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SI Group
The Substance Inside
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The Thermal Ceramics business of Morgan Advanced Materials makes a range of fibre and refractory high temperature insulation products used to reduce energy consumption in industrial processes. Its products are also used in passive fire protection applications.

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The Thermal Ceramics business produces a variety of market leading brands including; Superwool®, low bio-persistent insulating fibre, Pyro-Bloc®, modules, Min-K®, WDS® and BTU-BLOCK™, microporous and JM™, K® and TJM™ Insulating Firebricks (IFBs).
Smart chemistry that solves global challenges

SA Metal Group; Afrox evolves low-temperature oxyfuel combustion technology;
Lauds achieving results;
Mineral Zone appointed agents;
Industrial 3D metrology; SEIFSA;
THE SEIFSA/NUMSA agreement;
IDC starts to sell off Scaw units; Eskom tariff;
State’s scrap metal export; Metso;
Spectrum Technical; Atlantis Foundries

How Innsbruck sold bells to the world;
Hypertherm’s FlushCut;
GF acquires high-pressure die casting specialist;
A new manufacturing method;
Vesuvius and thyssenkrupp CSA cooperate;
Sand castings; Omega and Simpson enter into a global agreement

Struers introduces high-capacity Rockwell and entry level Vickers hardness testers;
Foseco launches new, insulating lining system;
Elkem’s Topseed conditioner;
Spectro introduces Spectro Midex MID05 small-spot ED-XRF
It might sound like an old cliché but I often get asked how our foundry industry in South Africa is doing and, the metalworking industry in general. It is very hard to give a definitive answer especially when you do not have qualified and quantified figures at hand. There are a number of figures that are bandied about and I have even seen a report saying 70 foundries have closed since 2010.

However, the most common response amongst industry and government officials is: “South Africa has about 170 foundries which directly employ about 9 500 people. Mostly small and medium-sized enterprises, a total of 25 foundries, have closed in South Africa since 2010, shedding 1 600 jobs.”

How these figures are derived I am not sure as I have not seen the research that has been done and by whom. In fact it is very difficult to get any South African figures on machines/equipment sold into any manufacturing industry let alone the number of products manufactured in a particular industry because, unlike most of our international trading partners, South African companies are not compelled to provide figures that are of real interest to make qualified decisions whether to invest or not. Sure you could probably get all the figures you want on staff numbers and the composition of them for any company, but the meaningful ones that influence investment decisions are not readily available in the open market.

My stock answer to the people that ask the question, whether they are a skeptic or not, is to go and read my magazine and see the positive stories that appear in each issue. This issue is no exception.

Some say that there are some “islands of excellence” but the positive stories, which either involve investment in equipment or new processes, or both, in our local foundry industry, continue to be written about.

Last issue I had an update on the continual investment at Naledi Foundry, as well as the stories on Ceralcast and Agni Steel. This issue there is the story on SA Metal that is beneficiating the scrap copper and brass metal into an essential product – not just ingot but one that is used in many different industries.

Then there is the story on one of South Africa’s biggest foundries that exports most of its castings. Atlantis Foundries have embarked on a process project that will pave the way to becoming a Smart Foundry by embracing the Fourth Industrial Revolution. This project aims to combine various technologies available to gather and analyse process data, with the aim of improving product quality and cost efficiency.

Atlantis Foundries has stated that its investment does not stop there. Currently the company is installing a sand reclamation system and more robots are planned.

I also know that from information given to me is that there are a number of other big installations that are either currently taking place and about to be completed and others that will happen soon. And this isn’t just happening at the so-called ‘big’ foundries, it is at new foundries that have just started up.

So we might not have the qualitative figures to work with but companies are making positive decisions despite this.
The Backbone of Ceramic Fibre

Ceramic Fibre Blanket
Ceramic Fibre Modules
Ceramic Paper
Insulation Boards
Calcium Silicate Boards
Vacuum Formed Products
Mixes, Cements & Coatings
Textiles - Cloth, Rope, Braids & Tape
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Contact the company closest to you.
SI Group, a leading global developer and manufacturer of chemical intermediates, specialty resins and solutions announced the implementation of a global brand transformation in September 2015. The project that impacted customers in more than 90 countries and facilities on five continents and took 18 months to implement also included the launch of a new logo.

According to the Group the rebranding launch represented the convergence of SI Group’s history and tradition with a modern aesthetic and the distinctive new look was reflective of emerging global workforce trends.

Originating from The Schenectady Varnish Co. established in 1906, the SI Group name was created in 2006 to reflect the changing scope in the worldwide marketplace. Today, SI Group comprises of 20 manufacturing sites in 10 countries, including the United States, Brazil, China, England, France, India, Korea, Singapore, South Africa and Switzerland, with more than 2,700 employees and over $1.6 billion in annual sales.

**About SI Group HA**

SI Group HA South Africa is a subsidiary of the SI Group, a company that says it creates smart chemistry that solves global challenges and makes great things possible. The company is a developer and manufacturer of chemical intermediates, specialty resins and solutions that are critical to the quality and performance of countless industrial and consumer goods. SI Group’s focus is on ten key market segments globally — rubber resins, antioxidants, fuels and lubricants, plastic additives, industrial resins, foundry, health and wellness, adhesive...
SI Group provides solutions that address four global megatrends: a clean environment, diminishing resources, changing patterns in mobility and changing demographics. As the world changes, SI Group says it will continue to supply solutions to increasingly complex problems as a chemistry partner.

“After all, with more than 100 years of innovation as a foundation, we are paving the way forward for the next generation of chemistry and partnering with our customers to build a better tomorrow.”

SI Group is deeply committed to global partnerships, providing chemistry solutions to valued customers in 90 countries, and building upon international relationships to best meet the chemistry needs of nations around the world. Their local presence enables them to provide targeted solutions to customers on a local basis.

**SI Group’s zero-zero-zero policy**

Safety of the environment, people and communities is important to the SI Group. The Guiding Principles of Responsible Care are key to their history and their future. They promise to conduct all aspects of their business to safeguard their employees, the communities they live and work in, and the environment.

They inspect every critical step in their manufacturing processes and every vital piece of equipment in their plants, and they strive to protect everyone whose life is touched by their products on a daily basis, including those who make, transport, buy, use and handle their materials.

The SI Group has set their goal at zero negative impact on people, the environment, and their reputation. The Group says they will measure their success using globally recognised criteria developed by the American Institute of Chemical Engineers’ (AIChE) Center for Chemical Process Safety.

“We are setting the bar high to meet this goal in our worldwide operations.”

**Foundry**

SI Group HA South Africa has two manufacturing plants in South Africa — one in Alrode, Gauteng and the other in Prospect, KwaZulu-Natal. Through its partnership with Hüttenes-Albertus the company manufactures and distributes products for the foundry industry such as organic and inorganic binder systems, coatings, feeders, special sands, bentonite, parting agents and metallurgical products that cover the entire range of chemical additives for the foundry industry.

For further details contact SI Group SA on TEL: 011 389 8200 or visit www.siigroup.com or www.huettenes-albertus.com
SA Metal Group —
maximising the value of scrap metal

Now beneficiating copper and brass.

SA Metal Group might be one of the oldest and largest scrap metal collectors and recyclers in South Africa but when you visit the company’s head office in Epping Industria, Western Cape, you are introduced to an aspect of the company that is not commonly known — beneficiating the scrap metal it collects and processes.

Scrap metal has been the core business of the family-owned SA Metal Group for the majority of its lifespan since grandfather Wolfe Barnett, an immigrant from the UK, established the company in 1919. Initially the company earned its revenue from buying up old machinery and breaking it up for spares. Scrap was a byproduct that was shipped back to the UK but this changed when spares became readily available in South Africa.

The Group is now run by Graham Barnett who deals with administrative functions, and Clifford who looks after the operational side. Both started at the company in the 1980s while father Aubrey was in charge. More recently fourth generation Barnetts — Graham’s sons Daniel and Rafael have joined the Group.

The new 1 000kW Inductotherm VIP™ Power Supply Unit in the melting department

Great care has to be taken during a copper melt. Copper won’t melt until it reaches 1,084 degrees Celsius

“Scrap metal prices per kilogram in South Africa are consistently changing and it is always a challenge for those companies in the industry to keep up with the changes. Ultimately however, we have been around for many years and now have 10 locations around South Africa — we only expanded outside of the Western Cape in 2001.”

“We have always believed in adding value to whatever material we collect wherever this is viable. All scrap metal purchased by the Group is processed by sorting, shearing, shredding, torch-cutting, granulating and baling, amongst other processes. In addition, all our scrap processing yards are equipped with the latest cranes and handling equipment that are able to unload material from suppliers, safely and quickly.”

“Our steel shredding plant for example, situated in Christian Avenue, Epping Industria, produces shredded steel scrap at a rate of up to 120 tons per hour, reducing auto bodies, home appliances and other steel structures into fist-sized clean fragments of steel.”

“But it is not only steel that we recycle and process. All non-ferrous metals are processed or sorted in our main and satellite sites. This includes aluminium, copper, zinc, stainless steel, lead, nickel, brass, tin, bronze and others. We purchase scrap metal from a wide range of Southern African sources including industrial enterprises, scrap metal dealers and private individuals.”

“Non-ferrous metal and shredder waste recovered from...
Is your foundry settling for “It’ll Do”... or are you striving to achieve “Global Best Practice?”
the shredding plant is sorted further in our separation plant, where a combination of perforated screens, wind sifters, eddy-current separators and induction sorting systems (ISS), coupled with hand-picking lines, ensure that over 99% of the metal contained is safely and efficiently collected.

“Designed for high capacity and reliability, our two 1 000 ton Lindemann shears, the largest in Africa, are situated at Epping Industria and at our plant in Germiston. A third 1 000 ton Le Fort shear is operational in Pretoria.”

