castings sa
volume 24 number 4
DECEMBER 2023


linkedin.com/company/foseco
FOSECO
The future of industry is partnership.
No one has all the answers. But we do all have part of the answer. It's why we don't just work for you. We work with you. And thanks to our global presence, we can do that wherever you are in the world. Together we find the best solutions to your challenges. That's what we do. We are Foseco.
Read more about STELEX Optiflow 3D
Additive manufactured filters for ferrous castings
VESUVIUS
A VESUVIUS GROUP COMPANY

castings sa

A specialised journal covering the technology, processors and materials field for castings

volume 24 number 4
December 2023

Castings SA
vol 24 no 4

Publishing Editor
Bruce Crawford

Online Editor
Damon Crawford

Editorial Board
Marc Hindle

Production Manager
Wendy Crawford

Layout
Ria Arnold

Advertising
Bruce Crawford/Wendy Crawford
Cell: +27 83 628 7654
E-mail: online@engnews.co.za
Website: www.castingssa.com

castings sa is published by BA Crawford Specialised Publications (Pty) Ltd.

Cell: +27 83 628 7654
E-mail: online@engnews.co.za

ISSN 1605-7589

castings sa, published every second month, is the official journal of the South African Institute of Foundrymen (SAIF). The information and ideas presented in *castings sa* do not necessarily reflect the position of the SAIF staff, executive, advisors, sponsors or members.

The supporting systems are very important at Atlantis Foundries, a foundry that is a leader in the world

Just over seven years ago I reported that Atlantis Foundries had embarked on a process that would pave the way to Atlantis Foundries becoming a Smart Foundry by embracing the Fourth Industrial Revolution. This project aimed to combine various technologies available to gather and analyse process data, with the aim of improving product quality and cost efficiency. The basic building blocks for such a concept are robotics, process instrumentation, and the tracking of components using RFID and other software applications. With all the data available and it being traceable to individual castings, the door has opened to enable the use of Artificial Intelligence for process control and inspection of components.

It was the beginning of an era where Atlantis Foundries would be recognised worldwide as a leader. I still remember the enthusiasm and vision of CEO Pieter Du Plessis and, with his help, we conveyed a message of forward thinking to the rest of the world that foundry owners were only dreaming of.

I always remember and, continue to regularly 'dine' on the fact, how the MD of the company involved in gathering and analysing the data so as to help Atlantis Foundries achieve the correct combination of process parameters during the production of the castings – DataProphet - told me that he had been summonsed to Europe by influential foundry owners, once they had read the article in Castings SA.

"They were astounded to see that South Africa was so far ahead of them," he said. "They wanted the same for their businesses."

Atlantis Foundries produces engine blocks that weigh in the region of 430kgs and all of them are exported. To deliver them to the US or Germany, for example, with sub-surface defects is a costly exercise and reputation damaging. The brief to DataProphet was to determine the combination of process parameters that gave Atlantis Foundries' the best results and reduced scrap. They were pioneers.

But it was not just the process parameters that Du Plessis and his colleagues looked at. They looked at the supporting systems and what it would take to have an overall operational improvement on processes and flows. They were not shy to engage Robotic Innovations, who would introduce a programme of automation using Fanuc robots that would become the workhorse to carry instruments that acquire data, while handling or performing their operations, aside from introducing consistency and relieving human stress and mistakes in the handling aspect.

If it meant moving equipment to accommodate the Fanuc robots, it was done.

Atlantis Foundries has not stopped looking at ways to improve. The latest project, which is reported about further on in the magazine, involves the introduction of Fanuc Robots for core assembly handling to do picking and placing, as well as performing core trimming. Again, in my opinion, it is a first in the world, because during my research I could not find anything related to the process on the web.

But it is not just in the foundry that new solutions have been sought. A new ground-mounted solar energy system and generator project is currently being installed to mitigate power loss and contribute to a better management of CO2 contributions, as well as supplement the power requirements. Prior to that a Watt Industries energy management and control systems to ensure maximum saving and energy usage improvement solution, which is part of a wider effort to save on costs, was installed.

There are many others – too many to mention. Suffice to say Du Plessis and his colleagues are way ahead of the rest of the foundry manufacturing world and South Africa should be proud of them.

South African Institute of Foundrymen

The aim of the SAIF is to promote and develop within Southern Africa the science, technology and application of founding for individuals and involved industries.

Office bearers elected at 2022 AGM

Chairperson/ President: Nigel Pardoe
Vice President: Andrea Moz
Treasurer – To be announced
Member: Clive Jones
Member: Kasongo (Didier) Nyembwe

Upcoming SAIF Events for 2024
SAIF Annual Golf Day: November 2024 at Reading Country Club, Alberton

Address Details
University of Johannesburg Metal Casting Technology Station — Metallurgy; Room G101,
John Orr Building, Corner Siemert and Beit Street, Doornfontein,
Johannesburg, Gauteng.
Postal Address:
P.O. Box 14863,
Wadeville, 1422.
Website: www.foundries.org.za

Executive Secretary
Tel: +27 (11) 559 6455;
Fax: +27 (11) 559 6526;
email: mbiljon@uj.ac.za

Hands on metrology and quality inspection solutions

gom
a ZEISS company

GOM Scan 1 3D scanner

GOM Scan 1 is here to open up new possibilities. Industrial standards such as GOM fringe projection technology and Blue Light Technology deliver the foundation for detailed and accurate 3D meshes. The integrated software GOM Inspect helps you apply the mesh to any project you want: 3D printing, reverse engineering or part inspection

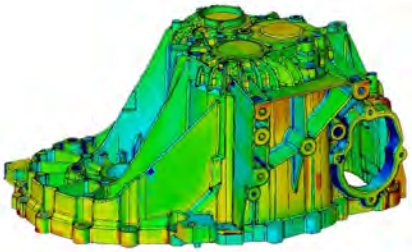
GOM ScanBox optical measuring machine

The ScanBox is a complete optical measuring machine developed by GOM for an efficient quality control in production and manufacturing processes. Available in 11 different variants for different applications and part sizes - from locking hooks to complete car bodies - the standardised measuring machines offer an all-in-one solution: Programming, automated digitising, inspection and reporting

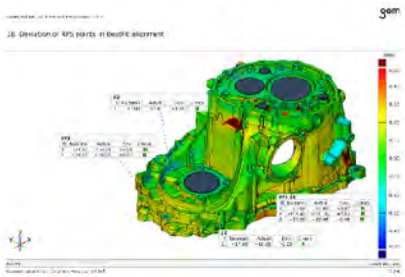
ATOS ScanCobot features

Automated Measuring, Inspection, and Reporting Process

Full-field data collection



Analysis



Reporting

ZEISS Certified Metrology Partner

ZEISS T-SCAN hawk 2 handheld 3D laser scanner

The ZEISS T-SCAN hawk 2 is a lightweight, next-generation handheld 3D laser scanner with remarkable ease of use. A portable system usable across many applications and industries
Handheld precision developed and produced, the satellite mode allows you to scan objects up to multiple meters

Form Measurement . Vision Measuring Systems. CMM. Small Tool Instruments. Data Management (SPC)

RGC ENGINEERING

ESTABLISHED 1960

A SYMBOL OF PRECISION

Tel: +27 011 887 0800 • info@rgcengineering.co.za • www.rgcengineering.co.za

Successful conversion from cupola to induction furnace

By Marco Rische, Wolfgang Baumgart, Sebastian Haardt and Stefan Schmitt

ABP Induction and Zorc Technologies offer specially developed tools for the successful conversion from cupola to induction furnace

The conversion from cupola to induction furnaces is a decisive step for foundries on the path to decarbonising their production. An important challenge here is scrap quality, which must be better in the induction furnace than in the cupola. ABP Induction and Zorc Technologies offer specially developed tools for this purpose, which allow optimised operation of the induction furnace. This article uses practical examples to show how a conversion can be made successfully.

The pressure from environmental policy requirements to achieve the climate targets set for industrial consumers is constantly increasing, also driven by the CO2 tax on fossil fuels. All industrial consumers of coke, oil and gas are pursuing alternative solutions to meet the medium-term environmental targets for CO2-neutral production. All companies surveyed in a study by Römheld & Moelle stated they would ask their suppliers for climate-neutral castings by 2050 at the latest, with 21% planning to do so by 2025 and 46% by 2030 [1].

ABP has recognised this paradigm shift to CO2 neutrality and has committed to this goal through its “Your Partner on the Way to Zero Emission” campaign. To meet the demand for decarbonisation, ABP sees great potential in replacing fossil fuels with modern induction furnace technology for ecological, economic and technical independence. In this way, users make a significant contribution to implementing the targets for decarbonising energy-intensive industrial applications. The inductive heating uses electrical energy. In this process, the heat required for the process is introduced directly into the molten material. The process is effective and, when green energy is used, it is also carbon-neutral. ABP can plan the entire process chain for the replacement of the conventionally heated cupola and accompany the customer along the path to conversion to electrically operated induction furnace technology. This is rounded off by digital tools and AI solutions from ABP partner Zorc Technology.

Foundries with cupola melting operation – Status quo and challenges

When foundries consider converting from a cupola to an

induction furnace melting operation, there are two fundamental challenges to consider: First, the conversion from cupola to induction furnace also means a change in operation – from continuous supply to discontinuous operation, to batch operation. The second challenge is scrap quality. In cupola melting operations, it is not uncommon to run even poor scrap grades. The induction furnace operation cannot cope with this because the coupling then becomes significantly worse. This makes it much more difficult, if not impossible, to achieve a utilisation rate of 100%. Utilisation rates of 60% are more likely. Keeping this gap as small as possible hinges on how the electromagnetic field couples to the scrap. This is strongly dependent on the set scrap quality and the parameters of the electrical power supply.

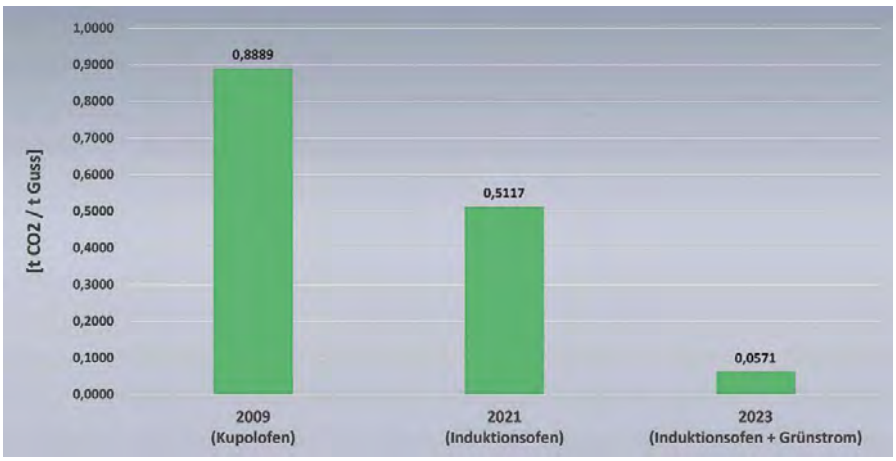


Figure 1: Römheld & Moelle Carbon Footprint in Scopes 1 & 2

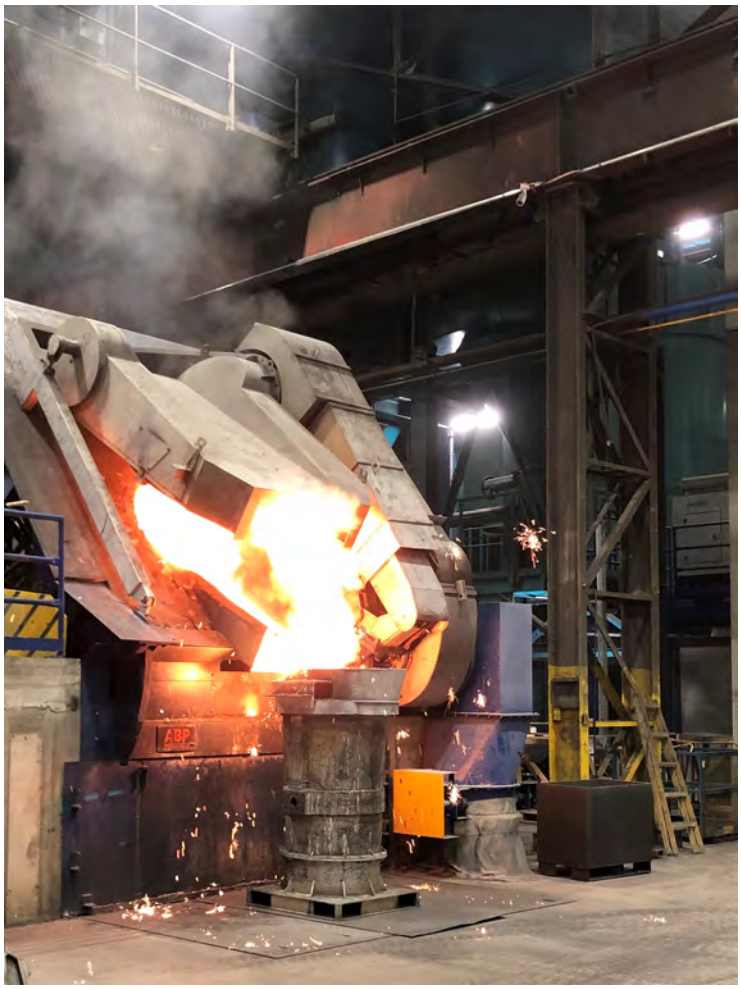
A practical example: Thanks to the conversion from coke-fired cupola to induction furnaces (Fig. 1), a large part of the emissions at Römheld & Moelle can be dealt with by changing the energy mix. A special contract with its energy supplier enables the foundry to obtain 100% of its electricity from hydropower in 2023 and 2024 [2].

What does this mean from a metallurgical point of view? Iron melted in the cupola has a high sulphur content due to the process. For the production of spheroidal graphite cast iron, therefore, single- or two-stage processes are used to produce the ready-to-cast melt. However, the production of vermicular graphite is consistently based on two-stage processes. In these two-stage processes, the first stage is used for desulphurisation, typically achieving sulphur levels of 0.06 to 0.025%. In the second stage, the morphology of the graphite phase and the composition of the metallic matrix are then adjusted to achieve the desired mechanical and physical properties of the material in the component.

Continuous desulphurisation of cupola iron is possible using compounds containing calcium. Specifically, the use of calcium carbide as a desulphurisation agent is also an option, but this is rarely used in foundry processes today due to environmental concerns.

Discontinuous desulphurisation processes include the Mg wire feeding process and the modern lime injection process developed by the Institute for Technologies of Metals at the University of Duisburg-Essen under the direction of Rüdiger Deike and the materials development department of the Fritz Winter company under the direction of Marc Walz [3], [4].

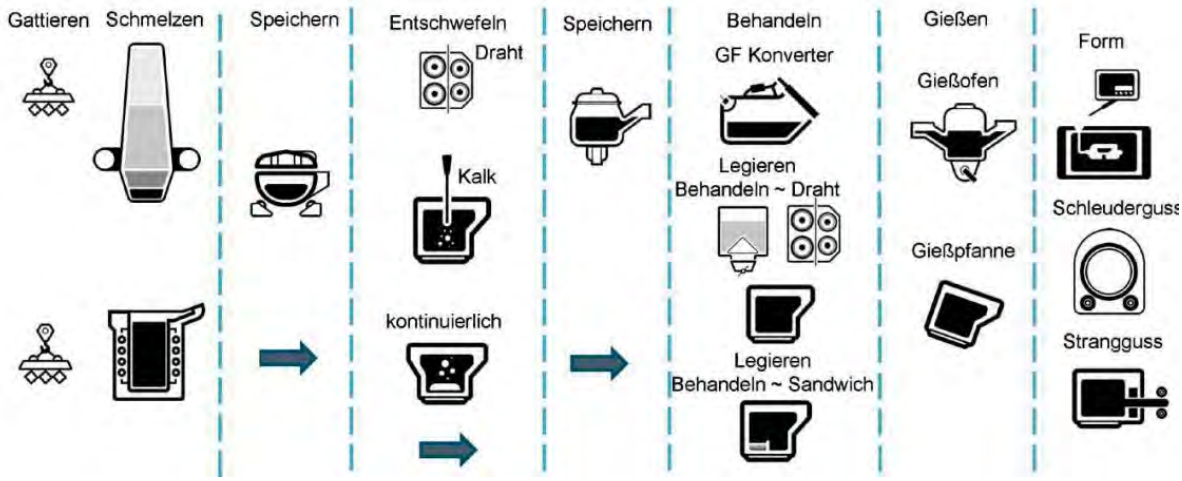
To produce the ready-to-cast melt from the resulting base iron, a second step involving treatment with magnesium, rare earths and inoculants is carried out. In particular, the wire feeding and the pour-over method have become established. Modern wire feeding methods also use an inoculation wire in addition to the magnesium wire, resulting in dynamic inoculation during treatment. The final step on the way to the desired metallurgy is inoculation during the casting process. This inoculation can be carried out by means of a pouring jet inoculation or an inoculation in the casting or runner system.



Many industries are feeling the pressure to take action to decarbonise. Given the long amortisation periods for capital goods in many industrial sectors, this already affects today's budgets. A key field in this context is the switch to low CO2 and, in the long term, climate-neutral production technologies in the metal processing sector, as it still accounts for a dominant share of CO2 emissions in industry today. The increase in process and material efficiency as well as induction melting offer great ecological and economic potential

The authors have written a comprehensive description, examples, programme and planning schedule, which can be found on the Castings SA website in full. The headlines are listed below. Please visit www.castingssa.com.

