise in the need for AM build simulation where the print job itself is simulated to anticipate areas of issue so that those can be mitigated before thousands of dollars are wasted with a low-quality print."

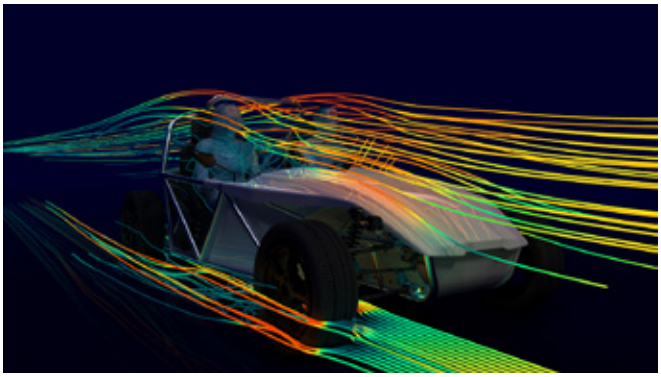
Every printed part starts with a CAD design that is usually simulated for performance. That data is then used in the production process where software like simulation products and production management systems are important. Image courtesy of Siemens.

Diving deeper beyond the actual part, there's an opportunity to apply the AM process directly into the traditional manufacturing process. He says this includes not just the print, but also the movement of materials, the printing, removal and post-processing of parts, and the uptime and downtime of equipment in the factory.

"This leads to the need for not just AM print simulation, but full factory process simulation where the entire workings of a factory can be laid out, timed and planned. This type of holistic simulation allows companies to streamline their operations and to identify roadblocks in the manufacturing process," says Eckhoff.

Eckhoff says it also indicates that companies that are expanding their AM operations can predict the performance of their operation before investing in equipment.

"This means they can answer questions like, 'If I add three more printers, how much does that increase my production capacity, how much more material will I require every year, and how many more people will I need to man and service that equipment?'" he says.



Factory simulation, according to Eckhoff, provides a company with usable data so that they are running production operations as efficiently and as cost-effectively as possible.

Companies leverage 3D printing for two main uses: Rapid prototyping and production. The development of a process follows the development or prototype of the part, says Tim Sissoko,

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"Initially, 3D printing was used for rapid prototyping, such as translating the design into a tangible artifact and validating concepts," he says. "3D printing is efficient and economical since it does not require the development of tooling, mould and casting patterns, and therefore enables designers to iterate quickly. From my observations, AM is now increasingly used for mass production to respond to three main challenges: To produce complex parts like in aerospace and medical, to produce customised goods like prosthetics, and to quickly launch or shift production."

Sissoko adds that modelling and simulation tools are increasingly used across the product lifecycle, which ultimately increases manufacturing's efficiency. Models that companies use range from systems architecture models, CAD, finite elements and multidisciplinary design optimisation to machining and forging simulation models.

"When using models for simulation, engineers can predict the behaviour of products and assess their physical architecture, but can also plan and preview manufacturing operations, detect issues and avoid rework," he says. "Models are progressively replacing drawings and documents, and these transformations come with the adoption of new tools, collaborative platforms and ways of working."

Efficiency with 3D printing and simulation

Yanis Mansouri is the digital engineering and manufacturing lead with Capgemini Invent. He makes the obvious case for efficiency with 3D printing, which ripples into manufacturing.

"Most parts are made using subtractive manufacturing, which can be very wasteful and expensive," he says. "More importantly, in some cases, engineers cannot envision how to develop complex parts with subtractive methods without significantly increasing cost or reducing the lifecycle of the parts. Therefore, AM is now considered as an alternative to subtractive manufacturing, with 3D modelling and simulation techniques being key to help engineering in this decision process."

"It all comes down to efficiency. Process simulation focuses on optimising processes that are used to manufacture a product whereas 3D printing is used to optimise the design of the product that is being manufactured," says Zohair Mehkri, the director of digital twin at Flex. "Therefore, combining both unlocks the ability to transform traditional manufacturing drastically. Cost savings, material savings and time savings are just a few of the benefits that come from the combination of these technologies."

The portability and flexibility of AM stand to bring great gains to manufacturing

"Beyond the speed to solution and complexity aspects, AM also allows production portability and flexibility from one factory or supplier to another," says Mansouri. "In the current context, where companies are bringing some of their manufacturing operations back home, AM could be one of the strategies to minimise disruption during the transfer of critical knowledge and operations."

Mansouri also notes that AM cuts down transportation and inventory costs, leading to part cost reduction and less environmental impact.

Working in concert

Doug Kenik is director of software product management at Markforged. He says engineers have an "over-engineering" problem regarding AM design.

"Without simulation software, engineers are following the workflow of designing-printing-breaking to test parts, which leads to added costs in time and materials," says Kenik. "Adding smart simulation into existing 3D printing workflows makes the process more efficient by taking the guesswork out of 3D printing. It gives engineers confidence that their part is strong and uses just the right amount of material, without going through lengthy and repetitive testing cycles."

Kenik notes that 3D printing continues to draw interest from industries, such as aerospace, automotive and medicine, and simulation will be a key factor to further adoption.

"It gives engineers confidence to push the boundaries of 3D printing and the materials at their disposal," he says. "A material that is transforming manufacturing is Onyx, which is a micro carbon fibre-filled nylon that offers toughness on its own but can also be reinforced with Markforged's unique continuous carbon fibres to yield the strength of aluminium. The Onyx material is ready to go from the print bed with a high-quality surface finish that helps expedite the manufacturing process for an end-use part."

The Onyx material he refers to is displacing applications that traditionally used aluminium or other metals. For example, according to Kenik, Larsen Motorsports, a Florida-based racing company, uses Markforged's Simulation Software to customise and test part strength for vehicles used in racing before printing a final design.

"Engineers at Larsen recently used Markforged software to customise a 3D printed steering wheel for a female driver with continuous carbon fibre," Kenik says. "This is a part that had previously been made from aluminium. With simulation, Larsen could design and test until they had the perfect design to then be 3D printed. This helps to save a day of labour and the cost of failure points for Larsen's technicians."

Software innovation drives success

The 3D printing industry is maturing, and it is being driven by smart software and data capturing, says Kenik.

"From the users' perspective of the software, they can look at the data internally and understand how to handle the next problem based on what was done previously," he says. "Together with hardware and cloud-based software, teams can build a network of a connected fleet of printers and integrate an automated workflow to quickly validate part performance; thus, this is a method to enhance distributed manufacturing. Overall, we believe software innovation will be a key driver of success for AM in the years ahead."

Article by Jim Romeo and it first appeared in Digital Engineering 24/7. Pictures courtesy Siemens Digital Industries Software ■

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EMO Hannover 2023 focuses on current production technologies

Want to learn about the latest in production technology? Production experts visiting EMO Hannover 2023 will be doing just this in September 2023. They can experience live and on site the latest trends at a total of four joint booths.

These booths will be focusing on additive manufacturing, connectivity, open space cobot solutions, and sustainability. Martin Göbel, Director Exhibitions at the EMO organizer VDW (Verein Deutscher Werkzeugmaschinenfabriken, or German Machine Tool Builders' Association) in Frankfurt am Main, knows the value of a visit: "Nowhere else can production specialists experience the sector's innovations so close up – presented in thematic packages over the entire process chain, and up to date at all times. So, if you're coming to EMO Hannover 2023 in September, you shouldn't miss out on the joint booths."

Innovative 3D printing as a fixed constituent

Here companies will be presenting pioneering concepts from the whole bandwidth of the additive process chain, whether direct and indirect 3D printing technologies, engineering materials, or rapid product development (RPD).

Connectivity of production processes at a glance

Here visitors will encounter new applications, automation processes, smart production, Industry 4.0, machine learning, predictive maintenance, IIoT (Industrial Internet of Things), and many other aspects. And the editorial series Future of Connectivity will also be reporting on these subjects in the run-up to EMO Hannover.

Humans and robots work hand in hand

More and more companies are investing heavily in automation to maintain their productivity and competitive strength, to augment their resilience and versatility, and to keep pace with growing demand. For instance, the number of new industrial robots installed in 2021 exceeded the 500 000 mark for the first time – a new record.