“The company is geared to operate in remote regions where mobility is paramount. With this in mind, our mobile baling machines are rigidly constructed to ensure optimal productivity. By compacting vehicles and other light metal raw materials into manageable-sized bales, we are able to facilitate the cost-effective transportation of this material to our works. Our mobile shears are likewise used in much of our demolition work and in the processing of on-site scrap material. Designed with durability and structural integrity, mobile shears can operate in the harshest of conditions and, with unparalleled power, allow a fast cut cycle that dramatically increases efficiency.”

“Advanced portable spectrometers are used extensively in our day-to-day operations. These provide accurate metal analyses to ensure the correct valuation of recyclable material.”

“Our weighbridges are electronic, assized and calibrated and are fitted with radiation detection equipment and cameras to ensure safety as well as accurate, documented systems for all material received at our yards across the country.”

“In addition, we operate a highly advanced machine shop on our premises, where we are able to manufacture a wide range of precision components.”

“Our works is also equipped with a boilershop, container building and repair works, a hydraulic repair shop, a carpentry shop and plumbing and electrical departments.”

Further beneficiation of copper, brass and steel

“Because of the constant fluctuation in the price of scrap metal we took the decision that wherever possible we should add further value to the metals that we were processing. This resulted in the establishment of a steelworks mill in 1999.”

“Under the banner SA Steelworks, SA Metal Group manufactures steel billet, reinforcing bar, round and square bar in straight lengths and coils at this plant. All products are manufactured from 100% recycled scrap steel.”

“Our shredded steel scrap is melted using energy-saving and low-emission electric induction furnaces and is then refined, alloyed and continuously cast into billets. These are then reheated and rolled into a range of steel products, all manufactured in accordance with international and South African Bureau of Standards (SABS) specifications.”

“All recycled steel used at SA Steelworks is collected in the Western Cape and processed in our own works. SA Steelworks is the only operating steel mill in the Western Cape region.”

Raw materials

The production of copper products begins with raw material in the form of either copper scrap, newly refined copper (called cathode copper, or simply cathode) or copper ingots. The choice of raw material depends on economic factors such as cost and availability, and the technical capabilities of the plant’s melting furnace.

Copper scrap is most often in the form of recycled copper wire that has been stripped of its insulation and/or baled copper tube, pipe, rod and other scrap that has been removed from demolished buildings, for example. Another common form of scrap is the so-called “home” or “runaround” scrap generated within the processor or fabricator itself.

“We realised that the company was collecting enough copper and brass scrap to consider beneficiating the material further. Coupled with the success and experience that the company had gained with setting up SA Steelworks and our own research, a decision was taken to setup a facility to manufacture copper busbars and brass bar with the intent to supply a broad spectrum of fabricators.”

“There are many fabricators of copper busbar in South Africa but very few companies that are manufacturing the busbar itself. The decision was made in 2015 and the process of setting up the mill to produce the copper and brass..."
rod began. The installation of equipment for the mill was completed in early 2016 and includes a 1 000kW Inductotherm VIP™ Power Supply Unit.”

“The continuous cast melting process allows us to produce solid copper rod which is then coiled before being sent to the extrusion facility, which was also setup from scratch.”

“SA Copperworks now manufactures a wide range of high-conductivity rectangular, square and round copper busbars, coiled copper rods and strip, paper-covered copper strip for the transformer industry, round and hexagonal solid and hollow brass bars, and solid square brass bars, as well as other profiles on request.”

“Product is either cut-to-size or coiled in strip, depending on the application needed by the fabricator. A full range of sizes are manufactured.”

“All the dies and other necessary accessories for these facilities are manufactured in our machine shop, as are any wear parts for the continuous casting and extrusion machines.”

“We have invested heavily over recent years and we can now boast that we have one of the largest capacities in South Africa to manufacture copper busbar that is supplied to many different industries.”

“Most scrap yards typically accept recyclable material from contractors and others, but many of them act only as the middleman and resell the material to specialised processors outfitted with the necessary high-tech equipment to efficiently process the material. We are now very much one of those specialised processors.”

For further details contact SA Metal Group on TEL: 021 590 3900 or visit www.sametal.co.za
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- HOESCH: grain refiners, master alloy’s
- SCHAEFFER: non-ferrous die coats, fluxes
- STRIKO: aluminium furnaces
- MAMMUT: crucibles
- PROGELTA: molten metal treatment and automation systems for grey and ductile iron foundries
- ELKEM: inoculants and nodulisers
- CERALCAST: local ceramic production facility
- REMET: investment casting products for the shell and wax room
- NEWFORM: Mica and other thermal and electrical insulation products

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Afrox evolves low-temperature oxyfuel combustion technology for the aluminium industry

Melting is a core step in the processing of primary and secondary aluminium but also extremely energy intensive and can impact both the productivity and total cost of aluminium production," says Simphiwe Molefe, Applications Specialist for Bulk Markets at Afrox.

"With the growing need for reducing production costs, increasing productivity and yield, enhancing quality and environmental awareness in the aluminium industry, Afrox — through its parent company, the Linde Group — is evolving and refining its technologies to increase productivity in the aluminium process chain. From melting and dross handling to refining, extrusion and annealing, Afrox has the technical competence and process knowledge to add value throughout the aluminium process chain."

Low-temperature oxyfuel combustion technology

“This technology is designed for the aluminium industry and is based on flameless oxyfuel combustion. The combustion in the process occurs under a diluted oxygen concentration. Basically, the flame is diluted by mixing it with hot furnace gases and this slows down oxyfuel combustion reactions and results in lower flame temperatures, comparable to those of an airfuel system. The mixing of flue gases with the flame also disperses the energy throughout the entire furnace for a faster and more uniform heating. The dispersed flame contains the same amount of energy as a normal airfuel burner, but with more effective distribution. The dilution of the flame also slows down the oxyfuel combustion reactions and results in lower flame temperatures, lower emissions, higher melt rates and lower fuel consumption, while avoiding hot spots and dross formation."

“Air consists of approximately 20,95% oxygen by volume with approximately 78,09% being nitrogen. With this amount of nitrogen by volume, during airfuel combustions nitrogen tends to absorb heat, in a way acting as an extinguisher. By increasing the amount of oxygen in the melting process, you reduce the amount of inert nitrogen in the combustion reaction. This has several advantages which include increased thermal efficiency, reduced fuel consumption, improved control over the process and less fuel emissions,” explains Molefe.

He adds that this is applicable to both primary and secondary aluminium processing as well as new or existing furnaces. While this is not new technology, it is often challenging for smelters to determine the exact suitable combustion solution to meet their individual needs.

“Together with the Linde Group, we have extensive experience with oxyfuel for aluminium melting which enables us to provide our customers with suitable combustion solutions that meet individual demands.”

“As a member of the global Linde Group, Afrox has access to cutting-edge gas solutions, and is able to assist customers in the aluminium sector in the use of oxygen to enhance the combustion process, increase efficiency and reduce emissions. Afrox’s oxyfuel solutions for the aluminium industry have shown to increase melting rates by as much as 100%, reduce fuel consumption by up to 50% and cut flue gas and emissions by anything up to 90%.”

Afrox’s oxyfuel solutions include a wide range of oxyfuel burners and technologies designed by the Linde Group to suit different processes and requirements for aluminium melting.

Airox® Combustion Technology

“The Airox® burner solution is an advanced tool for flexible and economic melting. The technology allows furnace operators to easily switch between oxygen, or oxygen-enriched gases during the melting process, and air during the holding phase. This results in greater melting capacity and flexibility as well as lower emission rates and energy consumption. Airox® combustion technology is well suited for furnaces that are used for melting and holding intervals, light metal foundries, extrusion companies and foil producers.”

Wastox® Combustion Technology

“This solution is most suitable for the economic melting of low-grade scrap and turns unwanted contaminants into valuable fuel. The secondary aluminium industry is often challenged to find economic, environmentally sound ways of melting scrap contaminated with organic compounds, as emissions can limit productivity and restrict the choice of raw material. Wastox® provides a powerful answer to these challenges by using oxygen lances to combust emissions within the furnace that are simple to install and operate.”

For more information contact Simphiwe Molefe of Afrox on TEL: 011 490 0470 or email simphiwe.molefe@afrox.linde.com
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S

outh African foundry equipment manufacturer
Lauds Foundry Equipment has reported that they have
achieved some impressive results and sales since
they launched their 5tph and 10tph secondary attrition sand
reclamation plant 36 months ago.

“As was the case with the atmospheric emissions
licenses (AEL) the Department of Environmental Affairs (DEA)
in South Africa is going out of its way to investigate waste
management processes of local foundries and waste foundry
sands is one of their primary targets.”

“Metal casting waste products include moulding sand,
core sand, slag, baghouse dust, furnace refractory,
broken cores, shot-blast fines and graphite electrodes,
most of which end up in a dumpsite and are not reused.”

“Waste foundry sands, which often cost more to dispose of
than to beneficiate, constitute the largest amount of waste in
the foundry industry.”

“In addition to reducing it’s impact on the environment,
foundries using one of the many chemically bonded sand
systems are also under increasing pressure to reduce costs,
but at the same time improve and maintain their casting
quality. One of the ways of meeting these requirements is to
invest in sand reclamation equipment.”

“Cost reductions after installing sand reclamation
equipment are made by re-using the sand after casting, buying
less new sand and with some systems actually reducing the
binder content at the mixer.”

“Casting quality is improved by using less resin at the
mixer and improving the sand grain’s characteristics so that
it becomes more rounded. A more rounded sand grain leads
to better compaction after mixing, greater strength and better
surface finish.”

“It becomes more obvious then that due to less sand being
dumped there is a noticeable reduction to the impact on the
environment and more compliance with the Department of
Environmental Affairs’ regulations.”

“Lauds have developed and patented our own equipment
for secondary sand reclamation that removes the coating and
renders the sand clean and re-usable.”