- Requirements for a modern induction furnace



Overview of the large number of possible process steps from the melting units to the mould

melting operation
- Conversion of the melting operation
- Example 1: Flake-graphite cast iron brake discs
- Example 2: Nodular graphite casting cast iron pipes
- Example 3: Vermicular graphite
- Planning and implementing the conversion: The engineering team
- The metallurgical team
- The specific implementation: Scheduling
- Engineering phase
- Transition of metallurgy from the cupola process to induction melting
- Tools for optimal planning and control of a modern production process
- Digital Twin Data Sources
- And what is the AI doing? Production planning and process control
- Interaction with process owners and employees
- References

Conclusion

To achieve decarbonisation targets, the transition of operations from fossil fuels to virtually carbon-neutral production is of great importance. How can foundries with cupola operations address the requirement for decarbonisation? For the experts at ABP Induction and Zorc Technology, the solution lies in switching from cupola to induction furnace operation and controlling the processes using digital tools which incorporate AI. The induction furnace has clear advantages when operating with high-grade scrap, and additional tools such as ABP OptiCharge and the ABP Meltshop Designer can increase production capacity and throughput and improve energy efficiency. The flexibility of production with stringent quality requirements is achievable with the help of dynamic production planning and control using digitalisation. The use of Zorc Genesis AI represents the next evolutionary stage of these systems and will result in increased efficiency even in complex production situations.

On the journey to CO2 neutral production Kovis Foundry in Slovenia replaced a cupola furnace with an induction furnace from ABP Induction

About ABP Induction Systems GmbH

ABP is a leading manufacturer of induction furnaces and systems for inductive melting and holding for the metal and metalworking industries. ABP is an expert in melting, pouring, holding and heating iron, steel and non-ferrous metals with design, production, assembly and services for foundries, forges and steelworks. The ABP Induction Systems Group with over 400 employees has companies in the USA, Mexico, Sweden, Germany, South Africa, Russia, India, Thailand and China. It is represented by service and sales partners in most of the world's industrialised countries.

For further details contact ABP Induction Systems on TEL: 011 623 1814/17 or cell number 072 158 1117 or email byron.mccall@abpinduction.com. You can also visit www.abpinduction.com or www.zorc-technology.com ■

DZANETECH

advancing chemical technology

Specialist chemical manufacturers, DZanetech provides bespoke products, consulting and technical support to local industries.

- **FOUNDRY**
- **TIMBER**
- **INDUSTRIAL**
- **CLEANING**
- **NDT**

Our vision is simple.
To advance our customers by advancing chemical technologies.

www.dzanetech.co.za

SS77 Cnr Standerton &
Noble Roads, Modderfontein

Contact Us:

JHB Jacques Swanepoel
jacques@dzanetech.co.za 079 514 6885

CPT Johan Jooste
johan@dzanetech.co.za 083 454 5465

KZN Zaid Syed
zaid@dzanetech.co.za 066 010 0999

IN PARTNERSHIP WITH

MR CHEMIE NDT-MATERIALS | AECI INDUSTRIAL CHEMICALS | HA GROUP

MycroKleen | Vemek precision engineering | VERSATILE

Atlantis Foundries automates core assembly

As metalcasters contend with a shortage of skilled workers, the requirements for environmental protection and resource conservation, increased quality requirements, and greater emphasis on ergonomics, Atlantis Foundries is expanding its focus on complete automation.

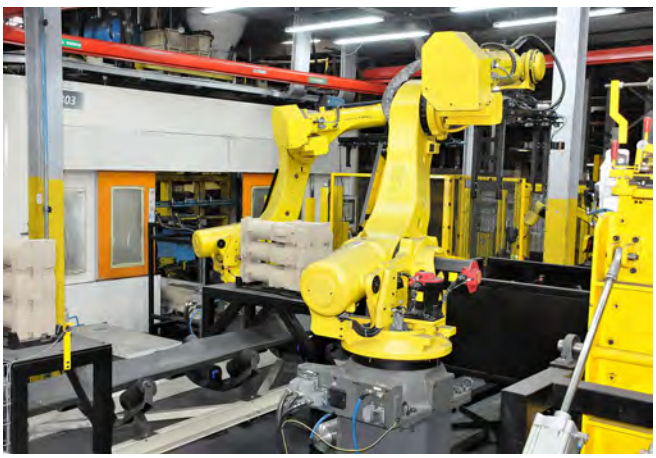
There is a relatively large amount of metal that goes into each product that Atlantis Foundries manufactures – on average 430 kilograms per engine block

Broadening automation at Atlantis Foundries, Robotic Innovations recently installed seven Fanuc robots - three medium sized Fanuc R2000iC 270kg capacity robots to do the picking and placing, with four Fanuc M10iD 12kg robots performing the core trimming

Robotic Innovations uses Fanuc robots for picking and placing as well as core trimming.

Traditionally foundries, whether they are ferrous or non-ferrous, constantly deal with the goal of efficiency, flexibility and work safety. They have to deal with new market requirements, producing an increasingly wide range of products and shorter life cycles, the growing focus on Industry 4.0, sustainability and connectivity with the digital revolution.

With this in mind over six years ago Atlantis Foundries embarked on a process that has paved the way to becoming a Smart Foundry by embracing the Fourth Industrial Revolution. The project, which is continuous, aims to combine various



The latest project to be completed at Atlantis Foundries by Robotic Innovations is the automation of core assembly handling

The two core trimming cells at either end of the core shooters consist of two robots, two 120° servo indexing turn-tables and one 180° forward/backwards indexing turn-table

The goal of the project is to automatically stack the eight sand cores that make up the inside of the engine blocks manufactured by Atlantis Foundries

Atlantis Foundries have incorporated a Heinrich Wagner Sinto CNC profile cutter into the moulding line. The HWS mills the sand with rotating blade heads and other tooling along the mould flask

technologies available to gather and analyse process data, with the purpose of improving product quality and cost efficiency.

The basic building blocks for such a concept are robotics, process instrumentation, and the tracking of components using RFID and other software applications. With all the data available and it being traceable to individual castings, the door has opened to enable the use of Artificial Intelligence for process control and inspection of components.

At the time Pieter du Plessis, CEO of Atlantis Foundries explained: "The corner stone of the project is the programme of automation in the foundry. The Fanuc robots installed by Robotic Innovations have become the workhorse to carry instruments that acquire data while handling or performing its operations. All the data collected throughout the process by the robots and the variety of inline instruments will be linked to specific castings. At the end of the process, the entire set of process parameters, including operator information, will be available for each casting."

"This process data will be analysed using Artificial Intelligence to predict various aspects of the castings such as material properties and sub-surface defects."

Atlantis Foundries uses cold box technology to facilitate the full spectrum of shapes and sizes across its engine blocks, operating fully automated core dipping facilities to connect to its tunnel indexing core drying oven and using green sand moulding techniques to be able to cast the full range of automotive component grey cast iron grades.

Operational improvements

A number of processes were implemented during the pandemic to further organise the various areas of the foundry and to streamline the operations. This included purchasing new equipment, as well upgrading and refurbishing existing equipment, and even the installation of radiation portal monitors that detect radioactive sources in trucks tasked with transporting iron and steel scrap to site. This certainty in planning and the rolling out of projects at the foundry has been aided by the reacquisition of the foundry by Daimler Truck AG in 2020.

"There is a relatively large amount of metal that goes into each product that we manufacture – on average 430 kilograms per engine block – so each time we have to scrap one it is very costly, especially if you take into account the complete process, including all the administrative work and the internal and external factors that surround one engine block. Atlantis Foundries export all of their castings to the USA and Europe, and with these long supply lines, any type of failure can be very costly if castings require rework or sorting at the customer."

Live data

"Our target is to get to the immediacy of live data so that we can react immediately to the analysis that this data provides. At the moment we have about a one-week lag but when you consider the several gigabytes of data, images and other information that are being analysed on a daily basis, we are well down the line."

"As we all know the foundry process is complex and has many separate steps, with each step having many process variables that influence the quality of castings. Additionally, there are many different material input factors, such as sand and chemistry that can vary from batch to batch or supplier, that need to be taken into account. Metal temperature and pouring time are also contributing factors. All of these parameters, if they are not correctly managed, will impact on our objective of zero-defects."

Another new development to aid staff in the inspection department was the installation of a conveyor and turntable system so that manipulation of the on average 430 kilograms per engine block is made easier

"As we said previously the corner stone of the project is the programme of automation in the foundry. The Fanuc robots installed by Robotic Innovations have become the workhorses and we have continued to install new robots in various departments in the foundry including sand preparation, core shooting, core transport, core finishing, and in moulding plant automation," explained du Plessis.

"One of the first and the biggest robots to be installed was a Fanuc M-900iC dipping robot linked with the automatic coating control systems,

supplied by Proservice in Italy. You will see that this example set the pattern for the rest of the robot installations where it is feasible to use them. Applications where heavy components or castings are involved and repetitive tasks, aspects where humans can have a big influence on the final product, are the areas that we have targeted for our Fanuc robots."

The control room where engineers can monitor all aspects of the plant

Ingate cutting system

"We want consistency in our processes. For example, our ingate cutting system has a combination of one large Fanuc M900iC 700kg capacity handling robot that loads and unloads the blocks into a positive location jig, so that a smaller Fanuc R2000iC 210F robot fitted with a Fanuc spindle motor and diamond cutting blade can cut the moulding ingates situated on the CAM section of the blocks after moulding."

"This was a huge win for Atlantis Foundries as the position of the ingates required very heavy grinders within a very tight space to be used manually. A terrible job simplified with great success by using robots, thanks to Robotic Innovations who have been involved with setting up the robots and the programming of them since we installed our first Fanuc robot in 2017."

"We – Atlantis Foundries – had a number of top priority projects that we envisaged would enhance our vision of becoming a Smart Foundry, with the underlying objective to improve quality, health and safety and efficiencies. Once a concept has been visualised, we then hand the idea over to Robotic Innovations who project manages each installation and system setup, as they specialise in robotic system integration and design turnkey automation systems for a number of manufacturing applications."

Some older projects: Mould breather holes and pouring cup cleaning

A Fanuc M-710iC 20L robot uses different nozzles to clean out the breathing holes and pouring cup of the top portion of the main mould.

Fettling training robot

As part of a large future project, Atlantis Foundries invested in fettling training and a R&D robot system that makes use a Fanuc M900iC 700kg capacity robot to load blocks onto jigs using a Fanuc part identification and positioning camera. A smaller Fanuc R2000iC 210kg robot, equipped with a Fanuc spindle motor, is then used to fettle/trim the blocks of excess flash.

"The R&D performed within this cell will equip Atlantis Foundries with the knowledge of what cutting tools and fettling accessories can be used on which portions of the block in order to get the best results when Atlantis Foundries installs automated fettling robot systems in the fettling department in the future," explained Engineering Manager Mike Hartung.

"Eight Fanuc robots have been purchased for this future project but in the interim the fettling department bays have been repositioned so as to offer better use of space and the flow of work pieces, better working space for the operators and the easy installation and operation of the robots in future."

CNC machine loading/unloading system

Besides fettling Atlantis Foundries performs a number of CNC machining operations on the blocks before finishing, such as powder coating, and shipping. Three very large Heller CNC machines make up this department. Before being moved to their current position in the factory the machines operated as individual machines with no work flow and engine block handling had to be negotiated around the fettling department.

"This has now been addressed and the machines have been strategically placed to allow a 12m long robotic linear rail carrying a Fanuc M900iC 700kg capacity robot to run to each machine's loading/unloading section. Two block infeed conveyors transport the blocks into the cell from where the robot collects them and places them into the correct CNC machine for machining," continued Hartung.

The same robot collects the machined blocks out of each CNC machine and places them onto an outfeed conveyor. This process was previously performed manually with blocks swinging from KBK overhead cranes. The robot has removed the danger of the operation and implemented control with predictability. Efficiencies have also rocketed and cycle times have been reduced to 90 seconds.

Besides fettling Atlantis Foundries performs a number of CNC machining operations on the blocks, before finishing. Three Heller CNC machines have been strategically placed to allow a 12m long robotic linear rail carrying a Fanuc M900iC 700kg capacity robot to run to each machine's loading/unloading section. Two block infeed conveyors transport the blocks into the cell from where the robot collects them and places them into the correct CNC machine for machining. The same robot collects the machined blocks out of each CNC machine and places them onto an outfeed conveyor. This process was previously performed manually with blocks swinging from KBK overhead cranes. The robot has removed the danger of the operation and implemented control with predictability. Efficiencies have also rocketed and cycle times have been reduced to 90 seconds

Core printing robot system

Traceability in manufacturing is very important and Atlantis Foundries is on a big drive to reduce scrap which was above industry benchmarks. Thanks to automation, machine and system investment, AI and other improvement investments is scrap rate both internally and externally has become the benchmark.

Marking the sand cores after they leave the slurry curing oven has been

You've got to be forward-thinking to stay ahead of the game

Direct importers and distributors to the metal melting and insulation industry:

Established 1998
25 years

- Elkem Foundry Products
- Mammut-Wetro Crucibles
- Hoesch Metallurgy GmbH Grain Refiners, Modifiers, Magnesium and Fluxes
- Becker Insulation Products
- Selee Corporation - filtration for the molten metal industry
- ICP - Ceramic Gating Components
- Ceralcast - Industrial Ceramic Solutions
- Tin
- Ferro Molybdenum
- Ferro Silicon
- Remet Investment Casting Products
- Schafer Mettalurgie GmbH - Fluxes and de-gassing products for the Non-Ferrous Industry
- Ceranovis Die Casting Coatings
- Newform
- Orton Cones and PCTR rings
- Insertec Induction Furnace Linings

Tel: +27 11 894-3039 Email: mrcas@iafrica.com
1 Dormehl Street, Anderbolt, Boksburg
Wouter Retief +27 83 258 5903 wouter@ceramicalloy.com
Brian Clough +27 82 926 6862 brian@ceramicalloy.com
Janley Kotze +27 71 672 0551 janley@ceramicalloy.com
Mike Retief +27 83 289 9394 mike@ceramicalloy.com

A member of AMC Holdings (Pty) Ltd

CAS

Ceramic and Alloy Specialists (Pty) Ltd

attempted many times without success. Robotic Innovations found the solution in a small Fanuc LR Mate robot fitted with a special industrial ink-jet printer. The trick was finding one that could withstand the dusty environment within the plant.

With experience in the cement palletising industry, Robotic Innovations brought the cement bag date printing technology to the Atlantis Foundries production line.

With data fed from the Atlantis Foundries SCADA control system to the robot and printer, a barcode and matching readable data string is printed onto the core assemblies in a specific position on the core assemblies. This data is then re-confirmed directly after being printed by using the camera which is also mounted onto the robot.

As part of a large future project, Atlantis Foundries invested in fettling training and an R&D robot system that makes use of a Fanuc M900iC 700kg capacity robot to load blocks onto jigs using a Fanuc part identification and positioning camera. A smaller Fanuc R2000iC 210kg robot, equipped with a Fanuc spindle motor, is then used to fettle/trim the blocks of excess flash. "The R&D performed within this cell will equip Atlantis Foundries with the knowledge of what cutting tools and fettling accessories can be used on which portions of the block in order to get the best results when Atlantis Foundries installs automated fettling robot systems in the fettling department in the future," explained Engineering Manager Mike Hartung

Days later, when each core assembly package is placed within the outer moulds, a camera snaps the barcode and the SCADA system matches the core package to both the upper and lower outer moulds, which in turn is matched to the final product once complete. This is proper manufacturing traceability.

The latest project in the foundry: Core assembly handling

"This project has been in the pipeline for many years and the solution and planning of the installation only started in October of this year," explained Altus Mostert, Managing Director of Robotic Innovations.

"The goal of the project is to automatically stack the eight sand cores that make up the inside of the engine blocks manufactured by Atlantis Foundries. Easy yes until you have to collect the cores from three very large separate Foundry Automation core shooters, clean each core's edges of any moulding flash, then they have to undergo an inspection go/reject process, create sequenced sub-assembly stacks and then a final full assembly all to within very strict automotive tolerances and cycle times."

"Oh yes, I forgot there are two core assembly variants each with three sub-variants with very little to no tooling changeovers being required within the robotic system. Some planning and thinking had to be done over a long period."

"We used seven Fanuc robots in total. Three medium sized Fanuc R2000iC 270kg capacity robots do the picking and placing with four Fanuc M10iD 12kg robots performing the core trimming. A cell of two robots has been setup at either end of the core shooters and there are two very large 120˚ servo indexing turn-tables and then one even larger 180˚ forward/backwards indexing turn-table. A core reject conveyor and an over/under front and rear core buffering conveyor rounds out the larger pieces of equipment for the system."

"Eight Fanuc robots have been purchased for this future project but in the interim the fettling department bays have been repositioned so as to offer better use of space and the flow of work pieces, better working space for the operators and the easy installation and operation of the robots in future."

Solar power installation

Earlier this year Atlantis Foundries signed an agreement for a major solar power purchase project. The agreement comprises more than 20 000 solar panels and a total rated capacity of 13.5MWp.

The agreement was signed with a long-term power purchase agreement with Energy Partners, an integrated energy solutions company.

According to the terms of the agreement, Energy Partners will engineer, finance, construct and operate the ground-mounted solar energy system at Atlantis Foundries' production plant. Planning and mapping of the project is now complete and preparing the site has begun. The project is set to commence on 1 May 2024.

The system, which has been specifically engineered to align with the foundry's electrical consumption profile, is estimated to replace up to 20 per cent of Atlantis Foundries' annual electricity consumption, considerably reducing its carbon footprint and representing a major step towards sustainable energy utilisation.

Generator installation

Another project that has been running concurrently at the Atlantis Foundries site, approximately 50kms north of Cape Town, is the installation of five diesel-powered generators.

"The generators are being installed purely for a precautionary purpose. The first is for if we have a total black-out then we can continue to operate in the foundry and the second is to supplement our power requirements should there be a demand for engine blocks that our current power capacity is not sufficient to meet the demand of."

"The generators can provide 5MW of power and that is sufficient enough to run the business park that is situated alongside the Atlantis Foundries site."

For further details contact Atlantis Foundries on TEL: 021 573 7200 or visit www.atlantisfoundries.com ■

nftn
NATIONAL FOUNDRY TECHNOLOGY NETWORK

NCPC
INDUSTRIAL EFFICIENCY IN SOUTH AFRICA

Looking forward to supporting you in 2024

The National Cleaner Production Centre South Africa and the National Foundry Technology Network are working to enable a sustainable and competitive industry.