Specifically cobots, or collaborative robots, are in high demand. They already now make up 7.5 per cent of all installed industrial robots, and this is an upward trend.

The Open Space Cobot Solutions Area is therefore fully dedicated to the interactions between humans and industrial robots and their actual and potential applications. Manufacturers will be presenting to an international trade public their automation solutions based on cobots and their innovative use: Grippers, image processing, measuring systems, software, industrial electronics, feed systems, and much more can be experienced up close.

Sustainability to underlie tomorrow's production

Here visitors can learn about the current trends in energy efficiency, the integration of renewable energies, circular economy, and lifecycle concepts – a fair highlight, not only with an eye to climate protection and reduced production costs in times of persistently scarce energy and raw materials. The focal theme Future of Sustainability in Production is also the subject of professional articles that appear regularly online.

Interested parties can find further details on the EMO Hannover webpage https://emo-hannover.com/thematic-sections ■

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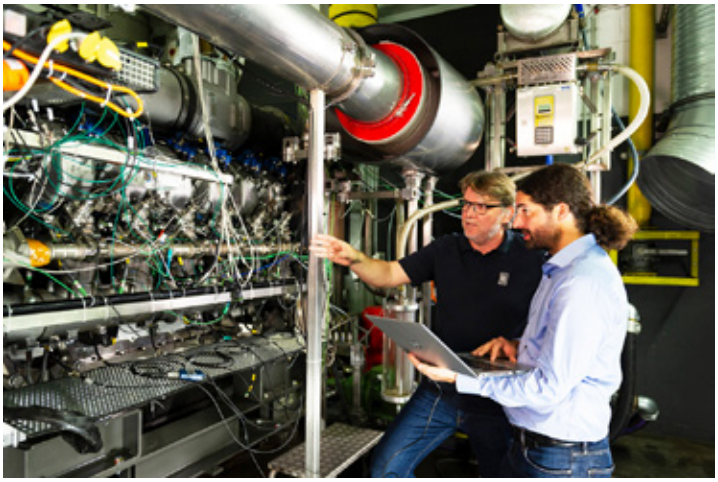
Rolls-Royce is making combustion engines green with hydrogen

Rolls-Royce has conducted successful tests of a 12-cylinder gas variant of the mtu Series 4000 L64 engine running on 100% hydrogen fuel. The tests, carried out by the Power Systems business unit, showed very good characteristics in terms of efficiency, performance, emissions and combustion. These tests mark another important step towards the commercial introduction of hydrogen solutions to meet the demand of customers for more sustainable energy supply.



Tobias Ostermaier, President of stationary power solutions, Rolls-Royce business unit Power Systems, explained: "This engine will serve the market demand for hydrogen solutions in the energy transition and will be available to our customers as a reliable and clean power source for gensets and combined heat and power plants."

The first installation of mtu engines running on 100% hydrogen is already planned for the enerPort II lighthouse project in the German inland port of Duisburg, as part of the development of a climate-neutral energy supply for a new container terminal.

Dr Jörg Stratmann, CEO of Rolls-Royce Power Systems, added: "We see hydrogen as one of the central elements of the energy transition. It can be used for both storage of excess energy and as a fuel, not only for engines but fuel cells and cogeneration plants to generate climate-neutral electricity and heat."

In times of low demand and high renewable energy generation from wind or solar, for example, the excess energy can be channelled through an electrolyser to convert water to hydrogen, which can later be used as fuel in any number of applications.

For several months, the mtu gas engine has been undergoing bench testing and continuous improvement in terms of efficiency, performance, emissions and combustion using 100% hydrogen as fuel. With green hydrogen, these mtu engines can be operated in a CO2-neutral manner in the future. For gas engines already installed, Rolls-Royce offers a conversion solution.

Andrea Prospero, an engineer at Rolls-Royce responsible for the development of the hydrogen engine, said: "We are very pleased with the rapid progress. The very low engine emissions are well below the strict EU limits, no exhaust gas aftertreatment is required."

Due to the different combustion behaviour of hydrogen compared to natural gas, some engine components including fuel injection, turbocharging, piston design and control, were modified in the test engine. However, by using proven technologies within the Power Systems' portfolio, such as mtu turbochargers, injection valves, and engine electronics and control, the development of the engine to use hydrogen was advanced quickly and efficiently.

Duisport, one of the world's largest inland ports, is working with several partners to build a hydrogen-based supply network for its new terminal, ready for operation in 2024. In the future, most of the electricity required by the port itself will be generated directly on site from hydrogen in a CO2-neutral manner. This will be achieved by two combined heat and power plants with mtu Series 4000 hydrogen engines (with a total installed capacity of 2MW) as well as three mtu fuel cell systems (with a total installed capacity 1.5MW).

As part of its sustainability programme, Rolls-Royce is realigning the product portfolio of Power Systems towards more sustainable fuels and new technologies that can further reduce greenhouse gas emissions. ■

German machine tool industry expecting growth in production in 2023

Manufacturers cautiously optimistic, noting increased effort required in training and development.

The VDW (German Machine Tool Builders' Association) is expecting production in the machine tool industry to grow by 9% this year to a volume of EUR 15.5 billion. In nominal terms, this is only 10% below the record result of 2018. At the annual press conference in Frankfurt am Main, Germany, Franz-Xaver Bernhard, Chairman of the VDW, said: "We have largely overcome the effects of the pandemic. This is reflected in the growth in production and in the order levels, which are only just short of the record result of 2018."

The industry has entered the current year with a ▸

significant backlog of orders. Even though the gap between orders and sales is currently closing, the German Federal Statistical Office is still reporting a twelve-month backlog of orders for the machine tool industry.

"This means that companies are well placed to weather any slump in orders in the first half of 2023, as suggested by the most recent figures," explained Bernhard.

Capacity utilisation is also rising steadily, having returned to 91.1% in January. The latest VDMA flash survey conducted at the beginning of December shows that 45% of machine tool manufacturers are cautiously optimistic about the current year.

Double-digit growth in 2022

According to VDW estimates, machine tool production grew by 10% last year, three points more than had been expected in the fall. This corresponds to a real increase of 3% and a volume of around EUR 14.1 billion. "At last, more machines can now be completed and delivered, because the supply situation for many metal components has improved," points out Bernhard. However, electronic component supplies remain tight.

Following a weak previous year, domestic sales grew by 16%, more than twice as fast as exports at only 7%. Europe came last within the Triad, at minus 3%. Eastern Europe performed particularly weakly because trade with Russia has largely collapsed. Cumulatively, German shipments have declined by nearly 80% since 2018. Italy has performed exceptionally strongly in the past two years, driven by a substantial subsidy policy for the purchase of machinery. Exports to Asia rose by 11%.

There was strong growth in exports to Thailand, India, Japan, and South Korea in particular. China was the main driver the year before. In 2022, the zero Covid policy made machine deliveries more challenging. Some exports were replaced by local production. Finally, the Americas were the main driving force with a 24% increase, driven by Brazil, the USA and Mexico. As the second largest market, the US is gaining in importance and, accounting for an export share of 14.7%, is closing in on China, at 18.7%. ■

Ford announce plans to return to F1 from the 2026 season

US automotive giants Ford have confirmed their intention to make a Formula 1 comeback when new engine regulations are introduced in 2026, meaning another chapter will be added to the American organisation's rich history in the sport.

Picture courtesy Motortrend

Ford's involvement in F1 stretches all the way back to the 1960s and the DFV (Double Four Valve) engine, built in partnership with British engineering firm Cosworth, which took 155 wins from 262 races between 1967 and 1985 (including several variant designs).

From their first title wins with Graham Hill and Lotus in 1968 to their most recent with Michael Schumacher and Benetton in 1994, Ford have played a part in 10 constructors' championships and 13 drivers' championships – making them the third most successful engine manufacturer in F1 history.

Some 20 years on from their last participation in 2004, the appeal of F1's future engine regulations – featuring increased electrical power and 100% sustainable fuels – will see Ford grace the grid once again from the 2026 campaign.

Stefano Domenicali, President and CEO of F1, said: "The news today that Ford is coming to Formula 1 from 2026 is great for the sport and we are excited to see them join the incredible automotive partners already in Formula 1."

"Ford is a global brand with an incredible heritage in racing and the automotive world and they see the huge value that our platform provides with over half a billion fans around the world."