“In the Lauds secondary reclamation process the
chemicals are removed and the sand is then separated
from the chemicals and sent through a fluidized chamber
which agitates the material, enabling the lighter dust and
resins to float and be extracted through a dust extraction
system.”

“Our secondary reclamation allows for sand used in the
foundry to have a longer life span, which results in many
benefits for the foundry, including keeping the DEA happy.
On average reclaimed sand additions are in
the region of 90% with only 10% virgin sand
having to be added.”

“Another major benefit is the power
savings that are achieved — only 17kW
total power required for 5tph.”

“We have had our secondary
reclamation units, which include the
primary attrition unit, sand cooler/classifier,
mixers and hoppers, operating in
foundries for some time now and the
owners are very happy with the results
they are achieving and the savings they
are making.”

“More recently we have installed our
equipment in a large automotive foundry
and the results the foundry has achieved
are surprising everybody as we are
averaging 50% LOI.”

“There is no reason why a foundry
using one of the many chemically
bonded sand systems should not have
a modern sand reclamation system on
their floor. Principally, there is a sand
reclamation plant to suit every foundry
requirement and budget, which will
ultimately satisfy the authorities
and their requirements and make the
shareholders smile.”

For further details contact
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LKAB Minerals, an internationally active company in the industrial minerals market, has appointed Mineral Zone, a specialist supply partner servicing the Metallurgical and Mining sectors in South Africa and internationally with a range of metals and minerals, ore and services, as its agent in South Africa for its refractory and foundry mineral products.

“Modern life would be impossible without minerals. They are used in the production of everything from paint to cosmetics, water treatment to sound proofing and concrete to ceramics. LKAB Minerals mine, process and manufacture minerals for every conceivable application,” explains Mineral Zone’s Managing Director Brendan Homann.

“LKAB (Luossavaara-Kiirunavaara AB) started operations in 1890 and today produces close to 27 million tons of iron ore products and is a growing supplier of minerals, services and high-tech products for mining and other industries.”

“LKAB Minerals is part of LKAB Group, a Swedish state owned company, and is an international high-tech minerals group that mines and upgrades the unique iron ore of northern Sweden for the global market. The group had sales of more than SEK 16 billion in 2016 and employs about 4 200 people in 13 countries. Other group businesses include industrial minerals, drilling systems, rail transport, rockwork services and property management.”

“Luossavaara-Kiirunavaara Aktiebolag is a name that is derived from the North Sami name for the two mountains in which the rich iron ore was known about as early as the 1600s. Luossavaara means the Salmon mountain and Kiirunavaara means the mountain of the Snow Grouse. These two snow covered peaks and the black magnetite iron ore below is depicted in the company logo, encircled by the iron symbol.”

“LKAB Minerals was established to develop products and applications outside of the steel industry and to refine production side streams. Through organic growth and acquisitions, the company has grown from a one mineral company to a multi mineral company with over 30 minerals in the portfolio, including Magnetite, Mica and Hydromagnesite Huntite from the company’s own mines. Aside from their own deposits LKAB Minerals source and refine minerals from strategically controlled high quality sources.”

“The company focuses on innovation and development in the areas of civil engineering, construction, polymers, coatings, refractories and foundries where unique product properties and industrial experience allows them to offer high customer value.”

**Refractory materials — primary focus**

“Our primary focus will be on selling LKAB Minerals’ range of refractory materials. LKAB Minerals offer a range of virgin alumino-silicate and magnesia refractory minerals, as well as a range of recycled alumina and magnesia based aggregates, utilised in monolithic refractory products for a number of applications.”

“The company has over 30 years’ experience in the processing of refractory minerals. In recent years, they’ve advanced and invested to improve the material offering and processing capabilities of the company and now offer a range of services alongside the portfolio of virgin and recycled
alumina and magnesia materials.”

“The range includes alumina, magnesia and chrome alumina materials, bauxite, calcined kaolin, fused alumina (brown and white), cement (CA50 — G7, G6, G9), cement CA70, mulcoa, mullite, refractory grade magnesite, DB magnesite and chamotte.”

**Foundry products**

LKAB Minerals offer a number of products for the foundry industry. The product portfolio ranges from core and mould sands to binders and core additives. In addition LKAB Minerals supplies a range of both naturally occurring sodium and activated calcium bentonite raw materials, and these can be supplied pre-blended with carefully selected and pre-graded coal and lustrous carbon producing materials in order to meet the needs of individual customer requirements.

The company also supplies iron oxides, MinSand, which is a synthetic sand produced from alumina with almost perfectly spherical particle shape, chromite sand, Olivine for use in alkaline resin bonded systems, Zircon sand and flours and Cenospheres.

**Other industries**

“Besides these products for the foundry industry, with our appointment as agents for LKAB Minerals in South Africa, we also have access to supply product to the construction, polymer, coating and refractory industries. These include product for concrete anchoring and weight coating, heavy media separation, iron catalysts, paints and coatings, adhesives and sealants, anti-corrosion coatings, products for the ceramic industry and polymers for automotive parts and decorative flooring.”

“For the last 14 years, LKAB Minerals has been represented in South Africa by Neil Tracey servicing the refractory industry out of their warehouse facilities in Wadeville.

We would like to welcome Neil to Mineral Zone where he will continue in this role for us, servicing our customers from the Mineral Zone office and warehouse in Boksburg, thus ensuring a smooth transition with no disruption to our customers.”

“This partnership gives Mineral Zone the opportunity as a specialist supply partner servicing the metallurgical, refractory and mining sectors in South Africa to offer a more comprehensive range of products.”

Mineral Zone also represents SI Group HA South Africa and Capital Refractories Limited. Additionally they are also the South African distributors for the refractory products produced by Norwegian company Elkem.

For further details contact Brendan Homann of Mineral Zone on TEL: 010 235 0046 or visit www.mineralzonesa.com
New aspects in industrial 3D metrology, inspection and testing conference

GOM to present optical measuring techniques for industrial casting processing.

GOM, a global industrial company that develops, produces and distributes software, machines and systems for industrial and automated 3D coordinate measuring technology and 3D testing, will hold a one day conference in March 2018.

This will be the first conference that GOM, based in Braunschweig, Germany, will hold of this type of event in South Africa. However, the company holds its internationally recognised GOM 3D Metrology Conference every second year. Over 600 delegates attend this conference that has been held 13 times and they include representatives from OEMs such as Audi, BMW, Opel, Porsche, VW, Boeing, Liebherr-Aerospace and Rolls-Royce.

The conference is an industrial meeting platform for design engineers, tool makers, production and quality assurance executives, metrologists, foundrymen and experts from well-known companies and research institutions to learn about the latest developments in optical measuring technology. Executives from GOM along with their local partner RGC Engineering will provide insight into the use of optical 3D metrology in the casting and foundry industry. They will present examples from the day-to-day practice, show how integrating optical measuring systems into the entire process chain helps you shorten development times, improve production workflows, and thus enhance your company’s profitability. Alongside these presentations the GOM Team stage live demonstrations to introduce the latest developments in 3D metrology related hardware, as well as in measurement and inspection software.

New trends in automated quality control as well as recent developments in sensor technologies and software for the entire production process ranging from materials testing through design and toolmaking up to series inspection will also be discussed.

The conference is a must attend for anybody involved in the manufacture or machining of castings. There is no charge to attend.

For further details contact RGC Engineering on TEL: 011 887 0800. Alternatively visit www.rgcengineering or www.gom.com
SEIFSA, unions sign three-year wage agreement

The National Union of Metalworkers of South Africa and Solidarity signed a three-year wage agreement with the Steel and Engineering Industries Federation of South Africa (SEIFSA) recently.

The settlement culminated after four months of intensive negotiations that covers the period from this year to 2020. Chief executive officer of SEIFSA Kaizer Nyatsumba has described the agreement as historic.

“The process was long and hard, and there were considerable challenges along the way, but we are hugely relieved that finally we and our labour partners were able to reach an historic agreement on realistic wage agreements for the next three years. It was not easy. Neither the unions or us are entirely happy with the agreement reached, but we can live with it. We believe that it is the best possible agreement that we could reach under the circumstances, and we believe that it is fair to both parties.”

He said that these negotiations came with vastly different starting positions. “We moved gradually over time to the realistic figures at which we eventually settled. We did so while being mindful of the terrible state of our economy and, more importantly of the worse state of the metals and engineering sector which has been bleeding jobs over the past few years.”

The agreement came into effect on 1 July 2017 until 30 June 2020. The parties have agreed that the workers’ wage component will increase by 7% in the current year, 6.75% in the second year and 6.5% in the third year.

National spokesperson of Numsa Irvin Jim said the union had initially demanded a 15% across the board wage increase for its members in recognition of the extreme suffering they (workers) experience as a result of low wages.

“We decided to compromise because we wanted to save the bargaining council and to ensure that centralised bargaining is sustainable. We are also mindful of the dire economic situation which is affecting the economy and the impact that it’s had on the companies.”

“We negotiated in good faith, and we conducted the talks with integrity. As a trade union we are always mindful of the demanding effects of a strike and the burden that it places on our members and their families.” Jim said.

Deputy General Secretary of Solidarity added that the agreement could bring stability in the industry. “The industry is currently under immense pressure and the demand for steel products is declining, which means that the status quo in the industry is changing. “We want to appeal to other employers’ organisations to come to the table as well so that the steel industry survives.”

For the first time in a decade, the metals and engineering sector has settled a three-year wage agreement without resorting to industrial action. Over the last ten years, the industry’s wage negotiations had been characterised by industrial action. A week-long strike in 2007, a two-week strike in 2011 and a three-week strike in 2014.

The 2017 to 2020 metals and engineering sector settlement agreement marks the way forward for SEIFSA and five trade unions, the National Union of Metalworkers of South Africa (Numsa), Solidarity, UASA, the Metal and Electrical Workers Union of South Africa and the South African Equity Workers Association.