Contact ncpc@csir.co.za for support with:

- in-plant assessments
- regulatory compliance support
- technical capacity building

www.ncpc.co.za | www.nftn.co.za

National industry support programmes funded by **the dtic** and hosted by the CSIR.

THA 29-2023

the dtic
Department:
Trade, Industry and Competition
REPUBLIC OF SOUTH AFRICA

CSIR
Touching lives through innovation

Viking Foundry includes flaskless moulding with investment in Sinto FDNX series horizontal parting flaskless moulding machine

The past two years have been memorable in many ways for Viking Foundry, based in Germiston, Gauteng.

"It has been a period of expansion and growth. But more importantly we began an improvement programme in the foundry, resulting in the installation of a new Inductotherm 900kW VIP Power-Trak Li Power and Control System, which includes a one-ton and a two-ton Dura-Line melting furnace," said Operations Director Greg Estman.

"We were looking to upgrade our foundry and to really come into the 21st century with newer, better automation and technology, and to really transform our factory to the factory of the future," explained Estman.

"We started in the melt shop because our furnaces and equipment were tired and additionally, with load shedding having such an effect on everyone in South Africa and we were not excluded, it made sense to address this department first. No melted metal, no castings, no business!!"

"The melt shop is the largest area of energy consumption in a foundry, so it offered the best opportunity to look for energy and demand cost reduction. Optimising melt equipment utilisation minimises kW and kVA demand and maximises tons poured. Proper maintenance and operation of the melt system reduces energy usage. The new induction melting technology has increased our performances, raised efficiencies and enhanced flexibility to achieve higher power utilisation and lower costs of operation."

The next step, in line with our vision to be more efficient, improve quality and bring down costs so that we can be more competitive against imports was to effectively modernise our moulding department. We had five, old green sand moulding jolt-squeeze machines that had been working day and night since the 1950s I think."

"Good castings depend on good moulds is the common saying among professional foundrymen worldwide. This saying carries more stringent and profound meaning today, because the requirements for the cast products are getting more and more severe. In fact, high-quality moulds in dimensions, hardness and strength are critical and indispensable for the production of high-quality castings."

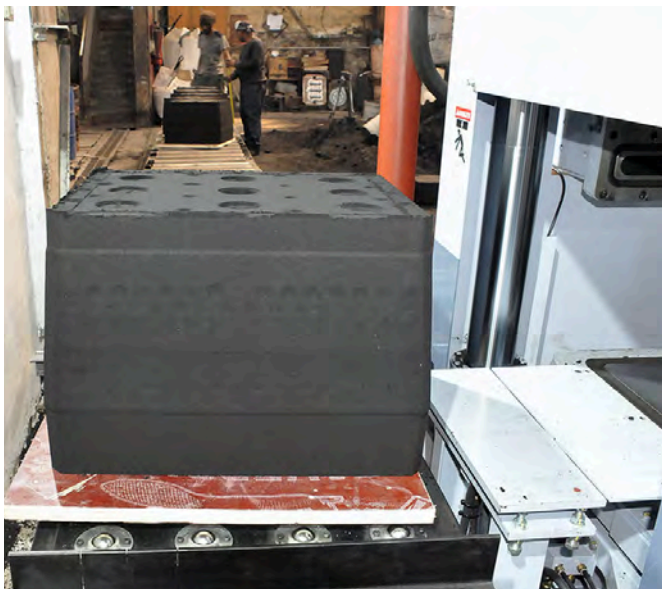
"Our research led us to Japanese manufacturer Sinto (Sintokogio Ltd). According to Sinto, FDNX flaskless moulding machines are designed as a "first step" for foundries switching from manual moulding to automatic moulding, with no compromise in the quality of moulds produced. It's also a compact design that makes it possible to replace a manual moulding line in one day, in part because the FDNX does not need to be installed in a pit."

"Installing a Sinto FDNX moulding machine is simple because it connects to a 220 volt power supply and requires a low air pressure system."

"The Sinto FDNX moulding process uses an air-over-oil compressed-air system rather than conventional hydraulic power. Compressed-air allows the machine cylinders to generate 'smooth, hesitation-free, and consistent movement, without hydraulics and pumps, according to the developer. Aeration is the design feature that results in high-quality moulds, as patterns with deep pockets and minimal draft become less challenging.'"

The new Sinto FDNX flaskless moulding machine

The new Sinto FDNX moulding line was installed with help from the service team from Sinto's subsidiary in South Africa Endeco Omega Sinto



The Sinto FDNX flaskless moulding machine operates any 400mm by 500mm by 360mm green sand mould or smaller

"The Sinto FDNX moulding process uses an air-over-oil compressed-air system rather than conventional hydraulic power. Compressed-air allows the machine cylinders to generate 'smooth, hesitation-free, and consistent movement, without hydraulics and pumps, according to the developer. Aeration is the design feature that results in high-quality moulds, as patterns with deep pockets and minimal draft become less challenging.'"

The 'old way' of doing things

An average maximum production rate of 90 moulds per hour is achievable on the Sinto FDNX flaskless moulding machine

"Our Sinto FDNX flaskless moulding machine operates any 400mm by 500mm by 360mm green sand mould or smaller with an adapter, and achieves an average maximum production rate of 90 moulds per hour. The current mould that we have in the machine has four impressions so we are making four castings at a time."

"We estimate that we can do castings between 1kg and 15kg and at the moment we are processing our existing general orders to produce SG iron, cast iron and chrome castings. The machine was only installed in November 2023 so we are still going through a teething phase but this will not take long and in the new year we will be canvassing for new clients."

"The new Sinto FDNX moulding line was installed, with help from the service team from Sinto's subsidiary in South Africa Endeco Omega Sinto."

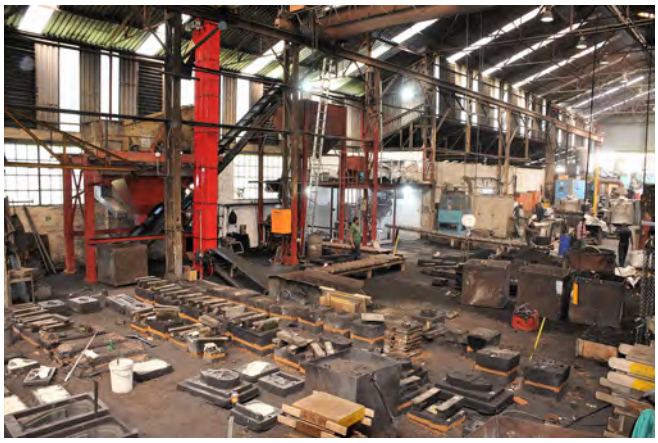
"We have also installed the hopper, batch mixer and conveyor system. We are using an existing shakeout and the green sand is fed from a platform above the machine. In time we will automate this procedure of the process."

"We definitely want to grow and have a bigger offering, more production capacity and faster cycle times for our customers and no more ergonomic concerns for foundry workers."

"There are various standards for identifying a 'modern' foundry – but automatic moulding is surely a primary indicator. Automatic moulding helps foundries fulfil all of the goals that casting buyers prioritise: High throughput, consistency, and lately accessibility for data analysis and reporting."

"Viking Foundry has now undertaken several capital projects to ensure sustainability and position itself for growth. The Sinto FDNX moulding line is the first one to be installed in South Africa. Hopefully it won't be too long before we install the second one."

For further details contact Viking Foundry on TEL: 011 873 5093 or visit www.vikingfdy.co.za ■



In addition, Viking Foundry installed the hopper, batch mixer and conveyor system. The green sand is fed from a platform above the machine

What the foundry looked like prior to the installation of the Sinto FDNX flaskless moulding machine

DMG MORI

RETECON (PTY) LTD
Your Partner in Metal Working

Perfectly suited specifications!

World Class - The M1

Outstanding milling performance and high rigidity at a competitive price – the new M1 is all about **"Designed for your Profit!"**

The perfectly suited working area is combined with a compact foot-print of only 6 m2 and the fixed and rigid table has a maximum load capacity of up to 600 kg assuring high machining performance.

Unique design based on monolithic bed assures static and dynamic rigidity as well as perfect damping properties.

DMU 40

Universal, compact and powerful:
the perfect introduction to 5-axis simultaneous machining.

The DMU 40 impresses with its universal character, high precision and ergonomics and CELOS with the latest control technology.

Universal design
the perfect solution for any requirement

Haimer - UNO autofocus

Ideal for multi-edge tools

In addition to its precision, speed and reliability, the UNO series also includes numerous features in hardware. The new design and improved ergonomics set the standard by using high-quality components from Festo/SMC, Bosch, Heidenhain, and IDS.

Automatically focuses on the cutting edge. Motorised spindles with convenient system cabinet and 24", 10 point touchscreen as standard.

Contact: Remando Strydom
Tel: 011 976 8600 • machines@retecon.co.za • www.retecon.co.za
Cape Town: 021 555 2270/1 • Port Elizabeth: 041 453 2720 • Durban: 031 701 8149

MTMA

RETECON (PTY) LTD
Your Partner in Metal Working

GfE-MIR Alloys and Minerals SA (Pty) Ltd has been acquired by the Heneken Group

The Competition Commission has approved the transaction.

"The Board, Management and Staff of GfE-MIR Alloys and Minerals SA (Pty) Ltd have the pleasure in announcing the successful conclusion of an agreement with the Heneken Group, whereby the Heneken Group has acquired GfE-MIR Alloys and Minerals SA (Pty) Ltd," said Russel Symons, past Managing Director and founder of GfE-MIR Alloys and Minerals in South Africa.

Heneken is a supplier of non-ferrous metals, scrap, and master alloys globally

The Heneken Group is a Slovakian based company founded in 2007 that has evolved from trading aluminium products and today has four different production plants supported by a global trading network.

"We will undergo a name change to Heneken Alloys and Minerals SA (Pty) Ltd. Heneken Alloys and Minerals SA currently produce aluminium powders and granules, ultra-low carbon ferro manganese, metallurgical grade fluorspar briquettes, high energy briquettes, calcium aluminate slag conditioner, silicon alloys and metal oxides for ceramic and glass industries. The company also trades various ferro alloys, base metals and mineral products."

"GfE-MIR have diversified from a trading and distribution company over the last years. Our focus today is on mining, mineral processing, ferro-alloy and metal production activities. GfE-MIR is active in these fields throughout South Africa and Southern Africa. It is for this reason that we would like to continue growing our business in this area of the manufacturing sector, adding value, exporting and exploring other opportunities currently being presented."

About GfE-MIR Alloys and Minerals SA

The company began trading as Varomet South Africa (Pty) Ltd in February 2005 as a reliable supplier, marketer and off-taker for a wide variety of commodities distributed across every major metal market. The company underwent a name change to GfE-MIR Alloys and Minerals (Pty) Ltd in 2008.

The company is today primarily active in the metallurgical industry and is involved in the importing, exporting, processing, sale and distribution of ores, minerals, alloys, and calcium aluminate. Products are exported globally and the company currently employs 200 people.

About Heneken

Heneken is a supplier of non-ferrous metals, scrap and master alloys globally. The majority of its products are sold within Europe. It currently operates warehouses in Rotterdam in the Netherlands, Koper in Slovenia, Istanbul in Turkey, Baltimore in the USA, Brno in the Czech Republic and Senec in Slovakia.

In 2017, Heneken bought a plant in Spišské Vlachy for recycling scrap aluminium – mostly car wheel rims and used cans. This was followed in 2019 by a zinc recycling plant in Košice and in 2020 by the acquisition of Laná, a company from Žiar nad Hronom focused on the production of aluminium ropes and wires for the energy industry. In 2023 Heneken started secondary aluminium production in Izmir, Turkey.

The Competition Commission found that the transaction is unlikely to result in substantial prevention or lessening of competition in any relevant markets. To promote a greater spread of ownership, the merged entity shall establish an Employee Share Ownership Programme (ESOP) for the benefit of qualifying workers.

The Commission further found that the proposed transaction does not raise any other public interest concerns.

"This is a natural next step in line with our strategy to supply our business partners with a broad portfolio of products of the highest possible quality. We remain committed to metallurgy. Our goal is to continue to deepen our know-how and expertise in this sector," said Heneken's CEO, Michal Hudoba.

In 2023 Heneken started secondary aluminium production in Izmir, Turkey

"The Company is entering into exciting times and we thank all for the historic support and can ensure you of continued growth in our recycling and waste processing operations. With the support of the Heneken Group it places the company on a sound footing to focus on new opportunities and at the same time developing and improving our existing business model," said Symons, who is staying on as MD of the company.

For further details contact Heneken Alloys and Minerals SA (Pty) Ltd on TEL: 011 740 1034 ■

The Leading Specialist in No Bake Equipment in South Africa

- Continuous Mixers 3 - 100TPH
- Fast Loop System, mould sizes up to 3.5M x 2.5M
- Carousel Moulding Plants, mould sizes up to 1.6M x 1.2M
- Manipulators from 350kg to 15T
- In-Line Semi-Auto Flood Coaters
- Mechanical Sand Reclamation 1 - 40TPH
- Secondary Attrition up to 10TPH
- Chromite Separation Plants up to 10TPH
- Thermal Reclamation from 250kg/Hr up to 12 TPH
- Core Shooters 2.5 - 100L

sinto

New Harmony ≫ New Solutions™

www.endeco-omega.co.za

sinto FOUNDRY INTEGRATION™

sinto FOUNDRY INTEGRATION

ENDECO OMEGA SINTO (PTY) LTD
192 Lamp Road, Wadeville, Gauteng, South Africa
T: +27 (11) 907 1785 E: info@endeco-omega.co.za

Sibanye-Stillwater's shares drop after it buys metals recycler Reldan for R3 billion on its journey towards net zero

Shares in Sibanye-Stillwater dropped recently after it said it had acquired US-based metals recycler Reldan Group of Companies (Reldan) for $155.4 million (R2.9 billion) as its CEO, Neal Froneman, hunts for worthy green metals assets.

Froneman is on the acquisition trail after the group, which has platinum group metals (PGM), gold and nickel operations in Africa, America and Europe, last week announced it had purchased a Tasmania copper mine in Australia for $10million.

The company is also diversifying into lithium, after recently buying the Keliber project in Finland where it has "initiated the construction of the lithium concentrator" and development of the Syväjärvi open-pit mine.

Sibanye-Stillwater said the acquisition was expected to be value accretive and positively contribute to the earnings and cash flow from day one. The deal was expected to close during the first quarter of 2024.

Froneman said: "The strategic acquisition of Reldan is a further pivotal step in our company's commitment to sustainability and our journey toward net zero. Reldan's exceptional environmental, governance, and safety standards position them as an industry leader, providing us with an exemplary platform to amplify our recycling efforts."

"We are excited to work alongside the Reldan management team and employees to seamlessly integrate and scale our operations, reinforcing our dedication to the advancement of green metals and recycling," he said.

Reldan is a Pennsylvania-based recycling group which reprocesses various waste streams, including industrial waste such as semiconductor scrap and plating waste and electronic waste such as mobile phones and tablets to recycle green precious metals.

Sibanye-Stillwater said the acquisition of Reldan complemented its US PGM recycling business in Montana, US, and enhanced its global exposure to the circular economy, providing a solid base for further expansion.

In addition to its US operations, Reldan has established a presence in Mexico and India, where it has forged strategic joint ventures with local partners. ■

ArcelorMittal to shut Newcastle and remainder of Vereeniging operations

ArcelorMittal South Africa shares have crashed as the company announced that it is putting its major Newcastle and Vereeniging long steel operations in care and maintenance due to a lack of demand. More than 3 500 employees will be affected by the decision. Long steel products include wire, rods, railway rails and bars.

Its share price crashed almost 30% to 100 cents on the day of the announcement, but recovered some of its losses by lunchtime. It was down 7% to 127 cents in early afternoon trading. The shares have lost more than 70% of their value over the past year.

ArcelorMittal has taken a dim view of South Africa's economy and the government's reform agenda because its steel operations in the country are taking a big financial hit. The company swung from a R3 billion profit in the first half of 2022 to a R448 million loss during the same period this year. The toll is so enormous that ArcelorMittal has announced the closure.

The steelmaker cited high logistical and transportation costs, energy prices and load shedding as reasons for giving up the operations. This comes after years of aggressive cost cuts to save the business, which ultimately proved fruitless as South Africa's steel consumption has declined 20% over the past seven years.

"Despite these best efforts, the initiatives were unable to counteract the cumulative effect of a slowing economy and a difficult trading environment," said chief executive officer Kobus Verster in a statement. South Africa now consumes only 4 million tons of steel as infrastructure expenditure dwindled.

High transport and logistics costs, as well as escalating energy prices and load shedding have added further pressure. In addition, a new preferential pricing system for scrap, a 20% export duty, and a ban on scrap exports have given steel production via electric arc furnaces an "artificial" competitive advantage over steel manufacturers, ▸

beneficiating iron-ore to produce steel. This means scrap metal traders who recycle steel are gaining an advantage over the company's more intense operations that consume heavy raw materials such as iron ore.

"These structural market issues are beyond ArcelorMittal South Africa's control and do not appear capable of being resolved in the foreseeable future," said the company.

The company also acknowledged the potential negative impact on the regional and local economies in which the mills were located, in particular the Newcastle Works, which was a major source of economic activity and jobs in the KwaZulu-Natal town.

The company said the wind-down would exclude the coke batteries at Newcastle, which would remain operative, producing metallurgical coke for use at the Vanderbijlpark Works, and for sale of commercial market coke to the ferro-alloy industry.

"The ArcelorMittal South Africa board and management have reached this point after having exhausted all possible options. As difficult as these circumstances are, we have a duty to ensure that the business remains sustainable in the long term, in the interests of the company and its stakeholders. The remaining business, after the wind down, will be substantially more profitable and able to invest the appropriate capital in product development and available growth prospects," Verster said.

The group has also been vocal about the negative impact of the collapse of the Transnet Freight Rail service, which has been particularly acutely felt at the Newcastle Works, which is located far away from its sources of raw materials.