"Our commitment to be Net Zero Carbon by 2030 and to introduce sustainable fuels in the F1 cars from 2026 is also an important reason for their decision to enter F1."

"We believe that our sport provides the opportunity and reach unlike any other and we cannot wait for the Ford logo to be racing round F1's iconic circuits from 2026."

Bill Ford, Executive Chairman, Ford Motor Company, commented: "This is the start of a thrilling new chapter in Ford's motorsports story that began when my great-grandfather [Henry Ford] won a race that helped launch our company."

"Ford is returning to the pinnacle of the sport, bringing Ford's long tradition of innovation, sustainability and electrification to one of the world's most visible stages."

FIA President Mohammed Ben Sulayem added: "There are few manufacturers who have such a celebrated motor sport history as Ford, so to see them coming back to the FIA Formula 1 World Championship is excellent news."

"It further underlines the success of the 2026 Power Unit Regulations that have at their heart a commitment to both sustainability and spectacle, and of course having more interest from the United States is important for the continued growth of the world's top motor sport category."

Ford's announcement follows on from Audi setting out plans to enter F1 from 2026, with the German manufacturer acquiring a minority stake in the Sauber operation that will become their works team. ■

Nidec completes the acquisition of the shares of Italian machine tool manufacturer Pama and its affiliates

Japanese machine tool manufacturer Nidec Corporation has announced today that it has completed the acquisition of all the shares of Pama S.p.A on February 1, 2023. Accordingly, Pama will become a wholly owned subsidiary of the company.

Pama, with a broad product portfolio and high technological capabilities in the fields of 5-axis face milling machines, machining centers, boring and milling machines, and large machine tools, boasts the world's largest market share as a boring and milling machine manufacturer, whose end users include major press machine builders, construction equipment manufacturers, heavy machine manufacturers for energy and earthmoving, shipbuilding and aerospace aircraft manufacturers.

In addition, Pama enjoys stable annual sales in Europe, North America, and China, a country where Pama has been in business since 1988.

Pama is one of the machine tool companies with longer traditions in Europe since it started its activity in 1926 producing boring and milling machines. in 1967 pama started to implement modern cnc control and automation techniques on their traditional production of horizontal boring and milling machines. All new products derive from this long experience and the constant study in solving application problems. ■

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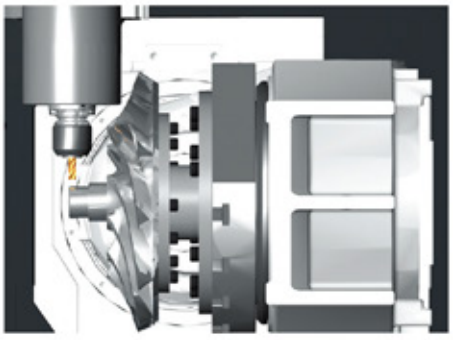

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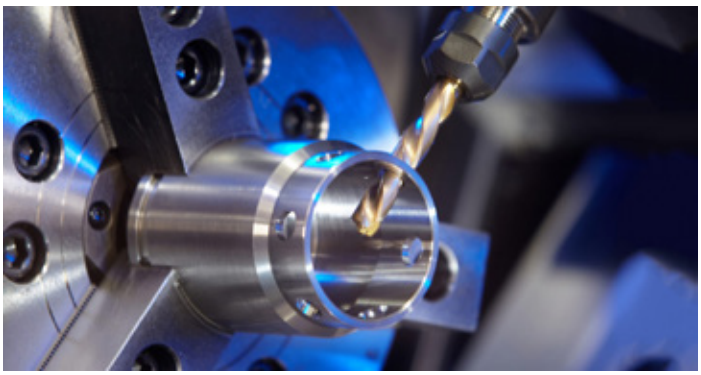
Sandvik acquires PMT Premier Machine Tools Limited



Sandvik has acquired 95% of the shares in the Irish based company PMT Premier Machine Tools Limited ("PMT"), a well-established solutions provider to medical customers in Ireland, with full coverage of machines, tools and services. The company will be reported within Seco, a division within Sandvik Manufacturing and Machining Solutions.

"The acquisition of PMT fits well with our strategy to strengthen our position in the fast-growing area of medical. Together with PMT, Sandvik will be able to offer complete machining solutions to the medical segment," says Stefan Widing, CEO and President of Sandvik.

PMT has through its strong partnerships the ability to deliver tailored machining solutions and services to its customers. The broad portfolio of services and know-how encompass the full machining process in medical, from design to verification, expanding Seco's offer from products to full solutions and services.

"PMT provides additional capabilities for Sandvik to grow within the medical segment, bringing strong relationships with key manufacturers of medical implants. We can build on PMT's medical machining know-how and, together with Seco's medical sales and application experts, expand into selected markets. We are very pleased to welcome PMT to the Group," says Nadine Crauwels, President of Sandvik Machining Solutions.

PMT was founded in 2000 and has 14 employees. In 2022, the company generated revenues of approximately SEK 120 million. The EBITA margin is neutral to Sandvik Manufacturing and Machining Solutions. Impact on Sandvik's earnings per share will be neutral. The parties have agreed not to disclose the purchase price.

For further details contact Sandvik Coromant on TEL: 010 500 2295 or visit www.sandvik.coromant.com ■

The world of laser technology plays a starring role at Lamiera 2023: Over 40 companies will exhibit

Exhibition space likely to be sold out with 300 exhibitors.

A little more than two months are left before the opening of Lamiera, the international trade show centred on sheet metal forming and sheet metal cutting machines and related technologies, scheduled to take place at fieramilano Rho from 10 to 13 May 2023.

In the exhibition halls, the proposal of technologies dedicated to sheet metal cutting will be particularly interesting. The world of laser technology has always played a starring role in the trade event promoted by Ucimu-Sistemi Per Produrre and organised by Ceu-Centro Esposizioni UCIMU. It will be represented by over 40 enterprises, as an expression of the best international production.

Besides laser, plasma and thermal cutting technologies for sheet metal, bars, sections and tubes, Lamiera will present a comprehensive offering of sources, consumables and machines, thus offering the visiting operators a complete and exhaustive overview of the laser segment, whose applications are becoming increasingly widespread.

Adh Italia, Alpemac, Amada Italia, Baykal Makina, Blm Group, Bodor, Comaf, Cutlite Penta, Cy-Laser, Dne Global, Eagle, Ermaksan, Ficep, Gweike Tech, Hpm High Performance Machinery, Hsg Laser, Hymson Italy, Kjellberg , Lag Machinery, Laserbergtech, Laser Plasma Systems, Laser Veronese, Laserisse, Le Macchine di Luca, L-Peak, Lvd, Mazak, Messer Cutting Systems, Mitsubishi Electric, Muratec, Optoprim, Prima Industrie, Prima Power, Salvagnini, Sei, Soitaab Impianti, Tecoi, Thermacut, Vd Industrial Equipments, Warcom and Zinetti Technologies/Schiavi Macchine International are the companies that have already sent their applications to exhibit at Lamiera. Once again, the exhibition stands out thanks to its complete presentation of this production segment.

Updated information on Lamiera and from March online preregistration is available on lamiera.net. ■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World first, multi-million manufacturing facility opens at the University of Nottingham

A new £3.8m facility that will revolutionise the world of manufacturing, making it more efficient and cost-effective, has opened at the University of Nottingham.

The state-of-the-art Omnifactory, a concept factory where different digital technologies are implemented to improve traditional manufacturing practices, was officially opened on Wednesday 1 March 2023 by Brian Holliday, managing director at Siemens Digital Industries and co-Chair of the Made Smarter Commission, with a keynote contribution from George Freeman MP, Minister of State for Science, Technology and Innovation.

Situated on the university's Jubilee Campus, Omnifactory is home to a bespoke test bed floor, developed in Nottingham, that provides a unique reconfigurable environment. The floor autonomously adapts itself to the next product's environment and specifications, reshaping itself through a combination of digital technologies, robotics, and artificial intelligence.

Svetan Ratchev, director of the Institute for Advanced Manufacturing said: "Omnifactory is a unique facility that will allow us to develop, demonstrate and rapidly implement the latest digital manufacturing technologies in industry."