Of SEIFSA’s 21 independent employer associations linked to the MEIBC, the National Employers Association of South Africa was the only employer organisation not party to the agreement.
Certain misconceptions were created following the agreement by SEIFSA and five trade unions, covering only 10 per cent of employers in the industry, recently. NEASA has been criticised for referring to this agreement as the SEIFSA[NUMSA agreement. We have done so, and will continue to do so, because the other four trade unions were not involved in these SEIFSA[NUMSA discussions.

“The outcome was simply presented to them for their signatures. While the SEIFSA[NUMSA agreement is not an industry agreement, it is indeed being portrayed as one. The signatories to this agreement represent less than 10 per cent of employers in the Industry. Although NEASA is singled out for not signing the agreement, the agreement was also not signed by the South African Engineers and Founders’ Association (SAEFA), Consolidated Employers’ Association (CEO), KwaZulu-Natal Engineering Industries Association (KZNEIA), South African Fasteners Manufacturers’ Association (SAFMA), Border Industries Employers’ Association (BIEA), Federated Employers’ Organisation of South Africa (FEOSA) and the South African United Employers’ Organisation (SAUEO).”

“One can hardly refer to this agreement as an ‘industry agreement’ while 90 per cent of employers in the Industry and by far the majority of employees are not covered by it. The Steel Industry faces major challenges. One of the challenges is the high minimum wages forced upon the Industry. These wages, which are on average double the wage paid in other industries, is the result of utterly poor negotiations by the federation SEIFSA over many years.”

“Although NEASA has been able to set aside these agreements through numerous Labour Court actions — all agreements since 2011 — the damage has been done. These market unrelated wage-agreements, enforced by business hostile agents (mainly ex-NUMSA officials), contributed not only to bringing employment in the Industry to a standstill, but also to tremendous job losses, according to the Industrial Development Corporation (IDC), 25 000 job losses and 500 business closures occurred during the previous year and an unprecedented 140 000 job losses during the 10 years prior to that.”

“Prior to the 2017 negotiations, all employer bodies, including SEIFSA, agreed that something had to be done to turn the tide on unemployment in the Industry. We all agreed, among others, that a new entry level wage, for new entries into the Industry, had to be established.”

“All employer bodies agreed that, in order to bring sanity to the issue of Steel Industry wages, which have already spun out of control, increases had to be based on the new minimums. All agreed that a one-size-fits-all approach could never be the appropriate arrangement for the industry.”

“Not surprisingly, SEIFSA walked away from the broader employer caucus and started secret talks with NUMSA. From the moment SEIFSA left the negotiations, taking NUMSA with them, negotiations practically came to a standstill. The fact that SEIFSA and NUMSA negotiated and eventually agreed on certain terms, is only relevant to them and nobody else. To suggest (as NUMSA is doing) that the combined employer proposal in respect of a new entry level minimum wage was based on the new minimum wage proposed by government, is simply not true.”

“What both SEIFSA and NUMSA however prefer to ignore, is the fact that NUMSA is also the major employee role player in the Motor Industry where the entry level wage is more than 50 per cent lower than what they have agreed to now with SEIFSA. They also prefer to ignore the fact that, in 2014, NUMSA reached an agreement with NEASA on a 50 per cent reduced entry level wage for newcomers.”

“Therefore, when NUMSA insists that they won’t agree to this type of arrangement, they are simply not honest. They have already done so in the motor industry and with NEASA. What they mean is that they won’t come to such an arrangement with SEIFSA — simply because they don’t have to. SEIFSA is simply in no position to negotiate this kind of settlement with NUMSA. That is why they are NUMSA’s preferred negotiating partner. Compromises from NUMSA are never required when negotiating with SEIFSA.”

“It is claimed that an agreement in the SEIFSA[NUMSA style sets uniform industry standards and that it exempts companies from negotiating on shop floor level. This argument gives rise to two points. To set a ‘one-size-fits-all’ industry wage is simply not appropriate as the sector consists of approximately 20 different industries, all with different economic drivers, different size businesses and situated in different areas in the economic hubs vs rural areas. All employers, including SEIFSA, agreed that the ‘one-size-fits-all’ approach is not appropriate.”

“"
“The SEIFSA/NUMSA wage agreement, however, not only again applies this ‘one-size-fits-all’ approach, but sets the wage on the level of the highest common denominator, the level of the unaffordable wage. This is the worst possible arrangement.”

“The second point is this: the fact that wages are negotiated centrally, denying business owners the opportunity to engage directly with their own workers, is perhaps the single most prominent reason for the distrust between South African employers and employees, rated by the World Competitiveness Report as the worst in the world. It is further claimed that the SEIFSA/NUMSA agreement is a ‘compromise’ settlement. Who has compromised though? Only SEIFSA did. They got nothing out of these negotiations. To say that a seven per cent increase, based on the already highest wages in South Africa is a victory, simply suggests that they do not understand the meaning of the word. Also, in respect of the seven per cent increase, within the state of the economy and the dire state of the industry, seven per cent is simply unaffordable to most companies. That is why the SEIFSA affiliated companies are encouraged to apply for exemption. This in itself is an admission that the deal is unaffordable.”

“There’s no element of victory contained in it. All it is, is a bizarre arrangement. It is also no victory where nothing is achieved to address the downward spiral the industry finds itself in, with the resulting job losses. Labour peace does not mean the absence of a strike. Sustainable labour peace means a dispensation where businesses grow and jobs are created. This is currently not the case and not addressing these issues is only delaying the inevitable — eventual large scale social unrest in this industry and beyond that.”

“The unemployed will demand more. Considering that a job, even a lower paying job, still remains by far better than no job at all, and even better than any form of grant. The SEIFSA/NUMSA agreement has a bizarre consequence. Although it affects only 10 per cent of employers in the industry, it has bound all trade unions into the agreement. The remainder of employers, 90 per cent of them, have no union to negotiate with. This leaves the industry with a very interesting dilemma.”
For over a year now the Industrial Development Corporation (IDC) has been seeking strategic equity partners for its struggling steel subsidiary Scaw Metals, which reported a loss of over R1 billion for 2016.

The restructuring of its steel subsidiary Scaw Metals into three standalone entities is now at an advanced stage with plans to secure strategic equity partners (SEPs) for each of the units said CEO Geoffrey Qhena while presenting the IDC’s results in Polokwane, Limpopo.

In a recent emailed letter to Scaw Metals’ suppliers the company says that the IDC had reached an agreement with the Barnes Southern Palace Consortium to dilute its shareholding in Scaw’s rolled products and wire rod products businesses, which employ more than half of Scaw’s 3 500 workforce.

The letter continues: “Following IDC’s strategic decision to dilute its shareholding in Scaw, through the introduction of Strategic Equity Partners (SEP) an agreement has been concluded with Barnes Southern Palace Consortium (BSP). BSP has lodged an application with the South African competition authorities ‘to approve its application as the SEP for Scaw’s Rolled Products and Wire Rod Products businesses’.”

“Through the SEP process the IDC has sought to identify partner’s that have proven operational experience, local and global market reach and a willingness to invest, grow and add value to the Rolled Products and Wire Rod Products businesses of Scaw.”

“BSP is comprised of the Barnes Group and Southern Palace. The Barnes Group is a South African company with significant industrial interests, Southern Palace is a black owned and managed diversified industrial holding company, and is one of Scaw’s current BEE partners. BSP will acquire a controlling interest in Scaw’s Rolled Products and Wire Rod Products business. BSP has a track record of successful business achievements and, as its members are sizable local companies in both the steel value-addition industry and other related industries, its combined reach and experience will provide additional markets and opportunities for growth. The IDC will continue to hold significant share holding in the Rolled Products and Wire Rod Products businesses alongside BSP.”

“In the meantime, the separate corporatisation of Scaw’s Grinding Media and Cast Products businesses will commence and an announcement relating to the SEP transaction/s relating to these businesses is expected to be made in due course. As such the existing Scaw Metals Group will evolve into separate focused businesses, thus leveraging the Strategic Equity Partnership strategy and focus sought by the IDC.”

“The IDC will remain a significant shareholder in all the businesses and will continue to play a key role in these entities.”

“We would like to assure you that Scaw remains committed to the partnership with you as a supplier. While some changes to our systems are necessary to effect this transaction it is our intention to make this transition as seamless as possible for both parties. You will be notified timeously of any alterations.”

According to reports, discussions with two other SEPs for Scaw’s grinding media and cast products divisions were at an advanced stage, with Qhena indicating that the competition authorities would be notified about these transactions in the not-too-distant future.

He indicated that, all going to plan, all three transactions should be finalised by year-end.

The Scaw Group reported a R787 million loss in 2017. The IDC, meanwhile, reported a R2.2 billion profit for the year, up from R223 million in the previous year.
Ruling on Eskom tariff hikes a blow for high-energy users

Eskom has been given the green light to pursue up to R60 billion in clawback tariffs.

The Constitutional Court has dismissed an application to set aside the power utility’s regulatory clearing account (RCA) adjustments, clearing the way for Eskom to recover a potential R60 billion through tariffs in the next year, revenue lost over the last three financial years.

RCA adjustments deal with funds that Eskom needs to recover due to a shortfall in electricity losses or an escalation in operating costs, through possible tariff hikes.

The National Energy Regulator of South Africa (Nersa) will now hold hearings as Eskom argues why it should be granted the delayed tariff hikes.

Meanwhile, Nelson Mandela Bay’s high-energy users are preparing for another battle with Eskom as they await the negotiation process for new electricity tariff increases.

The Nelson Mandela Bay Municipality believes higher energy costs will affect business operations and potential future investments and will ultimately increase the unemployment rate.