Solidarity said the ArcelorMittal South Africa announcement was a signal that government's mismanagement of State enterprises such as Eskom and Transnet, as well as its inability to promote economic growth, were now "claiming victims". ■

Atlantis Foundries installing second Nederman MikroPul FS type filter for dust extraction and air filter system

In its quest to become a Smart Foundry, Atlantis Foundries has not neglected its duty to environmental best practices and more importantly, its staff, suppliers and clients.

An example of the industrial filtration solution system for the future – Nederman MikroPul FS Flat bag filter with reverse air cleaning that is being installed at Atlantis Foundries. This is the second Nederman system to be installed at Atlantis Foundries

"The struggle for clean air is about having the possibility to breathe healthy air every day. Unfortunately, according to the WHO's guideline limits, this is not the reality for a large percentage of the world's population. Poor air is one of the most common causes of premature deaths throughout the world and industry is one of the largest sources of emissions. At the same time, industry, together with legislators, is the driving force behind several initiatives to improve the situation. And at the same time, save energy, increase recycling and enhance production efficiency," commented Pieter du Plessis, CEO of Atlantis Foundries.

Under the Environmental Impact Assessment (EIA) Regulations of 2014 and the National Environmental Management: Air Quality Act (NEM: AQA) of 2004, it's mandatory for all entities in the metallurgical industry to have an Environmental Authorisation (EA) and an Atmospheric Emissions License (AEL). These licenses ensure that foundries operate in a manner that's safe for the environment and protects public health.

Foundries and ore smelters require dust and fume collection for several different processes, such as sand casting and electric arc furnaces (EAF's). High temperature

dust collection and ventilation systems are often required to handle high dust loads of various particle sizes that are potentially hazardous or combustible.

The experienced engineers, programmers, project managers, and construction trade craftsmen at IAC understand the unique air handling requirements of foundries and smelters, and are here to help your operation meet or exceed nameplate production rates while adhering to applicable worker safety and environmental air quality control standards.

"For a long time, the Atlantis Foundries plant has met the criteria and requirements for the environmental license (AEL), especially for what is required in today's climate. Finding the best solution to foundry dust collection challenges related to melt pots/ pouring, sand shakeout, sand reclamation, and grinding, can be a complex process."

Environmental management and compliance

"We have also installed a new bag house for the new South African Standards and Regulations for Emissions for foundries that dictate minimum emission standards for particulate matter. These levels were legislated to decrease from 100mg/Nm3 to 30mg/Nm3. The first phase of this project was linking a number of our chimney stacks to a central extraction system to which we have also added a burner system to burn off moisture and oil residue. This bag house system is now operational and the emissions are fully compliant."

Dirty air enters the filter from the top with airflow direction in the filter itself from top to bottom. The dust is held back by the filter bags and these are gently cleaned by clean air after a certain differential pressure or preset time has been achieved. The dust drops into the dust collection hopper and is conveyed away via the dust discharge

Nederman MikroPul FS type filter: Emission Phase 2

"We installed our first Nederman MikroPul FS type filter for dust extraction system back in 2019. We have now decided to install a second Nederman MikroPul FS type filter for a few reasons. The current equipment is working according to specifications but will need upgrading in the future. To circumvent any breakdown, we are making provision for uninterrupted dust extraction and air filtration."

"The added benefit is that even though we are way below the stipulated requirement we are going to further enhance our air quality, while having the satisfaction that the working environment will not be compromised for our staff."

"The installation is part of Atlantis Foundries' Emission Phase 2 and will be the second FS filter on this site and will be commissioned in early 2024."

"The filter system has a design volume flow of 186 000m³ per hour. It will be supplied with a 250kW fan unit controlled by a Danfoss frequency converter type VLT for optimised control and energy consumption. The emission warranty stipulates residual dust level in the clean gas of maximum 5 mg/Nm3."

"The plant incorporates Nederman Insight Software that monitors the filter plant performance on PC Dashboard and mobile app. The system includes alarm history and trend detection and uses remote (cloud) data storage with security technology."

"The FS type filter is a cassette type filter bag design using continuous cleaning of the filter bags without the use of costly compressed air. This leads to improved filter bag life."

"The advantages of the FS filter design are numerous including a compact design with a small footprint and low space requirement, easy access to replace bags, reverse air cleaning so no use of compressed air is required, can handle very fine dusts, has low maintenance requirements and an attractive dust emission warranty."

"The FS filter offered a number of advantages that were attractive to us such as the small footprint mentioned before, no use of compressed air, an emission warranty of maximum dust content in clean gas of 10mg/Nm, low maintenance requirements and a number of worldwide references in foundry applications including foundries in South Africa."

"The Nederman MikroPul FS type filter was purchased from Nederman MikroPul, who are based in Germany, and Mondeco handled the local scope as well as all aspects of installation based on detailed engineering from Nederman MikroPul."

For further details contact Atlantis Foundries on TEL: 021 573 7200 or visit www.atlantisfoundries.com or contact Mondeco Solutions on 079 448 1277 or visit www.mondeco.co.za ■

Seidor introduces foundry-specific ERP software Metal One, which is certified by multinational SAP

Seidor has introduced the foundry-specific ERP software Metal One to the local industry

Seidor, an international technology consultancy firm that offers a comprehensive portfolio of solutions from SAP and is a SAP Platinum partner, specialises in implementing and supporting some of SAP's most popular business management solutions and has introduced the foundry-specific ERP software Metal One to the local industry.

"Metal One is the ERP software resulting from our 30 years of vertical expertise in the foundry market. Starting from the leading role it already plays in Italy, Metal One obtains continuous recognition internationally and is now the reference product for foundries in many countries in the EU as well as non-EU countries," said Enzo Fresolone, CEO of Seidor Italia.

The company has a commercial and technical presence with more than 85 offices in 44 countries, has 7 500 employees, of which 100 are based in South Africa, and a customer base of 8 500.

"Ferrous and non-ferrous metal foundries using precision casting technologies perform a number of specific procedures that are not effectively addressed by most ERPs available on the market," said Darren De Vries, Head of New Business Sales – Southern Africa, Seidor.

"The production chain in this sector has evolved significantly, integrating an increasing number and complexity of processes and adopting new technologies. To efficiently manage foundries in today's market, it is essential to have adequate technological solutions that allow them to be more agile, optimise costs and improve production performance and quality," continued De Vries.

"Metal One is an ERP solution developed by Seidor Italy, based on SAP Business One which, thanks to its features, enhances Industry 4.0 technologies and exploits all the potential of the cloud. It was developed after 30 years of experience in the foundry industry, bringing industry best practices into the robust SAP Business One system, aiming to make it a complete solution that offers an unbeatable cost-performance ratio," explained De Vries.

"Metal One is the perfect management platform for market-leading foundries. It communicates with big data analysis tools, offers interactive and navigable dashboards to monitor company KPIs in real time and automates industrial processes, thanks to an integrated data flow between the production line and management control."

The intelligent foundry

"Data collection and analysis have become a key aspect of digitalisation. Management software like Metal One facilitates a unified data flow because all industrial plants can be connected to the ERP and all the data obtained is available in a single system."

"Artificial intelligence tools track all relevant process information in real time, converting this data, thanks to the advanced analytics platform, into useful business information."

"This information is presented visually through interactive dashboards and helps increase the profit margins of each process and the performance of the company as a whole."

"Metal One contributes to this process by offering tools that help us to have optimal consumption of resources and effectively manage aspects such as recycling, reuse of materials, as well as the reduction of waste and emissions during the casting process and compliance with environmental regulations."

Sustainability

"Foundries also face the challenge of sustainability. Unlike traditional production systems, foundries must make a digital transformation that goes hand in hand with the transition towards a circular economy, where waste is minimised and the efficient use of resources is maximised."

"Metal One contributes to this process by offering tools that help us to have optimal consumption of resources and effectively manage aspects such as recycling, reuse of materials, as well as the reduction of waste and emissions during the casting process and compliance with environmental regulations."

Integrated management and traceability of all foundry processes

"When we say that Metal One is a complete software it is because it has features to manage all the operations of a foundry in a single integrated suite, capable of automating activities and providing easy access to updated information. Some of the most important aspects it covers are:

- Organisation, planning and management of the production process
- Complete traceability of operations in real time
- Coordination and control of internal and external logistics, including inventory management
- Quality controls throughout the production process
- Administrative aspects such as purchases or invoicing

The new era of foundries

"In the past, foundries focused exclusively on metal production, dealing only with the early stages of the supply chain. Today this is no longer the case. Foundries are becoming an integral part of the entire process, including design, prototyping and final product development."

"This is a paradigm shift whereby foundries are no longer just suppliers of castings. Metal One aims to accompany companies in the sector in this process of change, providing them with the necessary tools to optimise all processes, from initial production to the final product."

Prototyping and budget management

"Related to the previous point, with Metal One we can experiment and innovate through designing and testing virtual product models within the tool. In parallel, the system tracks and manages production costs, both for prototypes and final products. This way, we achieve greater control and better use of resources."

"Chosen by SAP among the new Intelligent Enterprise solutions worldwide and awarded for the combination of enabling technologies such as predictive analysis and machine learning, Metal One is the 'backbone' of the foundry that wants to play a leading role on the market stage globally."

"Remote monitoring of devices and sensors in the field helps manage factory needs in real time and ensures an optimised and automated supply chain powered by data. Failures and production stops can be avoided with the support of diagnostic reports processed at any time and in any place.

The foundry's decision-making processes will finally be driven by real-time information rather than a passive analytics experience."

For further details contact Seidor South Africa on TEL: 011 018 3000 or visit www.seidor.com or www.metalone.it ■

"In the past, foundries focused exclusively on metal production, dealing only with the early stages of the supply chain. Today this is no longer the case. Foundries are becoming an integral part of the entire process, including design, prototyping and final product development."

Ford Motor Company South Africa (FMCSA) has announced it will start producing plug-in hybrid electric vehicle (PHEV) Ranger models

Ford Motor Company is celebrating its proud 100-year legacy in South Africa with the announcement of a R5.2 billion (US$272 million) investment in its local operations for the production of the first-ever Ford Ranger Plug-in Hybrid Electric Vehicle (PHEV)

Ford Motor Company is celebrating its proud 100-year legacy in South Africa with the announcement of a R5.2 billion (US$272 million) investment in its local operations for production of the first-ever Ford Ranger Plug-in Hybrid Electric Vehicle (PHEV).

Ford is also marking this historic milestone with the reveal of an expanded product range that will soon be available to its South African customers. The line-up comprises the all-electric Mustang Mach-E, the exciting seventh-generation Mustang range (which will include the most powerful naturally aspirated Mustang ever – the Mustang Dark Horse), the all-new Territory five-seater SUV, and the next-generation Tourneo and Transit Custom.

Additional derivatives of the country's top-selling double cab pickup and current South African Car of the Year are being previewed prior to their upcoming local launch, comprising the adventure-oriented Ranger Tremor and the Ranger Platinum – the most luxurious Ranger ever.

"This is a momentous occasion as we celebrate Ford's Centenary in South Africa," said Elena Ford, Chief Dealer Engagement officer, Ford Motor Company. "From humble beginnings that established Ford in South Africa in November 1923, our team and facilities here have grown into a world-class operation that delivers the highest-quality vehicles to our customers in South Africa and around the world."

"It reinforces our family-company beliefs and values that continue to guide our business and are a source of pride for the families who have worked here for generations, the dealers who have been the face of the brand for decades, and our loyal customers who embody the enthusiasm for the Blue Oval," Elena Ford said.

Investment for Ranger Plug-in Hybrid

The investment for the plug-in hybrid version of the Ranger incorporates a new battery pack assembly plant that is being constructed within the Silverton plant for the PHEV system. Ford's Chassis Plant in the Tshwane Automotive Special Economic Zone (TASEZ) is also being upgraded to accommodate the unique chassis configuration for this model, including changes to the robots, welding equipment, control systems, conveyors and skids.

Furthermore, the vehicle assembly operations are being adapted to accommodate the Ranger Plug-in Hybrid, specifically on the Trim, Chassis and Final (TCF) line. This includes changes to the handling equipment, turnover fixtures, charging systems, leak detection and testing equipment, as well as a new repair area.

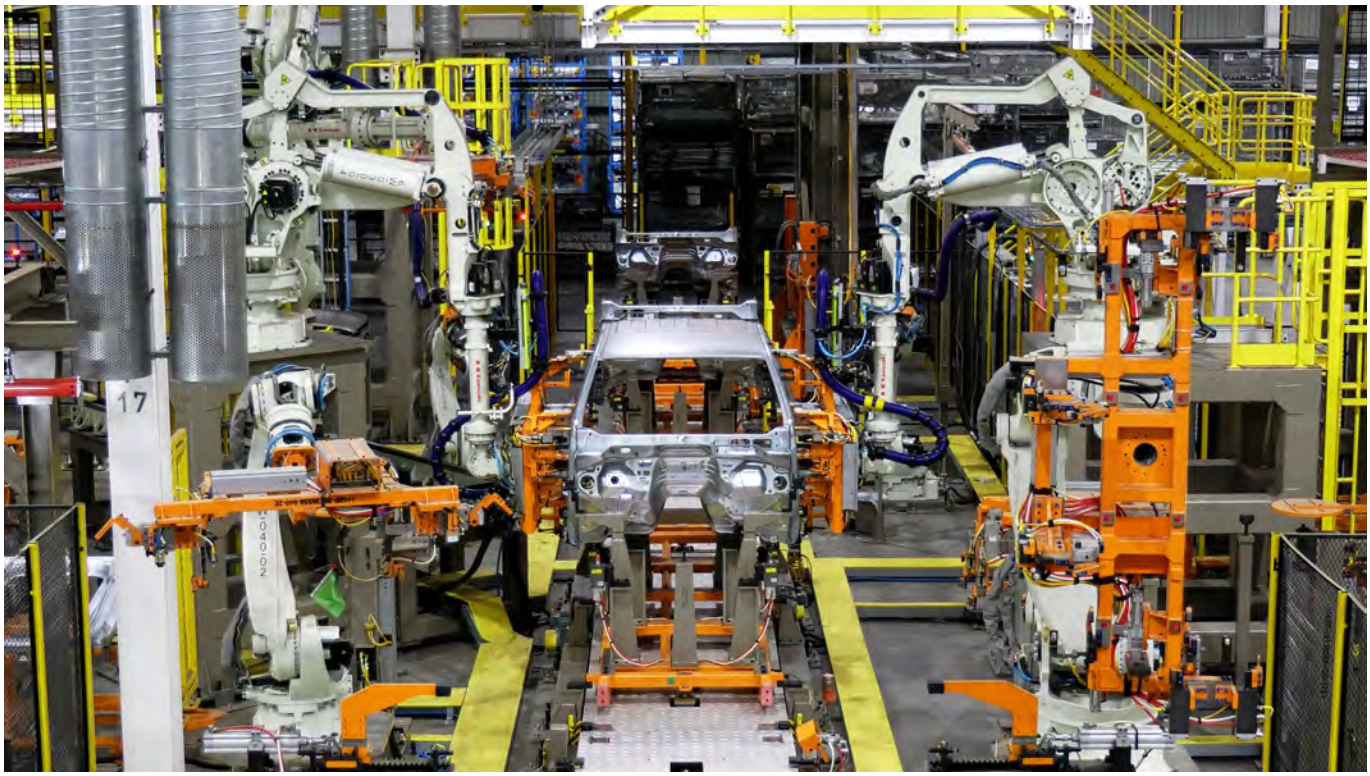
"The additional investment in the Silverton Assembly

Robotic Innovations

USES **FANUC ROBOTS**

AUTHORISED SYSTEM INTEGRATOR FANUC

www.roboticinnovations.co.za



The vehicle assembly operations are being adapted to accommodate the Ranger Plug-in Hybrid

Plant for the Ranger Plug-in Hybrid takes our total manufacturing investment in South Africa over the past 14 years to around $1.72 billion, or nearly R33 billion," says Andrea Cavallaro, Operations director, Ford International Markets Group. "It signals our commitment to the country, our employees and our extensive supplier network."

Ford currently employs approximately 5 200 people in South Africa. The local operations support around 60 000 jobs in the total value chain amongst supplier companies and contributes more than 1 per cent to South Africa's GDP.

Along with the new battery facility and plant upgrades required for the Ranger Plug-in Hybrid, the Paint Shop is being revamped to further improve paint quality and first time through (FTT) for all vehicles produced in South Africa. This will guarantee the highest levels of customer satisfaction and consistently deliver the required production volumes. The Silverton Assembly Plant has an installed capacity to produce 720 vehicles per day over three shifts, or 200 000 vehicles per year.