"Working closely with our industrial partners, we aim to transform current practices and improve productivity across different sectors by developing the next generation of smart, highly agile, and efficient factories, which will also support localised manufacturing supply chains."

"By leveraging technologies such as the Industrial Internet of Things (IIoT), artificial intelligence (AI) and data analytics, we can dramatically accelerate the development and sustainable manufacturing of new products and deliver significant societal, economic, and environmental benefits."

"Manufacturing processes have a significant impact on the environment, with a large proportion of the carbon footprint of some products being created during their production and logistics. By creating a new generation of smart, highly efficient factories embedded in local supply chains, we will contribute to the net-zero agenda and make a significant step towards the circular economy." ■

Studer hosts Motion Meeting Expedition 2023

1912 was the year that Fritz Studer launched Fritz Studer AG in Steffisburg, Switzerland. Today, the company is a leading builder of universal, internal and external grinding machines.

To update more than 60 members of the press from across the globe, as well as company representatives, about its business activities and new developments, Studer held what it called the Motion Meeting Expedition 2023 at its headquarters in February.

The new S100 internal cylindrical grinder for the entry-level segment

In his welcoming address at the event's press conference, CEO Jens Bleher spoke about the company's roots. "Since then, the pioneer in cylindrical grinding has presented countless technological innovations, a long tradition that is our obligation for the future. After a remarkable final spurt at the end of the year, Studer started 2023 in full momentum, with ▸

a large order backlog."

Sando Bottazzo, Managing Director emphasised that preparation was essential to success. He added that Studer takes the same approach to growing its business and experienced strong sales last year as a result. "Overall, it was the third-best year in our company history in order intake. All in all, in 2022, we once again succeeded in expanding our position in the most important markets in the world and increasing our market share."

Daniel Huber, chief technology officer, pointed out that last year also brought numerous new developments and an expanded product range. "In 2022, we presented an innovation at almost every large trade show. For example, Studer showcased the S36 production grinder at GrindingHub in Stuttgart, Germany. The machine closes a gap in the company's portfolio between the S11 and S22 and is well-suited for grinding electromobility components. The S36 is available with a monitoring concept for energy and air consumption."

COO Stephan Stoll wrapped up the press conference by speaking about the company's investment in the future. In the coming year, he noted, spindle shaft production will be renewed and expanded, and the warehouse and logistics infrastructure will be comprehensively modernised by 2025. In 2023, he said Studer expects a stable and strong output, possibly higher than last year.

The "Expedition Jungle" presentation, which focused on using, technology, concentration, instinct, and courage to successfully navigate the wilderness of manufacturing, showcased the new S100 internal cylindrical grinder for the entry-level segment. During development, special attention was given to a simple and efficient design of the components, making operation and maintenance easy, according to the company. In addition to typical parts that can be ground on the S100, including collets, bearing rings, ball bearings and cylinders, external and internal grinding of threads and non-circular forms is possible.

For further details contact Retecon on TEL: 011 976 8600 or visit www.retecon.co.za ■

Unconnected factories face risk as new strategies take hold

Unconnected factories face risk as new strategies take hold

Check out this report on how manufacturers in the metals, automotive, rubber and plastics industries can use these smart technologies to gain a market advantage before their competition does.

The fourth industrial revolution has begun and businesses need to be ready. It includes the addition of smart and autonomous systems partnered with data and machine learning. This will result in smart factories, where assets, processes, people and devices are all connected. Cyber-physical machines will monitor physical processes, create and share information with each other, and make decisions without human involvement. They will use the industrial internet of things, big data, cloud computing, cognitive computing and AI to maximise plant efficiency and productivity while reducing costs and waste.

In a recent Deloitte survey, 86% of US manufacturers thought that "smart factories will be the primary driver of competition by 2025," and 83% felt they "will transform the way products are made." In the same survey, 35% of US manufacturers said they had converted at least one factory to smart status or were "currently implementing initiatives related to smart factories."

The remaining 65%, however, had not yet acted to move their companies in this direction. Certain trends are expected to impact many of industrial manufacturing equipment's key segments, including metals, automotive, and rubber and plastics.

In the next five years, industry advances will include the processing of stronger, lighter materials that are replacing steel, machines that produce more complex parts with smaller tolerances at higher speeds, smart "cobots" and SCARA robots operating alongside factory workers, and software that incorporates machine monitoring, reporting, and predictive diagnostics.

Metals industry: US and global markets

According to the US Census Bureau (Annual Survey of Manufactures), US manufacturers' sales of metalworking machinery in 2019 totalled $31.8 billion.

Of this amount:

- 27% was special tool and die, die set, jig and fixture manufacturing
- 25% was machine tool manufacturing
- 19% was industrial mould manufacturing
- 17% was cutting and machine tool accessory manufacturing
- 11% was rolling mill and other metalworking machinery manufacturing

(This data does not include US imports. It does not represent the total US market for metalworking machinery.)

Worldwide, due to the pandemic, global machine tool consumption fell from $85.6 billion in 2019 to $65.7 billion in 2020, a drop of 23.2% according to the German Machine Tool Builders' Association (VDW) and Oxford Economics. Supply and demand were negatively impacted by labour shortages, reduced orders, and shipping disruptions which affected global supply chains.

Predictive diagnostics

The integration of sensors, monitoring devices and

software enables machines to track and report on their own performance, alerting operators to problems. This enables downtime to be scheduled rather than having an emergency shutdown when the part fails. A wide range of sensors are now available that are small and accurate, able to continuously measure and report on different machine variables and operating conditions.

Continuing labour shortages

Manufacturers were suffering from labour shortages before the pandemic, and this problem will likely persist after the recovery. The most experienced factory workers are retiring, and an increasing number of young people are choosing other occupations. These factors are expected to spur growth in labour-saving automation and digitally driven processes. The latter may even attract and help retain young people in the profession. Many modern machines incorporate features that make them easier to use and more relatable to younger employees, such as touchscreens, app-like controls, and intuitive software.

Increasing focus on aftermarket services

Global equipment manufacturers are offering more aftermarket services to customers, including maintenance, service agreements, spare parts and other value-added services, which have a higher profit margin than sales of original equipment. Services also allow manufacturers to smooth out their income stream during a slow economy.

It has grown difficult for OEMs to find qualified service techs, especially as older technicians retire, and machines are becoming more complex with the addition of digital technologies. As a result, manufacturers are shifting customer service to online platforms. Some OEMs can now access their machines directly through a VPN, enabling technicians to troubleshoot and solve problems remotely to avoid the time and cost of onsite visits.

This white paper includes both global and US market trends that are driving new thinking, designs, and technologies. It can be viewed at: https://cdn.base.parameter1.com/files/base/indm/multi/document/2023/01/Trends_in_Industrial_Manufacturing_Equipment___Anna.63c6f19eaf3d1.pdf ■

China overtakes the United States in robot density

China's massive investment in industrial robotics has put the country in the top ranking of robot density, surpassing the United States for the first time.

The number of operational industrial robots relative to the number of workers hit 322 units per 10 000 employees in the manufacturing industry. Today, China ranks in fifth place. The world's top 5 most automated countries in manufacturing 2021 are: South Korea, Singapore, Japan, Germany and China. This is according to the World Robotics 2022 report, presented by the International Federation of Robotics (IFR).

"Robot density is a key indicator of automation adoption in the manufacturing industry around the world," said Marina Bill, president of the International Federation of Robotics. "The new average of global robot density in the manufacturing industry surged to 141 robots per 10 000 employees – more than double the number six years ago. China's rapid growth shows the power of its investment so far, but it still has much opportunity to automate."

Robot density by region

Driven by the high volume of robot installations in recent years, Asia's average robot density surged by 18% compound annual growth rate (CAGR) since 2016 to 156 units per 10 000 employees in 2021. The European robot density had been growing by 8% (CAGR) in the same period of time reaching 129 units. In the Americas it was 117 robots – plus 8% (CAGR).

Top countries

The Republic of Korea hit an all-time high of 1 000 industrial robots per 10 000 employees in 2021. This is more than three times the number reached in China and makes the country number one worldwide. With its globally recognised electronics industry and a distinct automotive sector, the Korean economy profits from two large customer industries for industrial robots.