According to a statement by Eskom, the ruling allows it to institute a regulatory clearing account (RCA), through which it can recover costs retrospectively after the close of the financial year by raising tariffs the following year.

Eskom has submitted RCAs for each financial year since 2014.

The Bay’s high-energy users group wanted the RCA declared unlawful, but the Constitutional Court dismissed its appeal.

The group’s spokesman, Autocast SA chief executive David Mertens, said the court’s ruling was regrettable.

“The big question now remains how this ruling will affect next year’s electricity tariffs. Eskom encouraged users to consume less electricity when there was a shortage, then incurred massive expenses to increase the energy supply. Now that users have got into the habit of consuming less, Eskom expects them to pay more for electricity.”

“This will only encourage them to save more — and the power utility to increase tariffs more.”

Nelson Mandela Bay Business Chamber president Thomas Schaefer said households would also be affected should Eskom institute an “irrational electricity increase”.

However, he believed some good had come from the entire exercise.

“Although this ruling reverses a high court judgment, which had originally set aside an interim tariff increase in 2016, the business chamber believes that by challenging the national energy regulator [Nersa] it has ensured an increased level of scrutiny and accountability of Eskom and its practices,” said Schaefer.

“This, coupled with the increased public awareness around the governance concerns relating to Eskom, will hopefully contribute to a more realistic approach on the part of Nersa when considering future tariff adjustments.”
The Constitutional Court has dismissed an application by a local exporter of scrap metal for leave to appeal the judgment of the High Court of South Africa and the Supreme Court of Appeal upholding the State’s scrap metal export provisions, known as the price preference system, and ITAC’s decision to refuse to issue export permits to the SA Metal Group. This brings to an end almost four years of litigation over the lawfulness of the price preference system and the refusal by ITAC to issue export permits in accordance with that system. (ITAC is the International Trade Administration Commission, a statutory body in South Africa responsible for administration of trade policy).

The legal action was initiated after the Minister of Economic Development issued a Trade Policy directive requiring ITAC to administer a price-preference for local foundries and steel mini-mills on all scrap metal collected locally before they were offered for export. This Policy Directive was part of government’s plan to promote local industrialisation and the beneficiation of local scrap metal. This follows significant job losses and de-industrialisation in the steel industry. It was also introduced to support the national infrastructure plan and to support lower carbon emissions in the making of steel products. (Scrap metal uses less energy than the making of steel products from iron-ore).

The Trade Policy Directive by the Minister of Economic Development and the decisions of ITAC were taken on review by scrap-metal exporters to the Gauteng and Western Cape High Courts and later to the Supreme Court of Appeal. Cases were brought by the Metal Recyclers Association and later by the SA Metals Group. One court application was withdrawn before it was heard. In all other instances, the cases were decided in favour of the state, with cost orders against the applicants in these courts. The Constitutional Court dismissed the application for leave to appeal on the grounds that it had no reasonable prospect of success.

Welcoming the decision Minister of Economic Development Ebrahim Patel said that the decision makes it clear that rational decisions by the state in favour of job creation and industrialisation would be upheld by the courts.

“We appreciate that policies that seek to advance industrialisation and deviate from the current export oriented policies will be opposed by the white monopoly capital, and government must be firm and oppose any application by monopoly to derail policies that seek to ensure local development.”

“This is a lesson to other government ministers that they must defend radical policies if they are challenged. We have noted that many government departments always rollover and choose to abide by court decisions without coherently and forcefully putting their views to the court.”

“This is a victory against white monopoly capital. We call on the department to impose a 50% scrap metal exports tax in order to discourage exports, and to regulate prices of scrap to ensure that scrap collectors benefit.”

For further details, contact Tshwanelo Rakaibe of the Ministry of Economic Development on 071 484 5025 or TRakaibe@economic.gov.za
Metso investing in Isithebe foundry to increase manufacturing capacity for crusher wear parts

Over EUR 3.5 million to be spent including installation of second melting furnace.

Metso is increasing its manufacturing capacity for large crusher wear parts castings used in minerals processing by investing in a second melting furnace at its Isithebe foundry in South Africa. The EUR 3.5 million investment will ensure the availability of Metso’s heavy crusher wear parts globally.

“The demand for large crusher wear parts is growing in the mining industry. With this investment, we ensure we can meet our customers’ needs. Through the renewal of the foundry, we will improve our capabilities to deliver high quality heavy wear parts,” says Joni Meronen, director of Mining Crusher Wears at Metso.

The renewed foundry will be able to manufacture wear parts for the Nordberg® MP2500 cone crusher as well as for Metso and third-party primary gyratory wear parts with full use of the latest manufacturing technologies. The first product deliveries from the new furnace are scheduled for May 2019. During the renovation project, production of castings will continue as usual in the existing facilities.

“We are the leading service partner for the mining industry, and the only supplier able to provide a full portfolio of product, from spare and wear parts to equipment and service. This investment is part of our development agenda to execute our commitment to ensuring availability and reduced lead times for our customers,” says Jose E. Perez, senior vice president of the Crushing and Screening Wears business line at Metso.

Sustainable foundry operations

The Isithebe plant is part of Metso’s global foundry network, consisting of foundries located in Ahmedabad in India, Prerov in the Czech Republic, Quzhou in China and Sorocaba in Brazil. The renewed foundry will be built to follow Metso’s strict sustainability and quality principles as well as international standards.

“Sustainability is of utmost importance to Metso. We are developing our operations in a safe and sustainable manner, in close dialogue with local communities,” says Thando Makhoba, director of the Isithebe foundry.
Metallurgical and mining solutions provider Spectrum Technical hosted a successful two day Aluminium Technology Seminar for professionals in the aluminium primary and secondary industries in early September 2017.

“Spectrum Technical focuses on providing solutions for the processing of molten metal, in particular the casting of aluminium and zinc. We have been doing this since 1994, supplying a range of services and products,” said Kumaran Poonan, a Director at Spectrum Technical and head of the metals processing division.

“We held a similar seminar in May 2013, which was attended by over 60 delegates. The feedback from that seminar was overwhelmingly positive and this prompted us to hold our 2nd seminar on the 6th and 7th September 2017 at the Imvubu Lodge in Richards Bay, KwaZulu-Natal,” continued Poonan.

“This year over 100 delegates attended, an increase of over 65 per cent on the previous seminar. We were very pleased with this response and it indicates that there is a great need for professionals in our industry to participate in such a forum.”

“The idea was to bring primary and secondary aluminium casting professionals together to share their knowledge and expertise, as well as to create a networking platform for the delegates, who ranged from the process, maintenance and operations disciplines.”

“International speakers delivered papers relevant to the industry, to spark discussion and conversations. These international speakers included Dave Roth of GPS Solutions (USA), Pete Forakis and Mathieu Pettersen of Stas Inc. (Canada), Nicklas Kaecker of Drache (Germany), Jonatan Lindstrand of Precimeter Control (Sweden) and Giovanni Magarotto of Tomorrow Technology (Italy).”

“The speakers’ topics included the latest developments and covered areas such as aluminium reduction, carbon processing, as well as casthouse technology. Casthouse topics focused on dross processing, furnace charging, skimming and cleaning, metal treatment, launder systems, filtration and level control.”

“In the carbon and reduction sessions, measurements of key reduction parameters, ladle cleaning, anode slotting, anode stub inspection and recycling of carbon and bath materials through rotary crushing and material separation were highlighted.”

“The keynote address was given by Mark Krieg of the Aluminium Federation of Southern Africa and his presentation addressed the current trends in the aluminium industry.”

“We are very encouraged by the response from industry to our seminar. Besides our international speakers from Germany, Canada, Sweden, the USA and Italy sharing their knowledge with the local industry we had delegates attend from Mozambique, Pietermaritzburg, Richards Bay and the Gauteng Province.”

“The seminar left the delegates with practical tools and knowledge to assist them with plant issues they are facing. They also made contact with their counterparts in other companies having similar experiences,” said Gus Allan of Spectrum Technical.

For further details contact Spectrum Technical on TEL: 035 789 6563 or visit www.spectrumtechnical.co.za
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Atlantis foundries have embarked on a process that will pave the way to becoming a Smart Foundry by embracing the Fourth Industrial Revolution. This project aims to combine various technologies available to gather and analyse process data, with the aim of improving product quality and cost efficiency.

Atlantis Foundries manufactures commercial vehicle engine blocks for all of the blue chip international truck manufacturers. The list of manufacturers of trucks that the company supplies is an indication of the quality standards demanded of and achieved by Atlantis Foundries. Atlantis Foundries supplies commercial vehicle cylinder blocks to the engine plants of Detroit Diesel, Mercedes-Benz, MAN, Perkins and Cummins. The engines in turn are supplied to manufacturers such as Mercedes-Benz, Caterpillar, Western Star, Mitsubishi Fuso and Freightliner.

To further improve the quality and cost position of Atlantis Foundries, they have embarked on an ambitious plan to build a Smart Foundry. 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.

“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,” explained Pieter du Plessis, CEO of Atlantis Foundries.

“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 have partnered with DataProphet, a Cape Town based Company. The pilot project using Artificial Intelligence aims to predict sub-surface defects currently detected only after machining, and to identify the optimum process parameters to prevent the sub-surface defects occurring in the first place. The current model has a 70% success rate to predict casting defects, based purely on the raw process data. Castings with a high probability of sub-surface defects are identified, and additional inspection and testing is done to prevent the castings from reaching our customers,” continued Du Plessis.

“The results have been astonishing. The biggest challenge now is to keep the process within the very narrow process window that is recommended by the Artificial Intelligence algorithm. On batches where all the process parameters are achieved as recommended, we have seen internal scrap and rework dropping by 90%, and recently this has resulted in three weeks of zero scrap at the customers. Data is continuously fed into the system and new patterns are regularly discovered by the Artificial Intelligence software - as it is constantly re-training “itself” as new data is loaded into the system. This results in
continuous improvements to the process control, leading to further improving the quality of our products.”