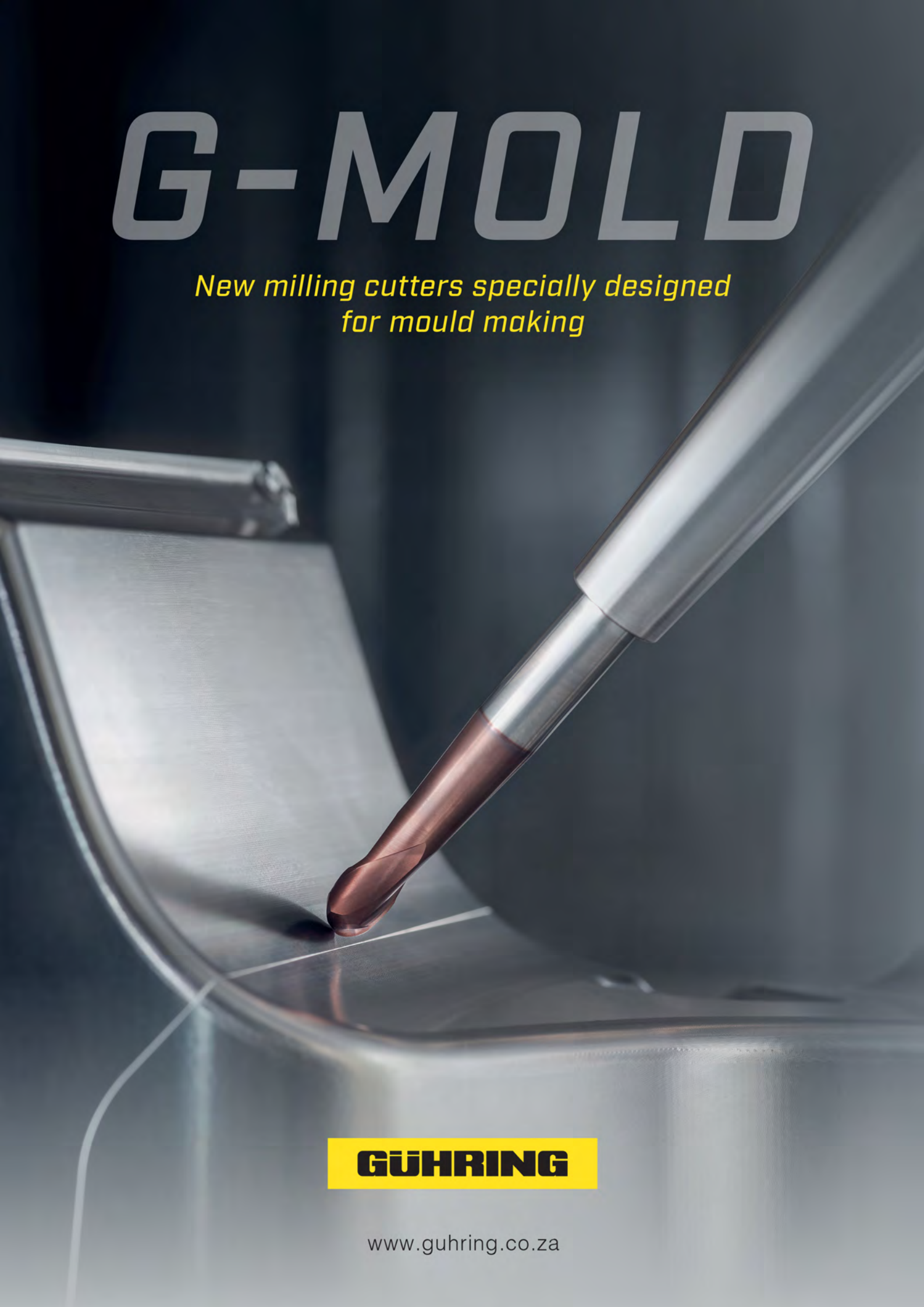
"As with the current Ranger models, the new Ranger Plug-in Hybrid will be exported to Europe as part of our commitment to offer a wide range of powertrain options for customers in this important mid-size pickup segment," Cavallaro says. "For the first time in about two decades the Silverton plant will also be supplying vehicles to Australia and New Zealand, as it will be the source market for the Ranger Plug-in Hybrid for these countries."

The Ranger Plug-in Hybrid will deliver more torque than any other Ranger, thanks to a 2.3-litre Ford EcoBoost turbo petrol engine paired with an electric motor and rechargeable battery system. It can be driven in pure electric mode for more than 45 kilometres without using a drop of fuel or producing tailpipe emissions, helping customers save at the pump and reduce their environmental impact.

"For the first time in about two decades the Silverton plant will also be supplying vehicles to Australia and New Zealand, as it will be the source market for the Ranger Plug-in Hybrid for these countries."

It will provide all the towing and payload capability customers expect of Ranger, along with Pro Power Onboard for the first time, enabling customers to power their tools and appliances on a worksite or remote campsite by plugging them into power outlets embedded in both the cargo bed and the cabin. This will ensure Ranger owners will have the power they need for both work and play.

South Africa is the fourth country across Ford's manufacturing portfolio to have exceeded 100 years of operations, following the US, Canada and Argentina. The Silverton facility will also celebrate its one-millionth Ranger produced some time next year, having reached 960 000 units in October. ■


G-MOLD
New milling cutters specially designed
for mould making
GÜHRING
www.guhring.co.za

Africa's first decarbonised iron plant to be built in Namibia

The Oshivela project in the west of the country is backed by the German government.

Namibia has begun construction of Africa's first decarbonised iron plant, to be powered exclusively by green hydrogen, the country's investment promotion body said.

Steelmaking is one of the most polluting industries in the world and the industry is seeking to shift away from coal-fired plants and towards the use of decarbonised iron.

The Oshivela project in western Namibia is backed by the German federal government, which has injected 13 million euros, and will use renewable energy to generate 15 000 tons of iron per year with no carbon emissions, the Namibia Investment Promotion and Development Board (NIPDB) said in a statement.

Namibia last year became the first African country to sign an agreement with the European Union to supply the bloc with green hydrogen and minerals needed for clean energy technology.

Production at the plant is set to begin in the final quarter of 2024, with plans eventually to ramp up production to one million metric tons of green iron a year.

The iron produced at the plant can also be used as a preliminary product in steel production in Germany to manufacture green steel for the production of wind turbines or vehicles, said Rainer Baake, Special Envoy for German-Namibian Climate and Energy Cooperation.

The project's developers, a consortium of German and Namibian companies, said the plant will use Hylron technology, which processes iron ore in a rotary kiln with the help of green hydrogen.

The German government recently updated its national hydrogen strategy to further speed up the market ramp-up for a hydrogen economy as part of its aim to become a global leader in the sector. Namibia, a former German colony, plays a central role in these efforts. In cooperation with German investors, the southwestern African state's government commissioned Sub-Saharan Africa's largest green hydrogen production project. Namibia's cabinet approved the entry into a 10-billion dollar project to build wind farms and photovoltaic plants with a total capacity of seven gigawatts (GW) to produce green ammonia, a hydrogen derivative which can be transported more easily.

The direct reduced iron, or sponge iron, that is produced can then be shipped to steelworks in Germany. "Namibia has ideal conditions for producing green hydrogen with the help of wind and solar energy," said economy and climate action minister Robert Habeck.

"Since Namibia has large iron ore deposits, green hydrogen can be used to produce green iron cost-effectively in the immediate vicinity of the mining sites - an important preliminary product also for the decarbonisation of steel production in Germany."

The overall investment is currently N$600 million, with a third of that coming from the German ministry of economy and climate. The project would employ 50 people during its pilot stage. ■

Is South Africa's infrastructure ready to meet the global demand for manganese ore?

Manganese becomes key battery material.

For a long time, South Africa has hinged its prosperity on gold, and the development and economic prosperity of the province of Gauteng gives testimony to this fact. Recent decades, however, have seen production of gold wane dramatically, from an era of having been our majority metal export to now being a small minority at 23% by sales in 2022. South Africa is a country that's rich in mineral wealth, however, and as a nation, we're awakening to the economic benefits to be found in that diversity. Manganese is a universal and widely used mineral essential for an enormous range of industries and sectors, particularly in the future economy.

Having enjoyed significant local growth in production and sales over the last decade, manganese is now affirming itself as the leader of South Africa's mineral renaissance. After all, South Africa is the world's largest producer of manganese ore, accounting for approximately 36% of global production. Most of South Africa's manganese deposits are in the Northern Cape, where the manganese mining industry is the province's major economic driver. In 2022, the manganese mining industry employed over 14 500 South Africans and generated more than R 7 billion in tax revenue. The industry has also contributed more than R47 billion export earnings over the last 12 months to the country's foreign exchange reserves.

The Northern Cape is well-positioned to capitalise on the growing international demand for manganese, as the province has abundant manganese resources in addition to a skilled workforce which has a long history of mining manganese. It's also noteworthy that the rise in demand for manganese is also sure to boost South Africa's copper industry, as manganese and copper are complementary minerals that are frequently used together.

Manganese is a crucial element in manufacturing of lithium-ion batteries, such as those used in electrical backup ▸

systems and electric vehicles. Recent years have seen a dramatic rise in demand for electric vehicles all over the world, and South Africa is in the perfect position to respond to that need.

Analysts estimate that the demand for manganese in lithium-ion batteries will increase by an average of 10% per year over the next decade, and South Africa's manganese ore production is expected to concomitantly reach about 50% of the world's additional manganese ore output over this period.

In 2022, the manganese mining industry employed over 14 500 South Africans and generated more than R 7 billion in tax revenue. The industry has also contributed more than R47 billion in export earnings over the last 12 months to the country's foreign exchange reserves

Manganese-rich cathode materials are also being developed to boost the efficiency of electric vehicles. This, in turn, will increase the demand for the metal. In addition to its use in batteries, manganese is essential to producing several other green power technologies.

However, the versatility of this metal extends even beyond the power industry. As an alloying element, it is essential in various types of steel production (often together with copper) and services the food processing, agricultural, chemical, construction, medical and aircraft industries. Further enhancing its reputation as a green-friendly mineral is that it can also treat wastewater and extract pollutants from soil and air.

The local manganese industry is keenly aware, however, that these exciting opportunities come with their attendant responsibilities. Primarily, there is the need to support local communities by providing jobs and training opportunities.

We also want the manganese mining industry to enjoy the reputation of operating in an environmentally responsible manner. This includes taking stringent measures to reduce water and air pollution and to manage waste products responsibly. Both the government and the mining industry are investing in new technologies to support the growth of the manganese industry. This will not only improve South Africa's operational efficiency and competitiveness in this field but will also enhance our environmental sustainability.

Casting applications

Manganese is grey-white metal with a pinkish tinge, and a very brittle but hard metallic element. Manganese is a reactive element that easily combines with irons in water and air. It is a steel with a relatively large component about 10 - 14% of manganese; highly resistant to wear and shock. The original austenitic manganese steel, contained about 1.2% C and 12% Mn.

Manganese steel casting involves creating intricate metal components using an alloy that contains a high proportion of manganese. This alloy's exceptional toughness, hardness, and work-hardening properties make it ideal for producing wear-resistant parts. Manganese steel is used in equipment for handling and processing earthen materials (such as rock crushers, grinding mills, dredge buckets, power shovel buckets and teeth, and pumps for handling gravel and rocks). Other applications include fragmentise hammers and grates for automobile recycling and military applications such as tank track pads as well as crusher jaws, railroad components, and construction machinery. The casting process allows for the precise formation of complex shapes while maintaining the steel's durability and abrasion resistance.

Is South Africa's infrastructure ready to meet the global demand for manganese ore?

Given the sudden acceleration of green power strategies in the developed west, the manganese industry is set to provide increasing opportunities for employment and economic growth in the Northern Cape. This will benefit not solely the manganese mining industry but the province, thus boosting the country's overall economic prospects. South Africa is indeed fortunate to be in the position in which it has both the material and operational capacity to rise to the demands of a rapidly changing world.

A 375-wagon manganese train broke the world record in 2019 for a production train with the most number of wagons. The 4km train ran over a distance of around 861km, from Sishen to Saldanha

However, if you look at all the government run services that are needed to facilitate the export of manganese ore it is only a matter of time before the Port of Saldanha, where most of the manganese is exported from, will break down because of lack of maintenance, as has happened in Eskom, PRASA, Transnet and the harbours. ■

Mercedes-Benz South Africa announces advancements in CO2 neutral manufacturing with R100 million investment

In advancing its commitment to environmental sustainability, through an investment of R100 million, Mercedes-Benz South Africa (MBSA) will install 22 847 photovoltaic (PV) technology (solar panels) at its East London manufacturing plant, to convert sunlight into electrical energy and to contribute to carbon reduction in the manufacturing process.

The additional photovoltaic solar energy forms part of the second phase of MBSA's pursuit towards net carbon-neutral manufacturing. By 2030, Mercedes-Benz plans to cover more than 70 per cent of the energy demand in production with renewable energies. A core element of Mercedes-Benz sustainable business strategy is Ambition2039, with which was already set the course for in our East London manufacturing plant in 2022.

"The installation of the Photovoltaic solar panels at our manufacturing plant is a key pillar of our energy strategy and will contribute towards the East London plant's daily maximum demand requirement of 12MW in times of peak-demand. The additional investment of R100 million into the second phase of the Photovoltaic solar energy project accelerates our carbon-neutral manufacturing ambitions and corporate citizenship mandate. As a company, we are working strategically towards delivering on our sustainability commitments, and feed-in agreements are required to utilise the new capacity from 2024 onwards. It remains our collective responsibility to safeguard the environment for future generations. To this effect, we call on all stakeholders to respond swiftly and to deliberately act towards helping to curb the exacerbating electricity situation in South Africa. Every action counts."

The investment into PVs affirms MBSA's commitment to environmental sustainability and heeds government's call to reduce the industrial consumption of electricity on a strained electrical grid. Furthermore, the installation of PVs offers a cost-effective energy solution and renewable energy source.

The first phase of the 3 692 PV solar panel installation was completed in 2022 and provided 2MWp (megawatt peak). The latest PV installation will cover an additional five rooftops of the East London Plant with 22 847 solar panels, expanding the manufacturing plant's footprint by a further 12.6MWp (megawatt peak). Combined, the total Photovoltaic size will approximate 26 539 solar panels, equating to 14.6MWpeak – a peak in line with the East London Plant's maximum demand during any production day. The annual generation of the completed system will contribute to an estimated 20 per cent of the East London Plant's annual MWh (megawatt hour) consumption.

The project is set to commence in quarter one of 2024, in partnership with a local supplier. ■

Invitation for public comment on second-hand goods act, 2009 (ACT NO. 06 OF 2009) amendments to regulations for dealers and recyclers

Government has called for comments on proposed amendments to the second-hand goods act to monitor scrap metal trade for dealers and recyclers, particularly impacting the iron and steel sector. These changes are intended to give effect to Phase 2 of the Scrap metal Policy to Limit Damage to Infrastructure and the Economy.

These proposed amendments include:

1. Enforcement of Registration Regime: Currently, the ▸

registration requirement under the Second-Hand Goods Act (SHGA) applies only to buyers of scrap metal, neglecting sellers. However, moving forward, the government plans to enforce registration for scrap metal sellers as well, aligning with the SHGA's envisioned registration regime. Notably, an exemption is anticipated for waste pickers, except for those involved in the sale of copper scrap metal

2. Enhanced Registration Requirements: A significant shift in the proposed amendments involves enhanced registration criteria. Going forward, both buyers and sellers will only be granted registration if they have an adequate Tax Compliance Status
3. Enhanced Reporting Requirements: The government is considering the implementation of an advanced input-output reporting system. This system will not only monitor compliance under the SHGA but also track exports of scrap metal and semi-finished products. Scrap dealers will be required to submit detailed monthly electronic reports to the International Trade Administration Commission of South Africa (ITAC). These reports will include vital information such as the date of purchase/sale, type and grade of metal, tonnage, total cost/revenue, and registration details of the buyer/seller
4. Inclusion of Semi-Finished Metals: A noteworthy development in the proposed amendments is the inclusion of semi-finished metals in the registration regime. While buyers and sellers of these materials were previously exempt, the new amendments will require their active participation in the regulatory process
5. Requirement for Registered Buyers: In a move to further control the trade in copper, the government is contemplating a requirement for registered buyers to exclusively purchase copper scrap and semi-finished copper products from registered sellers. This potential measure aims to restrict sales of such items to registered entities only

It is imperative for stakeholders to stay informed and actively participate in the discourse. All interested persons and organisations are invited to submit written comments on the draft regulations by no later than 8 December 2023 to Jacob.Setouto@csp.gov.za.

For a more detailed understanding and to contribute to the ongoing discussion, we encourage you to review the draft regulations and related information below:

https://www.gov.za/documents/notices/second-hand-goods-act-regulations-dealers-and-recyclers-amendments-17-nov-2023

https://www.greengazette.co.za/notices/second-hand-goods-act-6-2009-amendments-to-regulations-for-dealers-and-recyclers_20231117-GGN-49720-04073 ■

Volkswagen South Africa's Managing Director Martina Biene says the local operation is here to stay

This comes days after the company's global CEO Thomas Schäfer said he was "very worried" about the viability of the South African manufacturing operation, given the increasing cost of mitigating load shedding disruptions as well as port delays and rising labour costs.

However, during a year-end function on Monday that was attended by local media, VWSA boss Biene reiterated that although the issues raised by Schäfer are of huge concern, the company currently had no plans to leave South Africa.

In fact, Biene said the local operation was planning to increase production of its Polo to a record volume of 163 000 units in 2024.

To ensure this is possible without disruption, the company was planning to spend around R130 million over the next two years on renting generators and fuelling them with diesel. In recent times the company has also resorted to air freighting some car parts due to the port delays.

From the middle of next year, the local plant in Kariega, Eastern Cape, will become the sole producer of Polo hatchbacks for the European market. This will happen as the Pamplona plant in Spain is discontinuing the Polo to make room for the new ID.2 electric hatchback.

However, in line with the relaxed Euro 7 regulations, the current Polo won't be sold in Europe beyond 2028 and is also set to be discontinued in other markets by 2029 with no word on a possible replacement.

This, it would seem, is where the danger lies for the local Kariega plant.

"We're not a charity" - Volkswagen boss casts doubt on future of SA plant

Volkswagen international brand boss Thomas Schäfer's recent words during a visit to the country are nothing short of chilling.

Schafer mentioned how the Kariega plant was once ranked among the world's most competitive in terms of cost, reported Reuters. However in recent years the costs of overcoming disruptions caused by load shedding, as well as crippling port delays and rising labour costs have put the country in a somewhat less favourable position.

"Eventually you have to say, why are we building cars in a less competitive factory somewhere far away from the real market where the consumption is?" Schäfer said.

"I'm very worried about it ... We're not in the business of charity." ■

Business Rescue Practitioners clear up issue of temporary closure notice for Cast Products South Africa

The business rescue practitioners tasked with the business rescue of Cast Products South Africa have responded with the following statement with regard to questions asked about a memorandum sent to staff on the 20th October 2023:

"We confirm that all CPSA foundries are presently running as normal, and that the closure was a temporary measure that was instituted for a week whilst the business rescue team was resolving internal matters at the company."

Below is the content of the memo sent out and signed on 20 October 2023 by business rescue practitioner Johan Du Toit.