Singapore takes second place with a rate of 670 robots per 10 000 employees in 2021. Singapore's robot density had been growing by 24% on average each year since 2016.

There is a remarkable gap to Japan (399 robots per 10 000 employees) which ranks third. Japan's robot density had grown by 6% on average each year since 2016. Germany in fourth place (397 units) is the largest robot market in Europe.

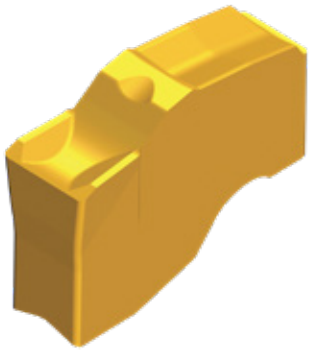
China is by far the fastest growing robot market in the world. The country has the highest number of annual installations, and since 2016 it has each year had the largest operational stock of robots.

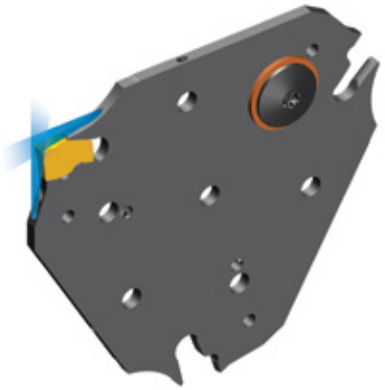
United States

Robot density in the United States rose from 255 units in 2020 to 274 units in 2021. The country ranks ninth in the world, down from seventh – now head-to-head with Chinese Taipei (276 units) and behind Hong Kong (304 units) and Sweden (321 units). ■

TaeguTec's innovative, advanced Win-Cut line for parting, deep grooving

Cutting-edge industries turn to Win-Cut for high performance.





At TaeguTec, economic conditions and pandemics have not slowed down the advancement to supply next generation metalworking products. In fact, they accelerated it with the introduction of the Win-Sfeed line of performance-driven cutting tools.

Following the incredibly advanced performance-driven Sfeed-Tec line introduced a few years ago, the metalworking giant went further with even more innovations that guarantee incredible machining productivity by attaining quicker speeds and higher feed rates, as well as longer tool life and unsurpassed consistency.

These technological advances in cutting tools specifically cater to the changes in manufacturing, such as the shift to electric-driven technology employed in the automotive industry and the overall digitisation phenomena taking place in every industry.

In response, TaeguTec's "Advanced Machining" tagline will inspire manufacturers to attain greater performance from their cutting tools while reducing cost in order to create consistent, reliable and safe products.

The powerful new Win-Sfeed line is applied to every family of tools within the TaeguTec umbrella. The optimised new tools have sensational and creative cutting geometries and clamping mechanisms that firmly secure the tools in place; simply put, the result is stable, vibration free, rapid machining with unmatched industrywide overall performance.

The innovative and superlative Win-Cut line and its new robust insert include three insert pockets and dedicated blocks that enable unsurpassed stable machining in parting and deep grooving applications.

The Win-Cut line delivers a great surface finish with no vibration in high feed or interrupted cutting situations.

Its reinforced blocks, which are designed to support the three insert pocket blades, firmly seat the blade on two sides. To significantly increase productivity, tool life, and chip evacuation, the blades include top and bottom internal through-coolant channels that are directed accurately to the insert's cutting edge.

For greater productivity, the line's user-friendly and unique clamping system enables machining at high speeds and feeds while helping machine operators save time, which in turn reduces tooling downtime.

The triangular blades are compatible with the highly popular T-Clamp workhorse inserts and the technologically advanced Cut-Sfeed inserts.

The thicker height insert of the Cut-Sfeed has a bottom-stopper and a specialised three-area contact that is more secure and reliable than conventional self-grip types. This enables improved surface roughness, insert position repeatability, and tool life even under tough machining conditions.

Furthermore, the Win-Cut line is compatible with a wide variety of machines including multitasking and general CNC machines.

For more information contact TaeguTec SA on TEL: 011 362 1500 or visit www.taegutec.com ■

METALWORKING NEWS

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DMG MORI launches new entry-level 5-axis machining center

At the recent DMG MORI open house held at the machine tool manufacturer's Pfronten factory in Germany, a new 5-axis machining center was launched aimed at the entry-level market. Less than two metres wide, the compact, competitively priced DMU 40 is capable of fully interpolative 5-axis machining to within microns within a 550mm x 450mm x 420mm working volume.

Of trunnion-mounted rotary table design, the machine is based on the DMU 50 3rd Generation, of which more than 10 000 have been sold worldwide, and features best-in-class components as well as preparation for automated production.

The one-piece machine bed made from grey cast iron, optimised geometry of the Y and Z-axis slideways and the inline spindle with hydraulic clamping all ensure high rigidity. Direct-drive ballscrews in the X and Y axes improve surface quality. For machining flexibility, the swivel range of the B-axis extends from -35° to 110°.

The ergonomic design of the DMU 40 offers optimal accessibility to the work area. Table loading height is 800mm and the distance from the operator to the table centre is short, while it is also possible to load components by crane. A large window and improved lighting provide good visibility. Optionally, the tool magazine may be loaded from the front.

There are three machine options with different equipment packages to meet customers' individual requirements. The standard DMU 40 has a 12 000rpm spindle and 24-position tool magazine. DMU 40 PLUS features a 15 000rpm spindle and a tool magazine with 30 pockets, linear scales and passive cooling of all main components. DMU 40 PRO is the most accurate and productive model, with active cooling and a 20 000rpm spindle.

The machine may optionally be fitted with automation in the form of a PH 150 pallet handling system or Robo2Go Milling robotic handling of workpieces, allowing customers to take advantage of autonomous production including overnight and at weekends.

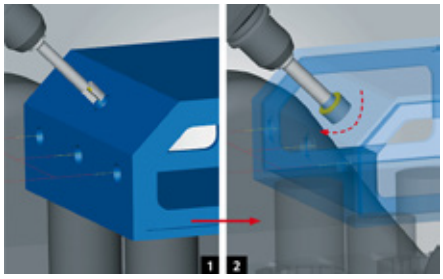
For further details contact Retecon on TEL: 011 976 8600 or visit www.retecon.co.za ■

OPEN MIND releases hyperMILL 2023

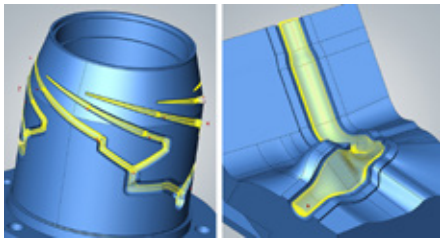
Load faster, calculate faster and create backbores.

The shift to hyperMILL release 2023 makes the CAD/CAM suite from OPEN MIND Technologies AG even more powerful and introduces innovative functions. Not only does the software load faster, but the calculation time of tool paths was able to be accelerated as well. In addition, the "General Transformation Pattern" function assures that you save time when machining recurring geometries. The new back boring machining strategy attains the highest degree of convenience and safety via its use of Virtual Machining technology.

OPEN MIND has equipped hyperMILL 2023 with a machining strategy for back boring. Programming the controller for the tools used to deburr and mill a countersink on the inaccessible back side of a hole can now be done with incredible ease. Because collision control is carried out using a 3D model of the tool in the virtual machine, damage created when inserting and retracting tools is safely avoided.



2.5D back boring: Collisions when inserting and retracting tools are reliably avoided



Convenient programming of continuous tool paths for grooves, tubes, and half pipes with any cross-section

Automatically transform any function

Up to now, standard features such as pockets and holes were able to be selected automatically. With the "General Transformation Pattern" function, OPEN MIND now makes it possible to select any reference geometry and search for that same reference in all other models, regardless of its spatial orientation. This creates a general transformation pattern including a frame at each reference feature. This makes it easy to program recurring shapes with a single click. The function is also suitable for multiple setups, for example.

5-axis strategy for more uniform surfaces

The "5-axis halfpipe finishing" strategy makes it incredibly convenient to programme continuous toolpaths for grooves, tubes, and halfpipes with any cross-section along an arched guide curve. This is a great advantage for users, as previously, this machining operation may have had to be divided into several steps. This strategy opens a wide range of applications, for example, in moulds and dies where the tool axis points in the demoulding direction.