A glimpse into the project to become a Smart Foundry

The start of the project is in the Core shop with a Fanuc M-900iC dipping robot linked with automatic coating control systems, supplied by Proservice in Italy. The core drying oven, also supplied by Proservice, acquires data for each core package. Once the core package exits the core drying oven, process data such as coating density and viscosity, drying time and temperature in each zone is available for each core package.

After the drying process, core vents are drilled using a Fanuc M-20iA robot. The robot will, in future, carry instruments to inspect the various cores as well as the core assembly.

After the vent drilling process the core package is assigned a unique sequential number from the production system Shopware. This unique number will be linked to all the data acquired for the core package.

The final operation in the core shop is the palletising of the core assemblies prior to storage. For this operation a Fanuc M-900iC robot is used. In future, an instrument will be fitted that carries out a dimensional assessment of the core package.

“During the latter half of 2017, Atlantis Foundries will install an off-loading robot at the shot blast machine. In addition to off-loading, the robot will use the spare cycle time to perform fettling of the front and rear face of the casting. In order to accurately fettle, the casting’s dimensional measurements of the major features are required. As with other data it will be captured and used by Artificial Intelligence software.”

“Atlantis Foundries have also invested in a Fanuc R-2000iC, which will be used for testing and developing future fettling cells, primarily to be installed in order to alleviate the harsh working conditions required of the current manual fettling processes.”

Visual inspection using Artificial Intelligence

Visual inspection is a thorn in the side of many Quality Managers, where any missed defects on a casting will end up at the customer, resulting in costly rework and sorting exercises. Atlantis Foundries export of all their castings to the USA and Europe, and with these long supply lines, visual inspection failures can be very costly if castings require rework or sorting at the customer. Modern convolutional neural-network based object detectors can process a scene containing many objects of interest, locating each object and classifying them into distinct categories and objects. This technology can be broadly applied: from identifying separate objects in a complex scene, to determining the location and extent of a visual feature.
In the case of Atlantis Foundries the objective is the same: find the location and size of defects on the surface of the casting and optionally classify and identify the type of defect contained in the regions of interest.

This technology was another breakthrough in our process to becoming a Smart Foundry. Not only is process data collected for each casting, but the end result is automatically recorded and the two Artificial Intelligence systems are complimentary; the prescriptive process module predicts defects and their potential location on the casting; and the inspection module visually inspects the castings to verify quality. This enables Atlantis Foundries to prevent a defective casting from being delivered to the customer, and to generate future training data.

Process control using Artificial Intelligence

Finding the correct process parameters for castings is a daunting challenge for any foundryman. The foundry process is complex and has many separate steps, with each step having many process variables that influence the quality of castings.

Determining the correct process parameters can be determined by following theory and using simulation software. However, theory and simulation software cannot account for all the process variations in a foundry. As we all know it is a careful balancing act, as one parameter change can solve one problem, only to create a new problem — every parameter has many degrees of influence. Different casting types also require their own unique process parameters based on their design. One approach to find the best set of process parameters is through trial and error, and given error this leads to trials and more trials. The complex relationship between these many process parameters - and the inherent variation of each parameter - may lead to the incorrect conclusion being drawn from a trial. This problem is far more complex than any single variable correlation.

“We first knocked on the door of DataProphet with this problem. How do we find sub-surface defects and what are the process parameters that give us the best results? At the first feedback session with DataProphet, we felt vindicated when Dr Michael Grant (he has two PhD’s) told us that based on 18 months of process and scrap data research, he and his team found no single direct statistical correlation between our process data and our defects. Validation that our intuition about the complexity of the foundry process is correct.”

“Foundry defects are caused by a complex combination of process parameters that varies over time. A sequence-based model was built using state of the art neural network architecture and it was used to determine the combination of process parameters that gave us the best results. DataProphet found the various operating paradigms that our foundry operates in. Each paradigm is described by a range for each process parameter and each paradigm has a unique yield rate (the rate of good casting to scrap castings).”

“For each high yield cluster, a set of process parameters was established, which provided us with a process window to aim for during production.”

“The results have been astonishing, especially when we are able to achieve the correct combination of process parameters during the production of the castings. The other striking discovery was that the optimum process specification is much smaller than previously thought, very small variations in the process that was historically seen as acceptable have been shown to have a very large impact on the yield rate; while some others that we have been trying to control with precision have been shown to have less impact. The challenge now, is to constantly achieve this very narrow process window. We came to the conclusion that the only way to keep our process within this very narrow window, is to build a Smart Foundry. We believe that Atlantis Foundries’ Smart Foundry will make us the global foundry of choice for complex castings in the future.”

For further details contact Atlantis Foundries on TEL: 021 573 7200 or visit www.atlantisfoundries.com
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How Innsbruck sold bells to the world

Its Grassmayr Foundry is not only the pride of Austria, but of cathedrals, synagogues, mosques and shrines the world over, writes Mike MacEacheran in BBC Travel.

Every late Friday afternoon, in a dimly lit workshop at the intersection of Leopoldstrasse and Olympiastrasse in Innsbruck, Austria, a small group of artisans gather to conduct a rather peculiar ceremony. Bowed solemnly in prayer and led by a plainclothes vicar, they murmur the Lord’s Prayer in hushed tones. Below them, half concealed in shadowy light, embers fizz from a six metre-deep pit, while the sermon reaches its climax.

But this is no place of utmost sanctity with pews or altar. Instead, the craftsmen are blessing a row of proudly polished bells embellished with Swahili script, Greek scrolls and Arabic curlicues.

It may seem strange, but for these obsessive bell makers, the Grassmayr Foundry is a shrine; their bells revered objects. Cast at 1 150 degree C over dried spruce then steamed for between 24 hours to three weeks, many bells will make the short journey from the western Austrian state of Tyrol to Germany, Italy and Montenegro, while others are bound for temples, pagodas, monasteries and mosques as far as Myanmar, Tanzania and Australia.

At the center of this curious benediction is Peter Grassmayr, the amiable 51-year-old foundry co-owner whose family has cast bronze and copper in the city’s south side since 1599. “Each bell has a story and a history, and if you’re not born into this idea you can’t understand it,” Grassmayr said, running a hand along the smooth curve of a bell at least twice his height. “Each one is a living thing with a different personality and sound that need to marry together.”

Stepping inside today, the foundry appears much as it ever has. The spark of craftsmanship is everywhere, along with the clank of metal and groan of industry. Grassmayr bells ring out at St Catherine’s Monastery in the Egyptian Sinai and on Mount Tabor in Israel, Grassmayr explained, but it’s a far
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newer, three-ton tubular bell in Aarhus, Denmark — cast for the 2017 European Capital of Culture — that really makes its chief architect proud.

“It chimes every time a new child is born in the city,” he said of the world’s largest organ-shaped bell. “I get goose pimples just thinking about it.”

This is the kind of romantic ambition that has made the foundry not only the pride of Austria, but of cathedrals, synagogues and shrines the world over. From the outside, you wouldn’t have any idea that the unassuming two-storey building turns out 300 bells a year. Neither would you realise the glockengiesserei, or bell maker, is Austria’s oldest family-run business, exporting bells to more than 100 countries on every continent and for eight religions. Yet while the time-honoured craft of bell casting has almost completely disappeared off the map, this Tyrolean town has determinedly hung on.

How Innsbruck sold bells to the world is contextual. With Germany only 38km to the north and Italy 40km to the south across the Brenner Pass, the lowest navigable route in the Alps, the city has long been a crucible of influences. Helping control the flow of mountain traffic, Innsbruck became a spiritual crossroads with artisans supplying trinkets and bells for pilgrims and traders passing en route to the great God-fearing cities of Cologne, Florence, Rome and beyond.

As history shows, Innsbruck’s forefathers had money to burn, too. A former seat of power for the Habsburg imperial dynasty, the city’s merchants built Rococo palaces, Baroque churches and houses with shimmering, copper-tiled roofs. And to go with their lavishly decorated chambers and towers, they demanded ornate carillons and clangers to ring from the roofs.

To see the richest of these architectural delights, follow Herzog-Friedrich-Strasse to the Goldenes Dachl, or Golden Roof, built by Emperor Maximilian I in 1500 and decorated with 2657 fire-gilded copper tiles. And when passing the Hofkirche church or Dom St Jakob cathedral, at the right time, you’ll hardly fail to notice the orchestra of metal in the air. Such ringing bells, like those at the Basilica Wilten, considered the most handsome Roccoco church in Austria, have hymned the nobility for hundreds of years. And, today, nearly 200 in Innsbruck alone bear the Grassmayr hallmark, each one inscribed with trumpeting-tooting cherubs, double-headed eagles and Latin verities.

“This is not McDonald’s with bells,” Grassmayr said, looking out of the window towards the foundry’s ‘graveyard’, a landscaped garden where historic bells dating back as far as the 1450s are sent to retire. “We can do things that others just can’t do. And we’re really pushing the science.”

25-ton bell cast for the Cathedral of National Redemption in Bucharest, Romania

Consider the foundry’s latest achievement; The record-breaking 25-ton bell cast for the Cathedral of National Redemption in Bucharest, Romania, a building that when completed next year will be the largest orthodox church in the world. Inside, its cavernous nave is to be hung with a bell so big and powerful it weighs the equivalent of four Tyrannosaurus rexes. It’s also pitched with an electronically-adjusted sound so clear it will be heard by more than one
million people across the city’s south side on a still day. Now, that’s a game-changer.

While it’s hard to imagine the resurgence of bell making in Europe, the craft is undergoing a slump elsewhere in the world. As recently as this past May, the doors permanently closed at London’s Whitechapel Bell Foundry, the world’s oldest and most storied bell maker. Having cast some of the most renowned bells in history, including Big Ben and the Liberty Bell, the symbol of American independence, the furnaces burned out for the first time since 1570.