"As you are all aware CPSA is has been under business rescue from 2022. The company has experienced some difficult times during the year 2023, but the Business Rescue Practitioners and the Executive team are doing all that is possible to ensure business sustainability amidst all the challenges. At the beginning of this year, there was a negative impact due to the low order book as a result of some key client reviewing and cancelling of some significant orders, which affected our operations and cash flow."

"We are happy to report that there has been a significant improvement in sales and order intakes. As a result of these good order books, we have had to raise funds to ensure a ramp up in production. We have always been supported by our shareholders (IDC in funding and ensuring that the business fulfils its financial obligations including buying materials and paying creditors, and paying salaries amongst others."

"At this stage, in the month of October 2023, we have a negative cash flow, which makes it difficult to continue to operate. Business Rescue Practitioners (BRPs) are in discussions with IDC to find a suitable solution to provide financial assistance and allow the business to continue normal trading."

While these discussions are ongoing, the BRPs and CPSA Management are left with no other option but to temporarily close the business operations until further notice. This will be communicated accordingly as and when the situation improves."

What does this mean to employees?

"Employees will be expected to stay at home during this period, and the company will legally owe salaries for all the days which employees would have been scheduled to work under the current short-time arrangement. It should be noted that this is a temporary closure of the business, and as soon as the finance becomes available, the business will go back to normal." ■

Sandvik Coromant has entered into partnership with the Application Centre for Additive Manufacturing at RISE

"There are numerous challenges in additive manufacturing. Addressing some of these together with RISE and the centre's other partners is going to be very exciting," says Ulf Rolander, Senior R&D Expert at Sandvik Coromant.

Additive manufacturing, commonly known as 3D printing, enables a paradigm shift in the manufacturing industry, impacting various sectors. In an effort to support the manufacturing industry in embracing the technology and further the Swedish adoption of it, RISE founded the Application Centre for Additive Manufacturing, in collaboration with industrial partners and academia.

Since its inception, the centre has expanded significantly, encompassing a wide range of expertise and equipment, playing a continual role in fostering sustainable transitions and resilient value chains.

Sandvik Coromant, now the 19th member of the centre, specialises in providing cutting tools and services to the metal cutting industry. Sandvik Coromant is part of the Swedish multinational engineering company Sandvik AB.

"We are very happy to welcome our new partner Sandvik Coromant to the centre. This partnership is particularly significant in overcoming post-processing challenges and will fortify the Application Centre for Additive Manufacturing. I anticipate a future marked by fruitful cooperation and joint accomplishments," says Seyed Hosseini, Director of the Application Centre for Additive Manufacturing.

The Application Centre for Additive Manufacturing is open to all industries, businesses and public sectors interested in exploring additive manufacturing. RISE provides expertise, test environments, and a wide range of equipment and materials to find the most suitable path for each company and product. This means that even small and medium-sized companies can have quick and easy access to the latest technology.

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

MIKROPUL
Nederman

FS Flat bag filter

with reverse air cleaning

The FS flat bag filter is suitable for larger industrial plants with hot gas applications.

- Compact design – small footprint.
- Filter housing including cleaning system completely pre-assembled. Transport and assembly-friendly.
- Horizontal removal of the filter bags facilitates easy replacement.
- Energy efficient design – no use of compressed air.
- Raw gas temperature up to 250° C.
- Dust emission warranty: 5mg/m^3 is typical value.
- Very low maintenance requirements.

Nederman Mikropul provides solutions for a wide range of applications within industries such as foundry, smelters, steel, aluminum, asphalt, mining and minerals.

Nederman Mikropul is represented by:
Mondeco Solutions (Pty) Ltd.
Johannesburg, South Africa
T: +2779 448 1277 E: info@mondeco.co.za

Mondeco

Nederman Mikropul GmbH
Industriestrasse 9
D - 77948 Friesenehim
www.nedermanmikropul.com

The casting that turned boating upside down

By Kim Phelan, a Contributing Editor to Casting Source, a publication of the American Foundry Society.

A revolutionary concept in marine engine design called for a special kind of front housing casting that took equal parts of designer and foundry ingenuity and collaboration to pull off.

The announcement was out: Recreational products manufacturer BRP was discontinuing its iconic Evinrude line of outboard engines. For employees at the Sturtevant, Wisconsin, plant that built them, the landscape was changing. A hint in the company's official press release on May 27, 2020, lifted the curtain hem on something brewing that might just take the boating industry by storm. Way at the bottom of the statement was a curious reference to a next generation marine engine technology called "Project Ghost," an internal code name for a new product they believed would transform recreational boating.

Until then, boat manufacturers and their customers had two options: An outboard engine that sits prominently (and even obtrusively) at the rear of the boat close to where passengers sit, or a stern drive/inboard engine that's housed somewhere inside the boat, taking up precious, though unseen, cargo space. BRP conceptualised a third, unheard of alternative they called stealth technology - an outboard engine that is fully and unobtrusively integrated with the boat, virtually out of sight and out of mind.

To achieve such a feat would, in part, require a complex front housing casting to hold the lower unit and gearbox assembly that enables a 150hp engine to reside sleekly below the boat. The BRP team – comprising Supplier Quality Development Engineer Dave Palmer, also an instructor of AFS technical programmes; Product Designer Roger Raetzman; and Senior Buyer Jim Milam – eventually selected AFS Corporate Member LeSueur Inc. (LSI), LeSueur, Minnesota, to produce ▸

the 76lb. aluminium (A356) casting that measures 28.33" long x 21.98" wide x 23.80" high.

"I'm pleased that we were able to easily integrate this casting into production," Palmer reflected. "This is a challenging casting. And it's a big casting. It needs to be dimensionally accurate, have effective structural properties and be cosmetically appealing. This housing is a testament to the great collaboration that we've had with LSI."

Known commercially as Rotax S, the outboard engine is currently available on BRP's Manitou pontoon boats, its Alumacraft fishing boats, as well as its Australian brand of Quintrex boats.

Brains Plus Beauty

Fitting the Rotax S outboard engine underneath a boat's swim platform would mean BRP engineers would have to take a traditional outboard engine and essentially turn it on its side. To do so, they replaced a typical vertical crankshaft with a horizontal crankshaft, which reduced the engine's overall height. The output of the horizontal crankshaft would then be channelled through a gearbox down to the outboard's lower unit.

"When you stand next to some of the big new outboards today, you feel like you're about three feet tall because the engine is just so tall," said Palmer. "Putting the crankshaft in a horizontal orientation allows us to keep within that profile to be able to fit the engine under the deck. This means, we have to have an additional gearbox, made at BRP's lost foam foundry in Spruce Pine, North Carolina, to take the output of that crankshaft down to the propeller shaft."

"The front housing that LeSueur makes is what holds all of this together, so it's really an important casting," Palmer continued. "That's really what's allowing us to make an outboard engine like this with a horizontal crankshaft, and it's a brand-new part for us - I mean, this is something completely revolutionary."

Besides the innovative engineering to reconfigure engine parts for a slimmer, "stealth" fit below deck, the casting required excellent cosmetic features, which low pressure permanent mould was better equipped to handle than lost foam, which had been considered. But why does an under-the-boat engine need to look good?

"It's not necessarily visible when you're on the boat, but it is when you're in the showroom," said Palmer. "And that's equally if not more important, because if the customer doesn't like the way it looks in the showroom, they're not likely to buy the boat or see it in the water."

Knowing the casting must retain its corrosion resistance and beauty for many years, the casting's coating supply chain is elaborate. Once delivered, BRP machines the parts and applies chromate conversion coating. From there, an e-coat is applied and it is painted before it is ready for final assembly.

To read the full article click on the link https://www.castingsource.com/node/1565 ■

Tesla is working with multiple 3D printed sand casting companies

Tesla is trying to master the art of casting large, complex car parts in one go. If it succeeds, it will change how cars are made, making it faster and cheaper to produce electric vehicles (EVs). According to a Reuters report, five people familiar with Tesla's plans revealed that the company aims to revolutionise the traditional, complicated, time-consuming, and expensive process of creating large components like a car's underbody, which typically requires assembling numerous smaller pieces.

Tesla's Gigafactory
(Image Source: Tesla)

To overcome these challenges, Tesla is looking into 3D printed sand moulds, which are much cheaper and quicker to make than traditional metal moulds. This way, they can test new designs without spending a ton of money. Reuters sources revealed that the carmaker is also experimenting with special types of metal that work well for these big, one-piece castings. The goal is to speed up how cars are made and make electric vehicles more affordable.

Innovative casting

According to insiders who spoke to Reuters, this seemingly simple shift in material choice could be a game-changer for the entire industry. Traditional moulds made from metal are expensive and time-consuming to alter. For example, a dashboard mould alone can cost between $100 000 to $150 000, while a mould for a bumper might range from $50 000 to $100 000. Engine component moulds can start at around $20 000 and go up to $80 000 or more, depending on the complexity and material.

A single tweak in the design of these moulds could cost as much as $100 000. But when it comes to creating an entirely new mould from scratch, the costs can soar up to $1.5 million, especially for large, complex structures like a car's underbody. A sky-high figure like this accounts for detailed design work, specialised machinery and labour, rigorous testing to meet quality and safety standards, and the cost of durable materials required for casting. Such high costs make Tesla's exploration of 3D printed sand moulds a potentially revolutionary development in the automotive manufacturing industry.

In contrast, 3D printed sand moulds offer a far more flexible and cost-effective solution. Engineers can easily revise designs using a digital design file and 3D printers, and a new sand mould can be printed within hours at a fraction of the cost. This dramatically shortens the design validation cycle from as long as a year to just two to three months, allowing for more rapid innovation and adjustments.

Moreover, Tesla leverages the flexibility of 3D printing with sand to experiment with intricate designs previously considered too risky or expensive. For instance, Tesla's engineers can now include hollow subframes in their one-piece castings to reduce weight and improve crashworthiness. Engineers place 3D printed sand cores within the moulds to create these hollow structures. After casting the metal, they remove the sand, leaving the desired hollow spaces behind.

Mould magic

Tesla prefers in-house solutions and tends to be secretive about its production techniques. Despite this, the company has embraced 3D printing for various purposes. A Forbes report revealed that Tesla's applications of this technology range from creating door handles to prototyping entire chassis. For Tesla's specific need to create 3D printed sand moulds, binder jetting technology would be the go-to method. These printers rely on layering, spreading sand on a tray, and then selectively applying a liquid binder to shape the mould according to the digital design. The machine repeats the process layer by layer to complete the mould and then removes the unbound sand to reveal the finished product. ■

An auto part printed out of sand using binder jetting
(Image Source: ExOne)

General Motors acquires Tesla 3D printed mould supplier Tooling & Equipment International

General Motors (GM) has recently acquired Tooling & Equipment International (TEI), a significant supplier to Tesla in the area of gigacasting, a process for casting large car body parts in one piece. This move is seen as a strategic effort by GM to enhance its manufacturing efficiency and compete more effectively with Tesla.

By integrating TEI into General Motors, the automotive giant told Reuters it was 'bolstering its portfolio of innovations and secure access to unique casting technology.'

TEI's expertise in sand casting techniques has been pivotal in developing Tesla's gigacasting moulds, contributing to their ability to produce complex components more economically. TEI utilises binder jet 3D printers to rapidly create and modify industrial sand moulds from digital files, allowing cost-effective casting of molten alloys with quick reprints for design adjustments.

The acquisition of TEI, which had been collaborating with Tesla since around 2017, marks a shift in the landscape of automotive manufacturing. TEI's work with Tesla involved gigacasting mould prototyping for various models, including the Model Y, Model 3, Cybertruck, and the Semi truck. GM's interest in TEI was evident when they engaged TEI in 2021 for underbody castings of the Cadillac Celestiq EV, leading to a long-term contract and dedicated production line for the Celestiq.

This deal grants GM access to advanced casting technologies and the expertise of one of the world's top sand casting specialists. It also represents a significant development in the ongoing competition among automakers to adopt and refine manufacturing techniques like gigacasting. Tesla, now without TEI, is relying more on other casting specialists and potentially developing in-house capabilities to reduce dependency on external suppliers.

The acquisition, reportedly under $100 million, integrates TEI into GM's Global Manufacturing division while maintaining its business entity. This move is not just about gaining a competitive edge but also about understanding and potentially adopting manufacturing innovations that have been largely driven by Tesla. ■

Toyota will adopt Tesla-style cast bodies that might be impossible to fix

Toyota has reportedly demonstrated a prototype production line for a cast car chassis, made by a process sometimes referred to as "gigacasting." The new manufacturing technique may offer significant production advantages, but could hand consumers the short end of the stick when it comes to the castings' repairability.

The casting process was demonstrated at Toyota's Myochi plant in Japan, where it fabricated the rear third of a unibody at an event attended by Nikkei Asia. Cast unibodies are proposed as a potential replacement for conventionally assembled unibodies, which combine shaped metal pieces via welding, industrial adhesives, and more to form a car's frame. In an example given by Toyota, a unibody built with traditional methods required 86 parts, 33 steps, and hours on an assembly line. But in its demo, the company reportedly produced a cast equivalent in a mere three minutes.

Toyota reportedly expects cast bodies to reduce production complexity, costs, and preparation time, not to mention make more efficient use of factory floor space. Fully optimised, Toyota anticipates it'll generate 20 per cent higher productivity than its competitors, and could halve body assembly time from 10 hours.

The technology will reportedly first be used for a mass-produced electric vehicle that will arrive in 2026 with cast front and rear body structures. Toyota reportedly plans to make cast bodies integral to its EV strategy, though 40 per cent of its EVs in 2026 will still use variations of the existing TNGA architecture.

Cars with cast unibody components are already sold by Tesla, which nicknamed the technique gigacasting. However, Tesla's pattern of poor quality control emerged here too, with one driver of a Model Y made in Austin, Texas finding frame fissures they could shine a light through. This doesn't mean casting is unsuitable for unibodies, as Toyota, whose identity and image are rooted in quality and reliability, likely would not ship a car with such a worrying flaw. ■

voxeljet and Loramendi jointly developed a fully-automated serial additive production solution for inorganic 3D printed cores as part of the Industrialisation of Core Printing (ICP) cooperation project

voxeljet showcases its next-gen 3D printers VJET X in action at BMW group. With 10x faster performance, the new 3D printers are integrated into a fully automated additive production line.

voxeljet AG and Loramendi demonstrate the world's first fully automated additive serial 3D production line for sand cores, jointly developed as part of the Industrialisation of Core Printing (ICP) cooperation project. A new video released today features the implementation of the first ICP production line at BMW Group's plant in Landshut, Germany. As BMW Group's largest component plant, Landshut has approximately 3 500 employees and supplies all of its vehicle and engine plants worldwide, including for nearly all BMW, MINI and Rolls-Royce vehicles, and for its motorcycle brand, BMW Motorrad.

The customised, low-emissions solution integrates voxeljet's high-speed VX1300-X (VJET-X) 3D printers into a fully automated pre- and post-processing workflow, including industrial microwaves for curing the 3D printed cores. Printing rates were increased by factor 10 with the latest generation of VJET-X 3D printers, and the toolless design of the sand cores allowed for variant changes at unprecedented speed without time-consuming tool changes and production downtime. The unused material is 100% recycled and reused in the production process.

"The fully-automated 3D production line at BMW's Landshut plant is a key milestone not only for voxeljet, but for the entire 3D printing and automotive industry," said Dr. Ingo Ederer, founder and CEO of voxeljet. "We believe this customised, near-zero emissions solution achieved in partnership between voxeljet, Loramendi and BMW will become an industry standard."

Together, voxeljet and Loramendi are revolutionising the industrialisation of core printing. The production of inorganic 3D printed cores has enabled BMW Group to advance the design of its engine components. For example, the cylinder head for BMW's B48 engine has been significantly improved by using 3D printing to produce water jacket outlet combi cores. Additionally, 3D printing allows BMW to produce sand cores in one piece, reducing the complex design of engine components while optimising the engine's efficiency and fuel consumption. The inorganic 3D production line also significantly reduces the foundry's emissions, as only water steam is produced during the casting process.

voxeljet's powerful next-generation binder jetting 3D printing technology offers the highest additive productivity and throughput to meet the demands of BMW's large-scale production needs. voxeljet's layer-by-layer technology works by using sand and an inorganic binder. A print head selectively bonds layers of sand to create the cores, which are then unpacked, microwave cured, cleaned and inspected before being fed into BMW's established casting process. voxeljet has been granted 1 patent and has 10 patent families with 28 patent applications across the United States, Europe, and other geographies that protect this proprietary approach. ■

Shaping the future
with our eco-friendly chemicals and materials.

Our sustainability approach is to reduce emissions while increasing the effectiveness of our products. With our product portfolio, we support you to produce in an environmentally and employee-friendly manner, without sacrificing performance and profitability.