CAM in dialogue

The example of back boring and its collision control based ▸

on a digital twin shows how hyperMILL Virtual Machining is already playing a role in standard functions. Simulation technology based on real NC and machine data is becoming increasingly more important. OPEN MIND is driving the necessary communication between CAM system and machine controller forward. Currently hyperMILL Virtual Machining supports controllers from Heidenhain, Siemens, Mazak, Fanuc, Fidia, Okuma, Röderstec, D.Electron and Hurco. Others are to follow.

CAD, CAM and data

hyperMILL 2023 not only leverages advances in computing power and software engineering to increase performance, but it also streamlines processes. For example, the hyperMILL Simulation Center loads faster because it does not include unnecessary data for the calculation at hand. The optimised handling of data also proves to be an improvement in another area. hyperMILL now makes it possible to import individual components from assemblies. Users can now use filters to select individual components when importing assemblies from other design systems' native data. This reduces loading times for large assemblies and eliminates the need to subsequently delete individual parts that are not required.

Another new feature in hyperCAD-S, the CAD part of the software suite tailored to CAM programmers' needs, is the revision of the "Holes" function. A hole can be composed and parameterised from a library of hole fits, countersinks, and hole ends via a dialog, which includes a preview. To improve graphic clarity, threads can also be displayed if required.

For further details contact Hi-Tech Machine Tools on TEL: 011 608 0088 or visit www.hitech.co.za

The new "General Transformation Pattern" feature makes it easy to programme recurring shapes with a single click

Kennametal introduces gold standard turning insert grade with advanced coating technology

KCP25C grade with KENGold coating sets new standard for wear and productivity in steel turning.

Kennametal has introduced a new, higher performance turning grade with an advanced coating technology. KCP25C with KENGold is the first choice for metal-cutting inserts with improved wear and higher metal removal rates for steel-turning applications.

"Our high performance KCP25C grade inserts with KENGold coating technology set a new standard for machinists working across a variety of steel turning applications," said Vice President of Global Product Management Scott Etling.

"This gold standard turning insert delivers a one-two performance punch of higher metal removal rates and improved wear resistance, meaning our customers can machine longer and with greater productivity and efficiency than before. Additionally, the insert's gold flank makes it easy to visually identify wear, maximise edge use and reduce waste."

KCP25C is a carbide grade for turning inserts in general purpose applications in a variety of steel materials and delivers consistent, repeatable performance. KENGold is a proprietary, multi-layer coating technology with enhanced pre- and post-coat processes that deliver an effective thermal barrier for greater crater wear resistance, typically experienced in these types of machining applications.

Key features and benefits of KCP25C with KENGold include greater wear resistance for more reliable, consistent tool life, improved toughness and reduced chipping, enhanced edge protection for greater machining accuracy and reliability, the gold flank makes it easier to identify wear and reduce waste from unused edges and increased cutting speeds for increased metal removal rates and higher productivity.

KCP25C with KENGold is an example of how Kennametal's global modernisation investments are enabling the company to innovate higher-performing products for customers. The company uses next generation chemical vapor deposition (CVD) technology to produce the coating while advanced pressing and surface treatment technologies deliver tighter tolerance levels than ever before, resulting in a more consistent, reliable tool life.

Kennametal has released KCP25C with KENGold in the most common insert shapes and styles: C, D, S, T, V and W. Longer term, the company plans to expand on KCP25C with additional turning insert shapes and styles, all featuring the KENGold coating technology.

For more information contact Kennametal South Africa on TEL: 011 748 9300 or visit www.kennametal.com ■

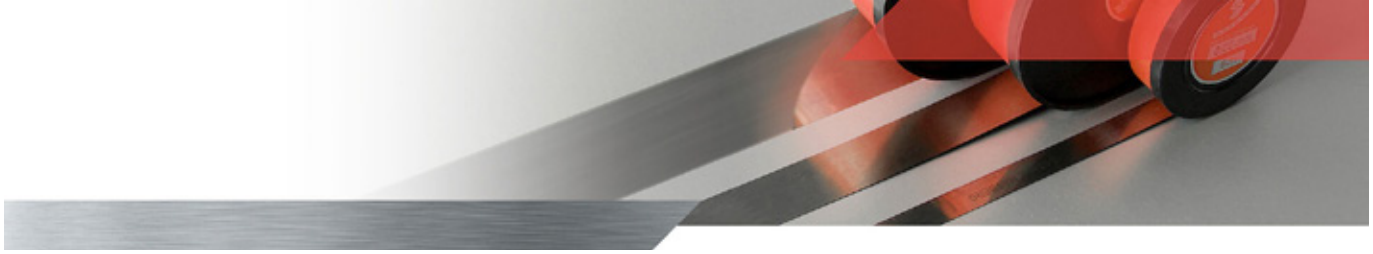
Uses for feeler gauge from Hasberg

Mechanical assemblies such as machines are built up from a series of mating parts. The fit of those parts is often designed to be within a specified tolerance that assures reliable operation for the machine – for example, the fit of a piston into the cylinder of an engine. If there is too tight a fit or clearance between the piston and cylinder, the engine may suffer from excessive wear and friction, shortening the life of the unit and resulting in maintenance costs and downtime. If the gap or clearance is too wide, combustion gases may escape during compression, reducing the engine performance. To make certain that gaps and clearances are within specified limits, engineers, mechanics, and machine operators rely on the use of measuring devices such as a feeler gauge.

What is a feeler gauge?

Feeler gauges, sometimes called thickness gauges or feeler gages, are mechanical measurement instruments that are used to provide a precise reading of the gap that exists between two parallel surfaces, such as the clearance between two machine parts or elements. Feeler gauges are typically sold as what is termed a set, with each set consisting of a series of dimensionally accurate pieces of shim stock that are joined using a common shaft and nut or riveted connection. The individual pieces, which are called blades, leaves, or plates, have very precisely calibrated thicknesses and can fold or fan out as needed when a measurement is to be taken, and can be recessed back on top of one another to fit into the gauge handle, which serves to protect the individual blades from damage when the tool is not in use. The blades are typically produced from a high carbon steel material. The use of high carbon steel is designed to ensure that the blade material will not compress during the measurement process, thus assuring that the gap measurements are accurate. Some models have a locking nut that can be tightened to maintain the blade position during use.

Each blade is annotated with its thickness designation. ▸



Different feeler gauge sets are sold with varying numbers of blades in them, which then corresponds to the overall gap range for which the gauge can be utilised.

Types of feeler gauges

The most common type of feeler gauge, called a straight leaf or straight blade gauge, consists of straight blades of uniform width constructed of high carbon steel sold in a set to cover specific dimensional values. However, there are variations on this standard that serve specific purposes.

Within the blade variety of gauge, some variations include changes to the blade length (long blade and short blade feeler gauges) as well as bent blade (also called offset) gauge sets. The bent blade gauge set can provide for easier use in space-constrained applications and for use in areas with restricted movement and access to the gap being measured. There is also a tapered blade type of gauge set, wherein the width of the blade becomes progressively narrower towards the blade tip, which again, can prove valuable when there are space limitations involved in the work area.

Go/no-go feeler gauges utilise blades that have a precision step between two specific thicknesses, rather than having blades that have a uniform thickness across their entire length. Go/no-go feeler gauges are designed to simplify the interpretation of the clearance or gap value by reducing the need to rely on the user's "feel" of the gauge, instead bracketing the clearance or gap value with a greater than/less than tolerance window.

Another type of feeler gauge replaces the use of a shim stock type blade with calibrated metal wires whose ends are bent to a right-angle. This type of gauge is termed a wire feeler gauge or a spark plug gap feeler gauge, owing to its principal use for setting the gap on spark plugs for combustion engines.

While many feeler gauge sets are available as standard items for purchase, there are also suppliers who will create customised feeler gauges to meet specific needs or applications. These customisation options may involve providing gauges that feature alternative blade materials, packaging, blade sizes, blade shapes, and tapers, as well as specialised markings.

Hasberg offers strip steel in a wide range of forms and types

Hasberg's product range includes strip steel in various lengths, widths as well as hardness grades. products made from strip steel (spring band steel, carbon steel etc.) in the form of feeler gauge bands and metal foils (for example, precision foils). Steel strip, such as carbon steel or spring band steel can be used in many fields of application.