“It’s sad, but I can understand it,” Grassmayr said, adding that his family recently bought the Whitechapel wood-burning stove at an auction.

“People told us 20 years ago it made no sense to expand. But we saw a future. And while business is going down in Europe, it’s growing worldwide. This year we’ve delivered 20 bells to the Philippines alone.”

What continues to excite the bell maker most, however, is how the instruments keep changing. For centuries, the bell has remained the primary symbol and expression of peace, its major tonality purposely sounding joyful and celebratory. Yet among its dominant strike notes is a minor third interval, which also brings a melancholic and funereal element. Likewise, when hit, some bells echo with more than 1,000 frequencies, while others reverberate with sound waves so deep you can’t even hear them. By consistently pushing the boundaries, Grassmayr continues to drive this constant evolution.

As he turned to leave, Grassmayr shouted to his team of craftsmen that there was still time to start making plans for next week’s orders. It was a reminder that, despite the passing of time, Innsbruck will continue to send a message to all four corners of the world, to spread the good news by the ringing of bells for generations to come. Because, ultimately, that’s what bell making is about.

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The record-breaking 25-ton bell cast for the Cathedral of National Redemption in Bucharest, Romania, a building that when completed next year will be the largest orthodox church in the world.

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castings sa vol 18 no 3 October 2017 35
Easy casting sprue removal leads to reduced grinding operations — Hypertherm’s FlushCut

The new flush cutting process is helpful for a number of applications including jobs that require the separation of two metals. Allows users to cut attachments, lugs, pad eyes and other positive features as close to the base as possible without piercing or damaging the workpiece.

Hyptherm, a manufacturer of plasma, laser, and waterjet cutting systems, has announced the release of FlushCut™ consumables for select Powermax® air plasma systems. The consumables, which are now available for Powermax105 and Powermax125 systems, provide users with the ability to cut closer to base materials than ever before. FlushCut consumables feature an angled nozzle bore that delivers the plasma arc at a 45-degree angle ideal for challenging removal applications. Instead of locating the nozzle opening at the tip as is typically done, the nozzle orifice is located on the side. This essentially bends the plasma arc, causing it to exit the torch at an angle nearly parallel to the workpiece. As a result, users can cut closer, or more flush, to the base metal than ever before, significantly reducing grinding work and increasing the opportunity to reuse lugs and attachments.

Traditionally, lug and attachment removal has relied on carbon arc gouging, oxyfuel and traditional plasma cutting equipment. However, these applications can be inefficient, time consuming and may pierce or damage the actual work piece.

In comparison to oxyfuel applications, FlushCut plasma cutting requires much less pre-processing time and reduces heat-affected zones up to 10x less. With carbon arc gouging, multiple passes are needed to accomplish the same as a FlushCut plasma process can do in a single pass, not to mention the increased smoke and noise. While traditional plasma cutters only allow the user to cut at a steep angle, creating more need for secondary repairs, such as grinding.

An angled nozzle bore design and flat guiding shield enables flush cutting that leaves less than 5mm residual material on the base or work piece, reducing grinding and secondary repair operations.

Typical flush cutting applications include removing lugs, pad eyes and temporary weld supports, material washing, end cap removal, rat hole cuts in I and H beams, bolt and rivet washing, casting sprue removal, post tension cable tail cuts and wearable part removal/replacement.

FlushCut consumables can be used in handheld applications. This new process has the potential to save companies a substantial amount of time while reducing operator fatigue and increasing safety on the jobsite. The introduction of FlushCut consumables is just one more example of how Hypertherm is helping customers address challenging metal cutting and removal applications.

The company’s engineers have developed numerous torch and specialty consumable options including consumables for gouging, extended reach cutting, marking, and fine feature cutting.

A testimonial video has also been made by Hypertherm. The video can be viewed at https://www.hypertherm.com/learn/case-studies/34

For more information contact Craig Sterly of Hypertherm on email craig.sterly@hypertherm.com or visit www.hypertherm.com.
GF Automotive, a division of GF, has announced the acquisition of Eucasting Ro SRL, a high-pressure aluminium die casting specialist with two production sites in Romania. The acquisition follows GF Automotive’s strategy to expand its presence in the growing light metal components business.

Eucasting was founded in 1960 in Italy by the Mapelli family. In 2006 the company started the expansion to Romania with a die casting foundry in Pitesti, 100 km west of Bucharest (Romania). Based on a strong customer demand for aluminium castings, a second plant in Scornicesti (around 50 km south of Pitesti) was opened in 2010.

With a workforce of approximately 500 employees, Eucasting generates a turnover of about CHF 50 million. Sixty per cent of the sales are achieved in the automotive segment followed by lighting solutions and further industrial applications. The acquisition is anticipated to be finalised in November 2017. The parties have agreed not to disclose any financial details.

“We are pleased to welcome Eucasting into the GF family. Both its customer base and its locations complement GF Automotive very well and we look forward to supporting its development,” said Yves Serra, CEO GF.

“We are excited to become a part of GF Automotive and to plan together the next steps in our development. The strong know-how and the lightweight competences of GF Automotive will increase our options to better serve our existing and new customers,” said Federica Mapelli, owner of Eucasting RO SLR.

GF Automotive is one of the world’s leading automotive suppliers and a technologically pioneering development partner and manufacturer of components for passenger cars, trucks and industrial applications. The division provides casting solutions based on iron, aluminium and magnesium at eleven production plants in Germany, Austria, China and the US.
A new manufacturing method created by Oak Ridge National Laboratory and Rice University combines 3D printing with traditional casting to produce damage-tolerant components composed of multiple materials. Composite components made by pouring an aluminium alloy over a printed steel lattice showed an order of magnitude greater damage tolerance than aluminium alone.

The process, published in Materials and Design, was developed for potential automotive and other applications where thermal and mechanical properties must be optimised simultaneously.

“This scalable processing strategy can be used to fulfill specific component functions, giving materials designers unprecedented control over both microstructure and material properties,” said ORNL’s Amit Shyam.

To date, product designers and manufacturers have viewed additive manufacturing as an alternative (or even a competitive threat) to more established forming processes, like moulding or machining. And those assumptions are correct: AM or 3D printing can be used in place of casting parts, with advantages to be determined by the scale of production or the needs of a specific design. But these technologies can also be used to optimise or improve aspects of the casting process, as in printing sand moulds and cores, or defining and repairing casting moulds.

But now it’s possible to imagine additive manufacturing as a pathway to products and materials that were never conceivable, except as some designer’s dream. Now, such dreams can be realised in the research lab, at least.

Researchers at Oak Ridge National Laboratory (ORNL) and Rice University have reported their results in developing a new approach to consolidating multiple materials into a single cast part, creating what they term “damage tolerant components. They contrast their method to established metal 3D printing techniques (referred to as “fusion-based metal additive manufacturing”), which often achieve geometric design goals but fall short of mechanical or material requirements in a functional sense.

In details reported by the researchers, the two materials they combined were stainless steel and aluminium. Their two-stage process “infiltrates” a 316L stainless steel lattice structure with a molten aluminium alloy, A356. According to their report, the process helps to overcome “issues with intermetallic formation, cracking, and poor resolution” that are common in many metallic parts formed by standard additive manufacturing.

The first step developed by the Oak Ridge team involves producing a lattice preform structure in the stainless material as a pathway to products and materials that were never conceived, except as some designer’s dream. Now, such dreams can be realised in the research lab, at least.

Researchers modified the shape and density of 3D-printed lattice structures to achieve desired material properties in composite metal castings.

Dual material components were created by pouring an aluminium alloy over a printed stainless steel lattice, and the results showed significantly improved damage tolerance than a simple aluminium part.

According to the process developers, these parts could have commercial application in automotive design and
production, where lightweight parts with more optimised thermal and mechanical characteristics are needed. In designing such a part, the new two-step process could be used to tailor the desired thermal and mechanical properties needed for a specific final application.

Compression tests conducted on the stainless steel/aluminium part showed that adjusting the volume fraction and topology of the stainless steel lattice can control its stress-strain response. Also, according to the researchers, tension tests on composites with a 39-vol% of stainless steel demonstrated “an order of magnitude improvement over the strain to failure” compared with the aluminium alloy on its own. “Inspection of the as-tested tensile specimens suggested that this exceptional damage tolerance is a result of the interpenetrating structure of the constituents,” the researchers wrote. “These results together demonstrate that this infiltration processing route avoids problems with intermetallic formation, cracking, and poor resolution that limit current fusion-based additive manufacturing techniques.”

“This scalable processing strategy can be used to fulfill specific component functions, giving materials designers unprecedented control over both microstructure and material properties,” stated Amit Shyam, one of the ORNL researchers and an author of the report.

“This scalable processing strategy can be used to fulfill specific component functions, giving materials designers unprecedented control over both microstructure and material properties,” stated Amit Shyam, one of the ORNL researchers and an author of the report.

“The key advantage of this processing strategy over other fusion-based metal additive manufacturing techniques is that in this two-step process, liquid-phase mixing of the constituents is excluded. As a result, we are able to overcome problems with cracking and poor resolution that limit most of the other fusion-based additive manufacturing techniques for printing composites,” according to their report.

Vesuvius and thyssenkrupp CSA cooperate

Vesuvius has been awarded with a turnkey project by thyssenkrupp CSA (Brazil) for the installation of Robotic Casting Technology on both slab caster ladle platforms.

The Vesuvius Robotic Casting Technology (RCT) is offering a solution that automatically carries out all tasks and supervision necessary on the casting platform. It improves safety as the operators can be reassigned to process supervision tasks in a safer, remote working place. Moreover the Vesuvius RCT provides enhanced operations traceability, increased productivity, better reliability and consistency for all casting operations.