To learn more on our sustainable solutions, contact our Team today:
awie.klopper@ask-chemicals.com I Tel. +27 82-464 2773 I Tel. +27 87-057 7635
JJ.deJager@ask-chemicals.com I Tel. +27 87-057 7649 I Tel. +27 82-550 9567

www.ask-chemicals.com

ASKCHEMICALS

Japan International Cooperation Agency (JICA) supports skills development – inaugurates Kimura Foundry's Casting Training Course in Bengaluru

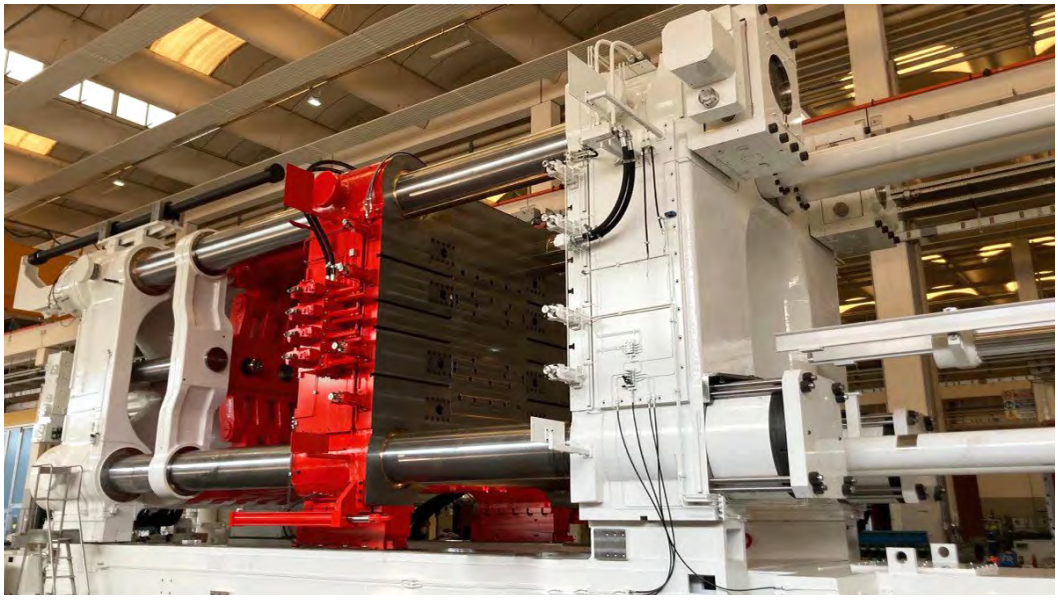
Japan International Cooperation Agency (JICA) is supporting the skill development program in the Indian casting industry through the launch of the Kimura Foundry Casting Training Course at Karnataka German Technical Training Institute (KGTTI) Bengaluru. The inauguration ceremony was attended by Dr. Sharanaparakash Rudrappa Patil, the Minister for Medical Education & Skill Development Entrepreneurship and Livelihood Department, Government of Karnataka, various dignitaries of the Government of Karnataka, Karnataka German Multi Skill Development Centre (KGMSDC) Society, Kimura Foundry Co., Ltd., Technology and JICA India office.

The casting training course at KGTTI will educate trainees on Japanese standards, best practices, and Kimura Foundry's extensive knowledge. It is poised to advance India's own casting industry significantly, training instructors in practical casting technology, metallurgy, environmental considerations, and quality control. The training module is a result of efforts by Kimura Foundry, the global smart manufacturing organisation with a rich history dating back to 1927 in Japan and a specialisation in full mould casting, which has done extensive evaluations to understand local regulations, production standards, and practices, as well as human resource development in the Indian casting industry.

JICA has expanding the scale of collaboration with private partnership to leverage developmental impact through the cooperation. As a part of private partnership programs, JICA has been nurturing a partnership with Kimura Foundry Co., Ltd., through SDGs Business Model Formulation Survey for setting up training course of Casting Engineers in India. ■

Ford, Hyundai test Tesla supplier's Giga Press

Tesla has pioneered the use of massive casting machines to make large single pieces of vehicle underbodies.



Idra, the Italian aluminium casting machine manufacturer and Tesla supplier, has added Ford, Hyundai and another European company to its customer base as more automakers explore this manufacturing technique.

Tesla has pioneered the use of massive casting machines, also known as 'Giga Presses,' to make large single pieces of vehicle underbodies, streamline production and reduce the work even of robots.

Front and rear underbodies cast by giga ▸

presses are combined with battery packs to form a three-piece chassis for battery electric vehicles.

A 'Giga Press 6 100' which produces a clamping force of over 6 000 tons, with the Ford brand printed on it, had been assembled and was being tested in Idra's plant in Travalgiato, near Brescia, northern Italy during an industry event organised by the company.

The machine will be installed in an R&D facility in the Detroit, USA and used for testing and benchmarking ahead of introducing the presses for production vehicles.

An even bigger press, the 9 000 ton, is Idra's largest and newest model and is the size of a small house or a tennis court, was being tested nearby but without the client's name printed on it. A source close to the matter, however, said it would be shipped to Hyundai, adding that it would also initially be used only for R&D purposes.

The source said Idra was also about to sign a supply contract for two 9 000 presses with a premium automaker in Europe, its first with a European group. Sources said Volvo has purchased two Idra Giga Presses for their new plant in eastern Europe.

Six Giga Presses are now emerging as the standard for an annual production of 500,000 vehicles, the source added.

Idra has already shipped 14 presses to Tesla, including two 9 000 ton machines for Tesla's large Cybertruck production at its Austin plant, Texas, according to sources and posts by Tesla on social media.

Idra has so far signed orders for 25 presses, with 21 already produced and shipped, including to leading Tier 1 parts makers.

What is a Giga Press?

The term Giga Press was coined by Idra CEO Riccardo Ferrario for the first order of an OL 5500 CS HPDC machine in May 2019, the Italian company said in a release announcing that the term had been added to online encyclopedia Wikipedia.

A Giga Press is a series of high-pressure aluminium die casting machines. Molten aluminium weighing more than 100kg is injected into the cold-chamber casting mould with a velocity of 10 meters per second. The cycle time is about 120 seconds, resulting in 30 completed castings an hour. About 500 castings can be produced each day using three 8-hour shifts.

The maximum width of a casting is 2.2m. The castings are currently used for front and rear underbodies, but Idra is working to add castings of battery cases and central platforms that incorporate battery cases. Idra's Giga Press ranges in size from 19.7m x 7m x 6m to 22m x 8m x 6.5m and have a clamping force ranging from 5 500 to 9 000 metric tons. ■

Ferrous scrap consumption declining in 2023

Trade group BIR says even China, where steel output was up in the first half of the year, is melting less scrap, according to a report in Recycling Today.

Global steelmaking and ferrous scrap recycling figures for the first half of this year portrayed a tepid market when presented to attendees of the Bureau of International Recycling (BIR) Ferrous Division session in October in Abu Dhabi, United Arab Emirates.

Rolf Willeke, the Brussels-based BIR ferrous statistics advisor, cited figures provided by the World Steel Association (Worldsteel) and other global and national steel and recycling organisations.

In terms of ferrous scrap consumption, it is down in all major countries and regions year on year, according to the BIR.

China's consumption of scrap was 2.9 per cent lower year on year in the first half of this year, at 116.2 million metric tons, though the country has remained the world's largest user of ferrous scrap.

Falling even further in their consumption of scrap were steelmakers in the European Union, down by 9.6 per cent; large-scale scrap importer Turkey, with a sizable 16.4 per cent decrease; Japan, with a 4.3 per cent decline; and the United States, at minus-3.1 per cent for the year.

The drops in scrap consumption in the EU, US, Turkey and Japan were matched by drops in overall steel production as well.

In China in the first half of this year, however, steel production rose by 1.3 per cent, meaning its iron ore-dependent blast furnace/basic oxygen furnace sector has kept its output steady.

While the steel sector misfortunes of electric arc furnace (EAF) producer Turkey have weighed on the global ferrous scrap trading sector, better news is emanating from India.

India was the world's second-largest ferrous scrap importer in the first half of this year, recording a strong year-on-year increase of 105.5 per cent to 5.49 million metric tons purchased from other nations.

The BIR Ferrous Division is now using the term "recycled steel" in place of ferrous scrap to resonate more effectively with the public and policymakers in highlighting the importance of our material for global steelmaking.

Also at the meeting, guest speaker Davide Braga of Italy-based recycling equipment Danieli Centro Recycling said scrap fed-EAF technology would double its share of global production by 2050 and also entail a significant increase in direct reduced iron (DRI) production.

Should the EAF forecast be accurate, an additional 300 million metric tons of scrap per year would be needed to feed those furnaces - an unlikely figure to meet, thus opening the door for more DRI.

Additional guest speaker Kedar Joshi of metals information services provider Davis Index said increased scrap demand may not come from the EAF sector alone. Joshi said integrated mills might have to increase scrap utilisation to meet investor and community demand for lower carbon emission scores.

Noting that entities such as the World Economic Forum and McKinsey & Co. are involved in metals sector decarbonisation, Joshi said Davis Index CEO Sean Davidson had a message for BIR Ferrous Division delegates: "It's time we drive this message to everyone we meet: Tell them 'You want a greener planet? Just let us continue doing the job we've being doing for more than 100 years.'" ■

The 75th World Foundry Congress (WFC 2024)

The 75th World Foundry Congress (WFC 2024), hosted by the World Foundry Organisation (WFO), will be held in Deyang, China from 25 to 30 October 2024. The conference will take place in the Deyang Wende International Convention and Exhibition Centre, Sichuan, China.

The World Foundry Congress is held every two years. It is hosted by the World Foundry organisation and hosted by its member states in turn. Since it was held in France in 1923, it has made great contributions to promoting the development and exchange of foundry science and technology in the world, improving the foundry technology level of various countries and promoting the progress of human civilisation.

The WFC2024 will be celebrated in Deyang Wende International Convention and Exhibition Centre, Sichuan, China. Known as the "City of Heavy Equipment", Deyang has a solid foundation for the heavy equipment industry and owns a number of leading enterprises and manufacturers. Under the slogan "Developing foundry", the delegates will access a full programme of technical presentations and visits to companies.

This is the third time that the Foundry Institution of Chinese Mechanical Engineering Society (FICMES) organises the WFC after successfully holding the 61st WFC (1995, Beijing) and the 69th WFC (2010, Hangzhou).

One of the main functions of the WFO is to unite the industry and disseminate appropriate information in a standardised and systemised manner at an annual event. To this end, the World Foundry Congress, is held bi-annually for the presentation of technical papers and providing an adequate networking opportunity for those wishing to have a thorough understanding of the latest research and developments in the cast metals industry. In addition, there are social events for delegates and their partners.

For further details visit www.75wfc.com ■

SMS group to build new electric arc furnace for SSAB for fossil-free steel production

SMS group has secured the contract from Nordic steelmaker SSAB to engineer, deliver and construct a new electric arc furnace (EAF) for steelmaking at SSAB's site in Oxelösund, Sweden.

The scope of supply includes a 190-ton Alternate Current-Electric Arc Furnace (AC-EAF) capable of processing various raw materials, including fossil-free Direct Reduced Iron (DRI) or Hot Briquetted Iron (HBI), and scrap. With an upper shell diameter of 9.3 metres, the new EAF is one of the largest installations in the world for similar applications, and it will help SSAB to scale up the decarbonisation of its production processes.

SSAB is revolutionising steelmaking with two unique steels with virtually zero fossil carbon emissions: SSAB Fossil-free and SSAB Zero.

SSAB Zero is based on recycled steel and SSAB Fossil-free is based on sponge iron reduced with hydrogen instead of coke coal. Both are heated in EAFs powered by fossil-free electricity and other fossil-free fuels. SSAB's ambition is to be a virtually fossil-free company in around 2030.

SMS will supply all automated features including the slag handling and Eccentric Bottom Tapping (EBT) operations, the advanced electrode control X-Pact® SynReg, which, together with advanced robotics applications, such as the X-Pact® Sampler, ensure operational safety as well as better precision and productivity without human intervention. ■

KEEGOR SOUTH AFRICA

IS THE SOLE DISTRIBUTOR OF MORGAN MMS CRUCIBLES & FOUNDRY PRODUCTS IN SUB-SAHARAN AFRICA

We distribute the following range of **high-quality, world-leading** products:

MORGAN CRUCIBLE RANGES

- Silicon Carbide Salamander Excel & Hi-Melt
- Silicon Carbide Iso-Pressed Ultramelt
- Clay Graphite Salamander Super
- Clay Graphite Iso-Pressed Syncarb Z2E2 & Sigma HT

FOUNDRY PRODUCTS

- Ladle Bowls & De-Slagging Spoons
- Degassing Rotors
- Pyrometer Sheaths
- Plungers

CRUCIBLE PRODUCTS

- Accessories & Lifters
- Furnaces

We are also a distributor for Scottish Chemical Industries, manufacturers of foundry fluxes for copper-based alloys.

KEEGOR | SOUTH AFRICA

ENGINEERED INVENTION - SINCE 1959

FIND OUT MORE **T** +27 (0)82 460 1593 | **E** eddie@keegor.com | **W** www.**keegor**.com

Keegor Group Keegor Group

Secondary copper production based on scrap infeed has risen by 7.5 per cent year on year nine months into 2023

The ICSG's (International Copper Study Group) report covering September 2023 says secondary copper production based on scrap infeed has risen by 7.5 per cent year on year nine months into 2023, according to a report in Recycling Today.

According to ICSG, that rate of increase is above that for global primary refined copper production, which rose by about 4.8 per cent in the first nine months of 2023. The overall landscape for copper in 2023 recently has led to price increases on the London Metal Exchange and COMEX.

The association says China has been a major contributor to the secondary production spurt this year, and it notes that maintenance and disruptions at primary refining facilities in several nations, including the United States, Sweden, Indonesia and Finland, have put a ceiling on primary refined copper output.

In the United States, several facilities are under construction or in the start-up phase that could eventually lead to more secondary copper domestic production and a decrease in red metal scrap available to the rest of the world.

However, US Census Bureau data aggregated by the US Geological Survey (USGS) shows any potential shift in scrap flows has yet to transpire in a significant way.

Despite oft-cited economic woes, China remains the largest buyer of US outbound red metal scrap. More than 212 000 metric tons of copper-bearing scrap went from the US to China (including Hong Kong) in the first eight months of this year, according to the USGS.

Malaysia has purchased more than 46 000 metric tons of US red metal scrap this year, and Thailand has bought more than 32 000 metric tons. Traders say much of that material, however, ends up in China in more carefully sorted or ingot form.

India is emerging as a red metals destination for US red metal scrap, with an eight-month 2023 total of around 48 000 mtric tons.

Overall, US recyclers shipped out 532 000 metric tons of red metal scrap for export in the first eight months of 2021 and 586 000 metric tons from January to August last year. This year, the total after the same period stands at 570 100 metric tons, for a modest 2.7 per cent decrease in year-to-date exports. ■

The 16 largest pig iron producing countries

According to Yahoo Finance South Africa sits at number 16 in the ranking. Production of pig iron in 2022 was 2.4 million metric tons. South Africa produced 17.5% less pig iron in 2022 as compared to 2021. This is mainly due to the inefficiency of the state-owned railway operator. Most of the iron ore and coal in the country is transported by rail and so producers had to hire trucks to transport raw material, leading to an increase in the cost of logistics.

Above South Africa were countries such as 15: Mexico (Production of Pig Iron in 2022: 3 million metric tons), Iran, Italy, Turkey, Taiwan, Vietnam, Ukraine (position 9 and 19 million metric tons), USA, Germany, Brazil, Korea, Russia, Japan (71 million tons) and India.

In position one is China (Production of Pig Iron in 2022: 830 million tons). The country alone accounts for around 63.8% of the total pig iron produced in the world. However, the country is also the largest steel manufacturer in the world and so to satisfy the immense local demand, the country still remains a net importer of pig iron, with a negative trade balance of $766 million in 2021.

China is the second-largest importer of pig iron in the world, after the US, with most of its imports coming from Brazil. China witnessed a decrease of 2.1% in the production of pig iron in 2022 as compared to 2021, when it stood at 869 million tons. This is mainly due to the 4% decrease in the demand of steel in the country in 2022, due to its economic conditions and extended Covid 19 mitigation strategies.

Iron is the least expensive and most widely used metal in the world. Pig iron, or crude iron, is an intermediary good that is produced by smelting iron ore or scrap iron, with coke in a blast furnace or an electric arc furnace. On the other hand, cast iron is the purest form of iron. Cast iron contains only 3% carbon while the carbon content of pig iron is around 4%. Pig iron is hard and brittle and also has other impurities, such as sulphur, manganese, silicon and phosphorus mixed into it, while cast iron contains no impurities and can be cast into any shape.

Pig iron, while not very useful on its own, is used as a raw material for manufacturing steel. The difference lies in the percentage of carbon present. Those irons that have a carbon content of less than 2% are called steels. Pig iron was not produced in Europe until the Middle Ages, but China was producing it as early as 256 B.C. ■

« INTERNATIONAL TECHNOLOGY.
SOUTH AFRICAN COMPANY. »

CERAMIC FIBRE SPECIALISTS.

RESISTANT MATERIALS SERVICES (PTY)LTD

— Est. 1987 —

EMAIL: rms@rmscc.co.za

WEBSITE: www.rmsproducts.co.za

Acetarc acquires the assets of A1 Roper

In August, molten metal pouring and handling specialist Acetarc acquired the assets of A1 Roper, the latter company having ceased trading at the end of February 2023.

The move signals the end of a rivalry between the two companies that dates back to the early 1970s when Acetarc was "the new kid on the block" in terms of foundry ladle suppliers.

Speaking about the move, Acetarc technical director Steven Harker said: "Once we have integrated the A1 Roper ladle parts into our production system, we hope to be able to offer support to those foundries that use Roper ladles. We will not be offering new 'Roper' design ladles but should be able to keep an existing Roper ladle operational for a few more years."

Established in 1967, ISO 9001:2015 accredited company Acetarc Engineering specialises in the design and manufacture of foundry equipment, principally with regards to molten metal handling and pouring. The Acetarc range of ladles are used in foundries around the world.

Spare parts for Roper ladles can also now be sourced from Acetarc. Contact them on TEL: +44 (0) 1535 607323, email: sales@acetarc.co.uk or visit https://acetarc.co.uk ■

Ceba and Kanthal in strategic partnership for the green shift – focus on electric ladle and tundish preheaters

The steel and metal industry's quest to decarbonise production requires new solutions for heating processes such as ladle and tundish preheating. A new strategic partnership between Kanthal, a global leader in industrial heating technology, and Ceba, an expert in equipment for ladle and tundish preheating and drying, aims to offer sustainable electric solutions for these processes, advancing the green technology shift.

As the steel and metal industry is looking for ways to decarbonise production, the demand for sustainable heating solutions is growing. Ladle and tundish preheating and drying are processes that today rely on fossil fuels with open flames powered by gas burners. With this partnership, Kanthal and Ceba will expand their capabilities and resources to provide innovative electrified alternatives to these processes. This will contribute to the reduction of carbon emissions and improve workplace safety.

The collaboration brings together Kanthal's cutting-edge industrial heating technology and Ceba's proficiency in engineering and manufacturing industrial heating equipment, delivering comprehensive electrified solutions for industrial heating requirements across various sectors. Ceba will develop equipment that incorporates existing heating technology from Kanthal.