For further details contact Duncan Macdonald & Co on TEL: 011 444 4345 or visit www.macduck.co.za ■

Sandvik CoroMill Dura offers flexible roughing and finishing in multiple materials

Versatile range of solid end mills.

Cutting tool and tooling system specialist, Sandvik Coromant has introduced a completely new range of high-end versatile solid end mills. CoroMill Dura will replace the existing versatile CoroMill Plura end mills. The concept is developed for roughing to finishing with different engagements in all applications and materials.

What makes CoroMill Dura stand out compared to the former versatile concept and competitor end mills, is the WhisperKut technology. Dr. Markus Groppe, Global Product Application Manager at Sandvik Coromant, explains the unequal helix concept: "Each flute is oriented at a different helix angle and every level of the cutting edge is unequally spaced from the others. This way you can achieve very good stability and efficient machining without vibration."

Another noticeable feature is how easy it is to choose the correct tool within the comprehensive range of solid end mills presented in the offer. "We have put extremely high effort on the tool selection aspect. Finding the right tool within the CoroMill Dura assortment should never be a hustle," continues Groppe.

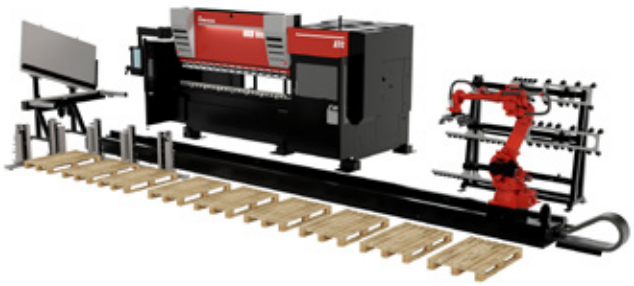
First choice is the four-flute plug and play solution, which works for a wide range of applications. Additional tool variants are available for more specific operations, such as key slots, dynamic milling, semi-finishing and finishing. Further assistance can also be given with the CoroPlus Tool Guide for CoroMill Dura online tool selector supporting the application areas slotting, side milling, pocketing and helical interpolation, all to make tool selection simpler.

CoroMill Dura is available from two to seven flutes with 1 to 4×D cutting length, with and without chip divider. The end mills can be reconditioned up to three times to original specifications.

For further details contact Sandvik Coromant on TEL: 010 500 2295 or visit www.sandvik.coromant.com ■

Amada releases a fully automatic retrofittable bending cell

Amada developed the RBR fully automatic bending solution as the answer to its customers requirement to produce a wide range of part sizes with a reliable and fast bending cycle, whilst maintaining high quality standards.



Amada's RBR series, a fully automatic solution with the possibility to schedule a large production run of different parts, is now available for the European market, The bending cell is equipped with all the appropriate devices to bring the necessary flexibility required by our customers, such as the automatic tool and gripper changers, and the motorised regripping units to support the part manipulation by the bending robot.

From the press brake side, the HRB-ATC series, available both as 100 tons 3 metres and 220 tons 4 metres, offers the advantages of fully automated production thanks to the automatic tool changer (ATC). The ATC, which is able to reduce the set-up time of the press brake by up to 80% compared to a manual tool loading, is also an essential device to let the operator schedule the requested production without any tool layout restriction. The Amada HRB-ATC series also features a punch reverse function and automatic crowning, compensating for deflections in the upper and lower beams when pressure is applied, which comes as standard to boost precision for users.

The Amada RBR series is available with either a 50kg or 200kg payload robots, selectable depending on the needs of the customer's production. The flexibility of the solution is granted by the support of a wide range of part size, from a minimum of 300mm x 200mm for either robot, up to 2 000mm x 1 000mm for the 50kg robot and 3 000mm x 1 500mm for the 200kg version. Subcontract fabricators serving markets such as refrigeration, kitchen equipment, retail display, furniture, and construction, for example, will certainly benefit.

This high level of automation is possible thanks to the offline programming module VPSS 3i Arbend and the Cell Manager scheduling system. Starting from a 3D model of the part to be processed, Arbend automatically programs the bending cell with just a few clicks of the mouse, while Cell Manager organises the full production autonomously.

The standard configuration includes a loading area, which allows you to load up to six stacks of different parts, a thickness detection device, to confirm the pick-up of a single piece before proceeding with the following phases, a reference table, and a customisable unloading area based on different pallet configurations. The motorised regripping unit and automatic gripper changer (AGC), which can store up to nine grippers, complete the standard package of devices. This configuration allows you to schedule any type of part without manual operator setup.

For further details contact Amada Johannesburg on TEL: 011 453 5459 or visit www.amada.co.jp

Mazak Integrex i-100HS multitasking machine for complex part applications

The Integrex i-100HS multitasking machine combines the abilities of a full-function machining center and a high-powered turning center to produce small and medium-sized workpieces in single setups.

Mazak says its Integrex i-100HS multitasking machine offers a small footprint and simultaneous 5-axis capabilities along with maximum versatility, high precision and throughput for complex part applications. The machine is said to combine the abilities of a full-function machining center and a high-powered turning center to produce small and medium-sized workpieces in single setups.

The machine employs a main and second spindle headstock with a 203mm chuck and 61mm diameter bore mounted on a 11kW, 6 000rpm integrated spindle motor for handling a range of applications, from heavy-duty cutting at low speed to high-speed cutting of nonferrous materials. It also offers an optional 74-tool automatic tool-change magazine.

A vertically mounted milling spindle provides 24kW, 12 000rpm and a rotating B-axis range of -30 degrees to +240-degrees. A roller cam drive for the B axis is said to ensure higher accuracy and rigidity, while providing zero backlash. A 36-tool (72-tool optional) magazine enables for fast tool changes and provides ample tooling for continuous part processing.

The machine also provides a Y-axis travel of 210mm and vertical X-axis travel of 450mm. The machine accommodates parts up to 500mm in diameter with a maximum machining length of 854mm.

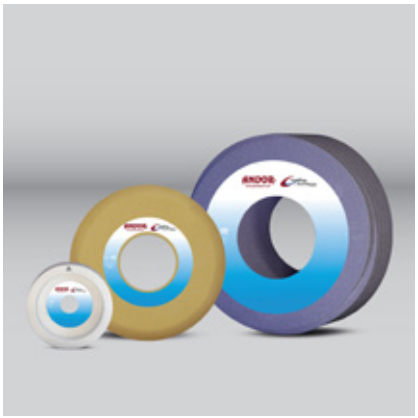
It also uses the Mazatrol SmoothAi, which is said to offer productivity advantages to the most demanding machining operations. The company says the Integrex i-100HS ensures the shortest possible machining cycle times, especially in fine-increment programmes for simultaneous 5-axis operations and free-form, die-mould machining. The control incorporates a variety of advanced programming functions said to make it easy to use and ensure high-speed, high-accuracy machining performance.

For further details contact Hi-Tech Machine Tools on TEL: 011 608 0088 or visit www.hitech.co.za ■

Andor abrasives: Optimum bonding systems with Grinding Techniques

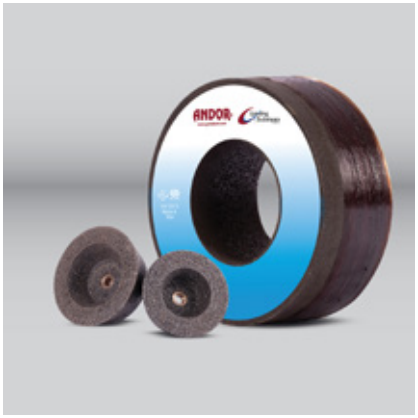
Bonding systems play a critical role in the performance of precision abrasives and can be seen as the “glue” that keeps everything together.

A high-quality bonding system holds the grain in place up to the optimum point where the grain is held just long enough for it to get blunt, and then to release the dull grain, in order to expose new sharp grains to continue with the cutting operation. A poor bonding system, however will release grain too early during operation which is also known as premature grain shedding, however where a bonding system holds the grain in place for too long, it will start glazing and eventually burn the material, resulting in an increase in dressing cycles between grinding operations, leading to a rise in lost time and inventory on grinding media.



Vitrified wheels

Vitrified application



Resin wheels

Resin wheel application

Two of the most popular bond systems, the Vitrified and Resinoid products, can be distinguished with the letter V for Vitrified, and the letter B, for Resinoid as part of the product specification. With both bonds being equally suitable for various applications, each one has certain characteristics that sets it apart from the other.

A vitrified bond is constructed from different types of clay and grains and are fired in a kiln at temperatures typically above 1250 degree Celsius. During this firing operation the clay or feldspar bonds with the grains around it. During the cooling process, each grain is surrounded by a glass like material which strengthens the bond and adds to the wheel’s overall rigidness. With these characteristics a Vitrified precision bonded wheel is perfect for applications requiring high stock removal where precision tolerances are required.

These wheels are often referred to as glass like in nature, as they are not able to handle any shocks or blows, compared to a Resin bonded wheel which are more rigid and resistant to shocks or blows.

Although not as rigid, Vitrified bonded wheels can be stored indefinitely, as they are not affected by water, or variations in temperature, while Resin bonded wheels are affected by alkali, humidity, and extreme weather conditions, resulting in deterioration of the bond over time.

Resin bonded systems are constructed from Phenolic resins and different types of fillers which gives it its characteristics. It is cured in ovens between 150 to 200 degrees Celsius, making it tougher but less rigid than a Vitrified bond, and suitable for precision grinding applications running at high speeds, necessitating high stock removal.

While Vitrified bonds break away under pressure during application, Resin bonds require heat to break away. In some cases, when insufficient pressure is applied during operation, Vitrified bonds will clog, as the bond cannot break away to expose new sharp grain at the optimum point on application. This can easily be rectified by increasing the pressure or infeed rate during the grinding operation.

When Resin bonded precision wheels are exposed to too much heat during operation, the bond system will break away too rapidly at the point of contact. To rectify this, coolant can be increased to keep both the workpiece and grinding wheel as cool as possible. It is of utmost importance to maintain any coolant when the acidity level creeps up, as a too high acidity level will attack the bonding system, causing it to break away prematurely. Cleaning out the whole coolant system and replacing it with a mixture at the correct percentages will alleviate this during application.

To ensure precision grinding applications are served with the best in bonding systems, it is important to partner with a supplier that understands these factors. Grinding Techniques have been locally manufacturing Andor precision abrasives for over 40 years.

For further information contact Grinding Techniques on TEL: 011 271 6400 or email info@grindtech.com or visit www.grindtech.com ■

Heavy-duty machining from Victor

Designed to tackle all heavy-duty machining requirements, the new Victor Vcenter G-series of machines are built with stability and rigidity in mind. The G-series is ideal for high material removal rates and applications where manufacturers are processing particularly challenging materials.

The powerhouse 3-axis G-series is available in three size variants to meet the diverse demands of the industry. The machines incorporate a meehanite casting with a wide base A-Frame design, a wide span column, four box ways and screw removers with a wide box way, all factors that enhance performance and stability.

The three G-series variants include the G105, G135 and G165. The smaller G105 provides XYZ-axis travel of 1 050mm x 600mm x 600mm, which stretches to a spacious 1 650mm x 850mm x 900mm on the largest G165. This impressive freedom of movement is matched by the accommodating bed sizes of 1 100mm by 600mm (G105), 1 400mm by 700mm (G135) and 1 700mm by 800mm (G165).

Furthermore, the robust nature of the range permits the loading of components up to 1 200kg, 2 200kg and 2 500kg respectively for the three machines.

Common features on all three variants include a powerful gearhead spindle design that generates a power output of 18.5kW with a torque level of 498Nm. Developed, manufactured and built in-house by Victor, the 6 000rpm gearhead design spindle retains maximum torque levels throughout the speed range.

This makes the Vcenter series particularly suitable for machining hard materials and exotic alloys with high material removal rates. Additionally, the G-series incorporates a Big-Plus BBT-50 spindle taper that guarantees dual face and taper spindle contact for precision, repeatability, performance and high-quality surface finishes.

The Victor Vcenter has an automatic tool change unit with 24 tool capacity and the option for 32 or 40 tool positions. All positions can accommodate tools up to 15kg. The axis feed motor generates 3kW of power on all axes with a rapid feed rate of 20m/minute and axis acceleration of 0.28G, which is driven through large 50mm diameter ballscrews to further enhance stability.

As standard, the Victor Vcenter G-series is supplied with the latest Fanuc 0i-MF Plus CNC, fully enclosed splash guarding, spindle oil cooler, screw-type chip removal, bottom guarding for coolant flushing, rigid tapping, three-step warning lights, auto power off and levelling pads.

Like every Victor machine available from GM CNC, the series is available with a host of options to meet specific user requirements including a 4th and 5th axis interface for increased flexibility, 32 or 40 tool ATC, and probing for automatic tool and component measuring.

Additional options are through spindle coolant, chip conveyor with cart, air conditioning for the electrical cabinets and linear scales for enhanced precision levels. Customers can also select a table shower, oil skimmer, automatic doors, air and coolant guns and more.

For further details contact Victor Fortune on TEL: 011 392 3800 or visit www.victor.co.za ■

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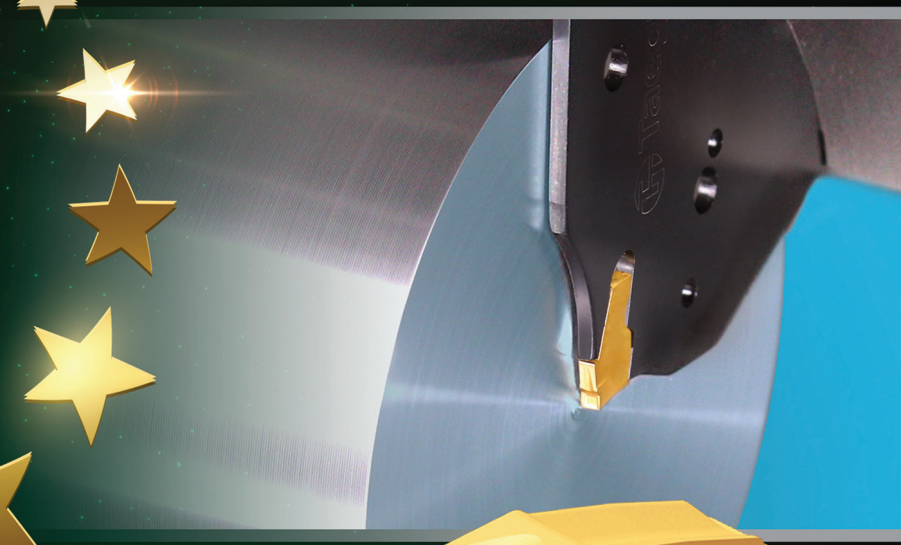

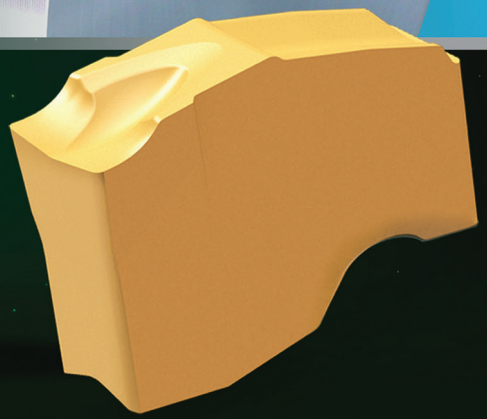

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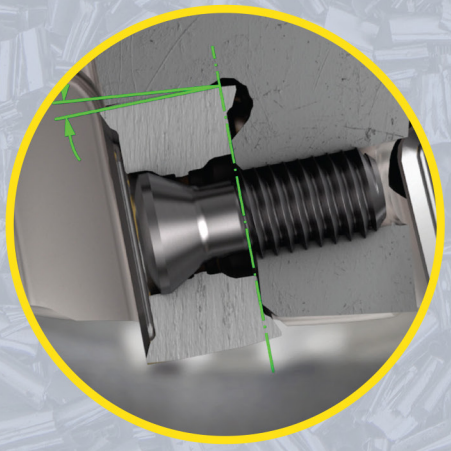

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