"We're thrilled about this partnership as it will enable the market introduction of electric ladle and tundish heaters, which is something that the industry is asking for," said Rickard Dahlgren, Acting President Business Unit Heating Systems.

"We are proud of this strategic partnership which is the result of a shared vision and commitment to reduce carbon emission in the metal industry, providing a significant step for a more sustainable future. We look forward to sharing the innovative systems that will emerge from this partnership," said Cesare Baldassari, Chairman of the Board of Directors and founder of Ceba. ■

Why Extending Your Brand Online Matters

castings sa

Online research is a key part of the industrial buying cycle, particularly during the consideration and selection stages. castings sa online is where buyers search, research and learn about new product technology and new process innovations. Aligning your message with the areas where prospects are likely to look for technical solutions is the essence of contextual advertising and brand development.

Online Advertising Opportunities

Extend your brand and put your message in context and receive the actionable results needed to grow sales while expanding your brand's digital presence. The castings sa website (www.castingssa.com) includes the latest issue of the publication in both digital and PDF format to download, industry events, international and local exhibitions and links, news, employment opportunities and a showroom giving you details of supplier and metalcasting engineering companies' activities.

Take the opportunity to have your company banner logo on the website.

www.crawfordpublications.com

www.castingssa.com

www.metalworkingnews.info

Crawford Publications

CONTACT
Bruce Crawford
Cell: 083 628 7654
Email: online@engnews.co.za
B.A Crawford Specialised Publications (Pty) Ltd

www.castingssa.com

Visit www.castingssa.com and see how you can reach a wider market!

ASK Chemicals presents REZIANCE resin portfolio

ASK Chemicals, a global leader in chemical solutions for the casting industry and a supplier of high-performance resins, has unveiled its new REZIANCE brand portfolio of industrial resins. Building on its expertise in phenolic resins in both the foundry and industrial resin businesses, ASK Chemicals is expanding its footprint into new markets with a new product line of phenolic resins.

The acquisition of the industrial resin business in 2021 represented a significant milestone in ASK Chemicals' diversification strategy. It expanded the company's focus to include a wide range of applications such as friction, abrasives, refractories, impregnation, wood, paints and coatings.

"ASK Chemicals offers high-performance phenolic resins and specialty solutions for casting and a growing range of industrial applications. With the launch of our REZIANCE industrial resin brand, we are embarking on an exciting journey of diversification. I am confident that with our passionate global team and our high-performance products, we offer attractive benefits to our customers," stated Christoph Henseler, Chief Business Development Officer at ASK Chemicals.

ASK Chemicals' technical understanding of the industries, combined with its legacy expertise in industrial phenolic resins, makes the company a partner of choice for demanding technical solutions. The commitment to technical excellence and high customer satisfaction has always been central to ASK Chemicals' go-to-market approach.

At the upcoming SAE Brake Colloquium ASK Chemicals will showcase its technological solutions for braking systems. The event will provide attendees with an exclusive opportunity to learn first-hand about the company's braking system solutions for enhanced safety and performance.

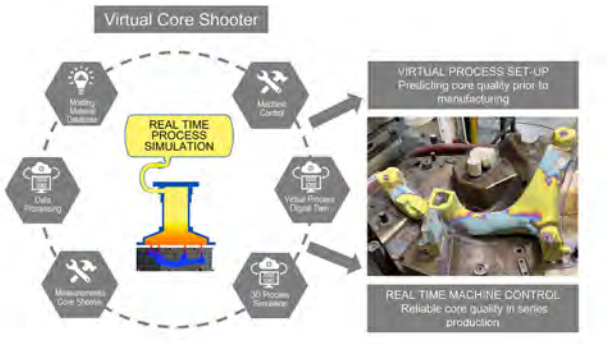
This is an international press release and products might not be available locally. Check with ASK Chemicals in South Africa.

For further details contact ASK Chemicals on TEL: 087 057 7635 or visit www.ask-chemicals.com ■

Hüttenes-Albertus, Laempe and MAGMA present their developments on core production

Three leading technology providers in their respective fields, have successfully continued their long-standing partnership to develop digital core production.

In the production of modern, complex castings, it is important to achieve consistent quality in core production, which involves the interplay of several influencing factors and process variables. However, it is only at the end of the production process - when you have a finished casting - that you can determine whether the process can deliver 100% of the required quality. Foundries would certainly benefit from being able to identify potential deviations in advance, as this would give them the opportunity to intervene in the process at a very early stage.



The integrated concept of the Virtual Core Shooter is linking expertise of three market leading companies

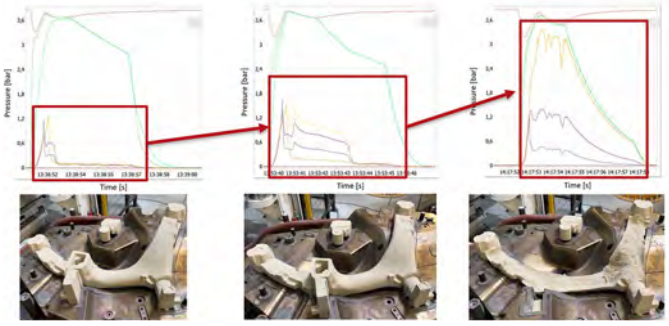
Simulation-based mapping of core production

This is exactly what simulation-based mapping of core production does. It makes the process transparent and predictable, considering as many process parameters as possible. Integrating these methods into the

production environment is the vision that drives the partnership between HA, MAGMA and Laempe.

Digitally retrace the production of a core

The three partners introduced their revolutionary concept for the first time four years ago. At the leading international trade show GIFA in June 2023, the three partners presented the progress: The concept was illustrated on an extended machine control console of a Laempe core shooter. Visitors were able to digitally follow the production of a core on three interactive screens.



Pressure curves in the core shooter can be used to predict core quality

Core quality can be better assessed and controlled

Various parameters of the core making process are continuously monitored and linked to real-time measurements taken in the machine. The data is processed in real time by a unique simulation software that predicts pressures and mass flows for the sand and air throughout the machine and core box system. As a result, the impact on core quality can be evaluated and controlled by making adjustments to the shooting process, answering questions such as: What is the effect of sand height in the shooting unit on the process? What is the effect of air vent blockage or cavity cleanliness? At what pressure is the sand shot into the mould cavity? How stable is the process and what parameters need to be changed if the set quality specifications are not met?

Combination of process simulation and real core production

"With this patented new tool, we have been able to combine process simulation and real core production. By coupling the properties of the sand-binder mixture over the time with the core shooter and current tooling, we can simulate the entire process holistically. In this way, we ensure a reliable core quality", says Dr Ingo Wagner, Product Manager Core Making Processes at MAGMA GmbH. "Due to the short computing times, it is even possible to integrate the simulation into the real-time operation of the machine. We are also implementing this technology as a front-end predictor into MAGMA C+M, our core making process simulation software."

Important building block for digitalisation

"For Laempe, this initiative is an important building block in our digitalisation initiative, which we are supporting by our Laempe Digital Cockpit software suite and our Core Vision real time inspection system", comments Rudolf Wintgens, Managing Director of Laempe. "The now established link between process data, machine control and the final core distinguishes this approach from many Industry 4.0 activities in a foundry that lack the link to product quality."

Detect core defects that are not visible to the naked eye

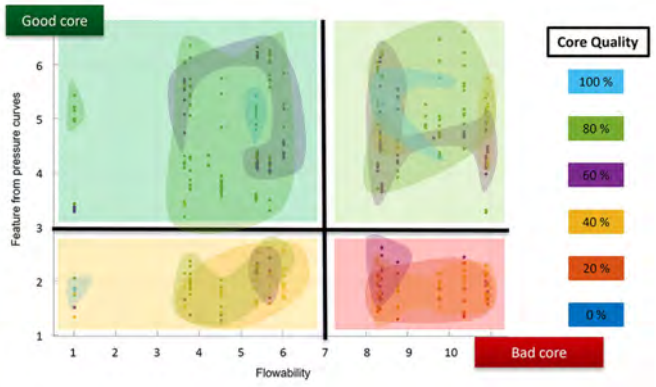
And the next step has already been taken. HA has invested in a comprehensive series of fully instrumented core making experiments to link the behaviour of sand-binder mixture to the virtual system. The latest AI technologies have been used to establish a robust predictive capability between the state of the sand system at different machine settings and the final core quality.

"We can now identify core defects that are not visible to the naked eye, but cause problems further down the process chain," explained Amine Serghini, a member of the HA management team.

"Deformation during core storage, core breakage during casting as well as casting defects are often not only caused by the binder itself, but also by parameters such as the storage time of the sand-binder mixture. A fresh sand mix flows better, has better compactability and ensures less tool deterioration and vent clogging. The virtual core shooter is used to predict whether a sand mix can still be used without causing downstream problems or how the production can be set to maintain good core quality."

Prediction by means of virtual core shooter

The empirical data behind the direct simulations have been collected during tests at the HA Centre of Competence (CoC) in Baddeckenstedt, Germany, on a state-of-the-art Laempe core shooter used there. This data allows important influencing parameters and their effects on the casting process to be accurately modelled in the machine and tooling. The CoC is equipped with a wide range of technical capabilities and provides a valuable platform for partners from different disciplines to systematically drive innovation in joint development projects.



With machine learning tools quantitative correlations between the behaviour of the sand mixture, the process condition in the machine and core quality was established

Real-time and data-based core production control

The technical implementation of a real-time, physical and data-based core production control system has become reality thanks to the partnership between MAGMA, HA and Laempe and represents a revolutionary step towards Foundry 4.0. This approach opens a world of new possibilities for all three partners as they strive to provide their customers with intelligent solutions for optimised and robust core production at all times.

Contact the local representative of Laempe and MAGMA for more details. For further information on Hüttenes-Albertus contact DZanetech Cape Town on 082 562 8779 (Dean Horne) or 083 454 5465 (Johan Jooste), for Johannesburg 083 274 1657 (Koketso Mamogale) or for Johannesburg/KwaZulu Natal 066 010 0999 (Zaid Syed) or 082 809 7380 (Paul Malone) or visit www.dzanetech.co.za ■

Automated coating application of alcohol based coatings by the installation of a Foseco Inteligent Coating Unit (ICU Pro)

To meet the latest quality demands Metso:Outotec was challenged to improve coating application consistency, reduce casting defects, at the same time automate coating control and adjustment and to improve quality control.

Metso:Outotec is a Finnish company specialising in mining equipment. Metso:Outotec has a global footprint with 15 000 employees in over 50 countries and provides sustainable technologies, end-to-end solutions, and services to the aggregates, minerals processing, and metals refining industries. The Metso:Outotec foundry in Prerov, Czech Republic produces metallic ware parts for Metso:Outotec's mining customers.

The parameters

- Alloy: Predominantly CrMo Steel (minority Mn Steel)
- Coremaking: CO2-resol, PUR cold box Moulding process: Alkaline phenolic binder technology
- Casting temperature: 1 480 to 1 520°C Pouring weight: max. 8 tons

Foseco's products used included the ICU Pro unit, TENO* coating 5000 A-80, FENOTEC* 280 ES binder, FENOTEC HC 10, 20, 30, 35, 45 binders, STELEX* PrO filters and KALMINEX* XTA sleeves.

The solution

The Foseco Intelligent Coating Unit (ICU) automates the process of measuring and controlling the dilution of refractory coatings to ensure the correct consistency is maintained and the properties required for optimum application are achieved. The ICU is fully ATEX certified and ensures the safest operation with solvent coating.

The outcome

The use of the ICU unit resulted in a uniform coating layer thickness, reduced coating waste, removed sand particles in the coating and increased core shop productivity by 25%. Casting scrap and rework levels were also reduced.

For more information contact Foseco South Africa on TEL: 011 903 9500 or visit https://www.vesuvius.com/en/our-solutions/en-za/foundry.html ■

GOM Zeiss ScanBox sets new standards in industrial 3D metrology

ScanBox is an optical measuring machine that supports customers with fast and precise measurements for quality control in the production and manufacturing process. Available in eleven models, the measurement systems deliver accurate and traceable results, guarantee high throughputs and are easy to operate thanks to an intuitive user interface and the Virtual Measuring Room (VMR) as central control and measurement planning software.

The ATOS ScanBox is not localised, but can be set up and put into operation within one or two days. The core of all measuring cells is a robot-driven 3D scanner of the ATOS series, which is used for non-contact and three-dimensional measuring of parts. The standard software solution virtual measuring room (VMR) simulates the real measurement cell environment, making it possible to display movements during the measurement process in virtual simulations. Thus, the robot can be controlled via drag and drop commands without a control panel. The measurement and inspection process can be prepared based on CAD data without the need for a real part.

The ATOS ScanBox models have been developed specifically for production-related inspection and quality assurance processes, and are already used by numerous enterprises including Ford South Africa, Daimler, VW, Rolls-Royce, Bosch, Honeywell, Samsung, Automotive Lighting and ZF. In their industrial production facilities, the measuring cells achieve high throughput rates, since more parts are analysed in a shorter time. Furthermore, the measurement cells achieve high reproducibility and, at the same time, process reliability, since measurement and inspection processes are deployed at different locations without a user.

For further details contact RGC Engineering on TEL: 011 887 0800 or alternatively visit www.rgcengineering.co.za ■

Still serving the **FOUNDRY INDUSTRY** and more…

Insimbi's core business is supplying the metal industry, and by design and organic growth the company has diversified its product offering and caters for the following industries as well.

FOUNDRIES AND NON-FERROUS
This division is constantly seeking new and innovative solutions for our customer base

STEEL
Ferrous and non-ferrous alloy products required in the steel and stainless steel melting production process ranging from cored wire, fluorspar; FeMn, magnesium and aluminium

SPECIALTY PRODUCTS
Supplies welding powders, optical consumables, cobalt sulphate and carbon products to a diverse spectrum of industries

EXPORTS AND BULK
Supplying ore, ferro alloys and metals on a global scale

ROTARY KILN
Our established partnerships with the cement and lime industries enables us to remain the preferred supplier of refractory and technical support to this market

FIBRES
Manufacturer and supplier of both steel and polypropylene fibres into the concrete and monolithic refractory industries

POWDER COATING
This newly introduced division supplies quality coating powders into the metal finishing industries

REFRACTORY DIVISION
We specialise in the design and supply of refractory products to the metals and furnace building industry

SEPARATE ENTITIES
- Insimbi Aluminium Alloys
- Insimbi Metals Recycling

INSIMBI
GROUP

SHEQ
National cert
Certified: ISO 9001:2015

Head Office: Wadeville – 011 902 6930
Cape Town – 021 577 1901
KZN – 031 465 1022

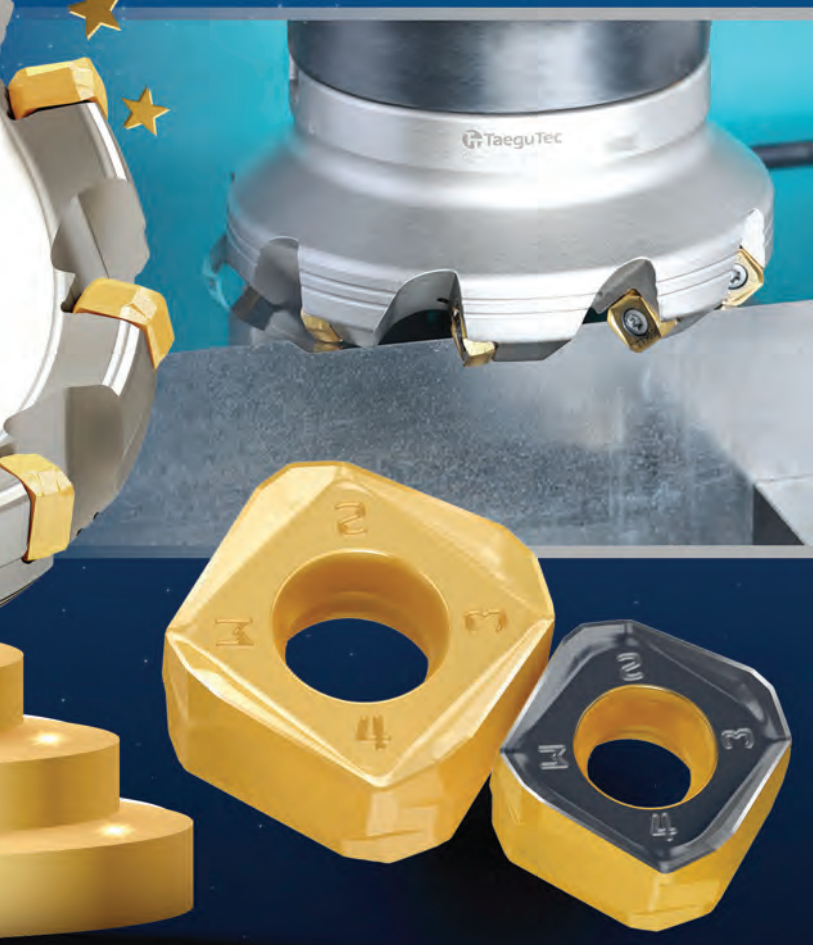
www.insimbi-group.co.za

CHASE8SFEED

FACING & HIGH FEED

High Feed & Face Milling with 8 Cutting Edge Insert for Improved Productivity

- High productivity with max. No. teeth
- Strong tool body and reinforced cutting edge
- Excellent chip evacuation
- Economical 8 cutting edge



TaeguTec SA (Pty) Ltd
Member IMC Group

Tel (011) 362 1500 • Fax (011) 362-1511
Clearwater Office Park, Block F, Cnr Atlas & Park Roads, Parkhaven, Boksburg
Email: info@taegutec.co.za

www.taegutec.com

AGENTS
Cape Town - DTM Prazision - 076 411 9937
Durban - Rodney - 082 923 3487 • Port Elizabeth - Johan - 084 587 6186
Secunda - Jimmy - 082 654 6164 • Bloemfontein - Kevin - 083 407 1668