Robotic Casting Technology is an industry breakthrough that paves the way towards a fully automated monitoring of the steel continuous casting process. OEM Hyundai was one of the first companies to install the RCT technology at their high performance steel casting plant in Dangjin, Korea.

The project has been developed with CSA during the last two years including several customer visits in the Hyundai reference plant as well as in Vesuvius’ Systems Technology Center in Ghlin Belgium. CSA is setting high expectations in operational safety and process repeatability on its continuous casting ladle and tundish casting platform with this robotic installation. The decision to include a ladle tube changer (LTC) was motivated by improved process safety as well as improved stability of casting conditions, especially for operations like ladle shroud handling and oxygen lancing of the casting channel.

At times when the major steel companies develop extremely demanding ultra high performance grades, RCT brings a critical step change in the quality performance of the continuous casting process. These include improved steel quality protection through increased tightness between the ladle and tundish, as well as the possibility to perform safely the ladle opening with the ladle shroud submerged in the tundish steel bath.

The unique LTC concept has been proven during operation of the first generation, however the CSA project as such is an important milestone.

At times when the major steel companies develop extremely demanding ultra high performance grades, RCT brings a critical step change in the quality performance of the continuous casting process

In the CSA RCT layout for the ladle casting platform, two industrial robots will collaborate to perform the following tasks:

- Ladle shroud transport and connection on ladle tube changer
- Ladle shroud cleaning and inspection
- Oxygen lancing of the casting channel
- Tundish powder distribution
- Temperature measurement in the tundish
- Steel sampling
- Hydrogen measurement

For more information, visit www.vesuvius.com. CSA can be found online at www.thyssenkrupp-csa.com.br

Vesuvius and thyssenkrupp CSA cooperate

Vesuvius has been awarded with a turnkey project by thyssenkrupp CSA (Brazil) for the installation of Robotic Casting Technology on both slab caster ladle platforms.
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This newly introduced division supplies quality coating powders into the metal finishing industries.

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

**Separate entities**
- Metlite Alloys is a producer of quality aluminium ingots and deoxidants.
- Insimbi Aluminium Alloys is a producer of quality deoxidants.
- Insimbi Nano Milling develops, manufactures and distributes nanosized products and composites.
The work that EnvisionTEC has been doing to advance industry using various 3D printing solutions has not gone unnoticed, and another recent development that the company has made looks set to bolster its considerable reputation still further. In collaboration with Viridis 3D, EnvisionTEC has patented an impressive robotic 3D printing solution, specifically designed for metal casting in foundries. The state-of-the-art technology can be used to 3D print sand moulds, mould cores and investment casting patterns, for all kinds of foundry applications.

EnvisionTEC’s 3D printers and printing solutions have been applied successfully in a range of different fields, with the dental industry and jewellery design reaping particularly large rewards from its efforts. This latest innovation is one of the first forays the company has made into the heavier industries, and its partnership with Viridis 3D played a significant role. Viridis 3D was founded back in 2010, and it provides all-inclusive industrial 3D printing systems for metal casting, ceramics, and composites, including the machinery, the software and the required training and guidance. Partnering with EnvisionTEC should expand the reach of their technology, both in terms of the range of distribution and the level to that it can be developed.

The new technology that the collaboration has introduced is essentially an automated 3D printer. It consists of an ABB robotic arm, with a proprietary print head attached that uses exclusive binder jetting technology. The system is capable of printing the moulds and mould cores that foundries use to cast molten metals into solid shapes. Viridis 3D’s Viriprint software is used to control the system, 3D printing from an original CAD model, and the whole production process can take just a few hours to complete.

A range of different sizes are available for different applications, so the system can be modified according to a foundry’s specific needs. Two print heads are available and the system offers four different build envelopes.

The technology has the potential to disrupt the metal casting industry. It offers unprecedented speed in terms of both manufacturing of parts as well as the time it will take to transition from older technology and get the new robotic 3D printing system up and running.

Costs will also be cut drastically, in a number of different ways. The Viridis 3D systems use significantly less sand in their manufacturing process, which means foundries will have to shell out a lot less for materials. Implementation of this new system should also change the way that moulds and casting patterns are made and distributed. Instead of being manufactured on a large scale in a remote location and being shipped out to where they are needed, they can instead be rapidly produced in strategic locations for same-day use, with just the raw materials and the 3D design files being sent out.

The drawbacks

Despite Viridis’s clever design, surviving in their niche market will still be an uphill battle. They will have to contend with the limitations of powder bed inkjet 3D printing in addition to foundry specific complications.

The immediate hurdle is that parts made with many powder bed inkjet printing materials are very delicate. The printing process also requires a fairly clean environment and parts may require a bit of post processing to remove excess powder material before use.

The bigger hurdle is that their target market — foundries — are stereotypically laggards for adopting new technologies. For the most part foundries operate on an ‘if it ain’t broke don’t fix it’ paradigm. Most of the potential customers for this tech are likely to already own an alternative tool for making moulds and mould cores.

For further details visit www.envisiontec.com
Omega Foundry Machinery, a leading manufacturer of no-bake equipment based in Peterborough, UK and Simpson Technologies Corporation from Aurora, Illinois, USA, a leader in foundry and chemical industries process technology, have recently signed an agreement to cooperate in the field of sand reclamation.

“The demands on foundries to manufacture better castings at a lower cost while addressing the problem of disposing of large quantities of waste sand into landfills continue to intensify. Sand is the largest waste element in the foundry process and in some instances can constitute up to 70% of total waste volume,” said Mark Fenyes, Chairman of Omega Foundry Machinery.

“We have joined forces to help foundries to realise the cost savings and technical advantages available from sand reclamation. This agreement will allow Omega to give a proven solution to one of the main problems that face greensand foundries worldwide,” continued Fenyes.

“Our experience over many years in the foundry industry, both Simpson’s and Omega’s, has shown that no two foundries are exactly the same when it comes to their combination of sand, binder and operating conditions. As a result, the only way to properly determine the performance and expected payback of a sand reclamation equipment installation is to conduct a test prior to implementing a system.”

“Under license Omega Foundry Machinery installed a Simpson Pro-Claim® system at our Omega pilot plant in the UK to process the unique sand samples that emanate from each individual foundry. Foundry personnel are encouraged to be part of the testing at the Omega facilities so they can witness the stages required and see the results first hand. The testing of sand is an essential first step in determining the correct equipment to maximise performance and savings of the reclaimed sand when investing in a sand reclamation system.”

About Simpson Technologies Corporation
Simpson Technologies, founded in 1912, is a fifth-generation family business that concentrates on the design and manufacture of technology and services for the worldwide metal casting and chemical process industries. Primary products include greensand batch and continuous mixing equipment, moulding sand coolers, on-line mixer controls, core sand preparation systems, shell sand preparation plants, sand reclamation systems, sand laboratory equipment and foundry system design, engineering and automation systems.

About Omega Foundry Machinery Ltd
Omega was established in 1984 as a result of a management buyout from parent company Baker Perkins. The company has continued to concentrate on the no bake segment of the market and has manufacturing capabilities in the UK, USA, India, South Africa, Australia and Malaysia. Omega also has representative offices in Mexico, Turkey and China.

For further information contact Roy Dias of Endeco Omega on TEL: 011 907 1785 or email roy@endeco.co.za, or Peter Petersen of Mondeco on 079 448 1277 or email peter@mondeco.co.za or visit www.endeco-omega.co.za

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Struers introduces high-capacity
Rockwell and entry level Vickers hardness testers

Hardness matters!

Struers has introduced a completely new generation of hardness testing equipment for materialographic quality control in both laboratories and on production floors. The new series of nine Duramin products offer a cost-efficient quality-control process to the market. The products were launched earlier this in Stuttgart at the Control 2017 exhibition.

Manufacturing industries and laboratories are facing fierce global competition. Productivity targets must be met without compromising quality compliance of raw as well as processed solid materials. This is why highly-automated, reproducible and operator-friendly processes within hardness testing are in high demand.

The series of Struers' nine new generation hardness testing products, which also re-introduce the Duramin brand name, are specifically designed to meet the market-demands for higher productivity and the need to determine the quality and characteristics of solid materials with the highest level of reliability and accuracy.

Robust and operator-friendly design
The prime focus has been put into developing products that are robust and less time-consuming to use by any skilled operator.

The new range of Duramin hardness testers follows international quality standards and obviously fits any need to conduct quantitative tests like Vickers, Rockwell or Brinell.

In order to maximise productivity, the new Duramin hardness testers have been built with great automation features and can be configured to almost any need with a wide list of supplementary accessories to provide fast and reliable data on quality in repeatable processes.

Beginning with the Duramin-170, a high-capacity hardness tester and the Duramin-4, an entry level Vickers hardness tester, the new Duramin range is said to represent the latest generation of highly successful hardness testers. With 30 years of experience within hardness testing, Struers is committed to constant improvement by listening to customers and understanding their evolving needs.

The Duramin-170 is a dedicated Rockwell tester with a load range between one and 250 kilograms. It is suitable for fully automatic Rockwell testing, Jominy testing, and Rockwell testing of large samples. This is a high capacity Rockwell tester, with a motorised test head, optional motorised XY-stage, and an embedded PC. Duramin-170 is particularly suitable for Rockwell testing of large or tall samples or for fully automatic Jominy testing.

Duramin-4 is a manual micro and micro/macro hardness tester. This entry-level range of micro hardness testers primarily targets Vickers testing, but can also be used for Knoop and Brinell testing. The Duramin-4 testers are equipped with a combination of manual and automatic features to ensure easy operation. Duramin-4 is available in two load ranges: 10 grams to two kilograms and one kilogram to 62.5 kilograms. It has an automatic six-position turret, manual XY-stage and Z-axis, and manual indent evaluation via an eyepiece.

For more information, contact your nearest IMP Branch, Gauteng TEL: 011 916 5000, KwaZulu Natal TEL: 031 764 2821, Western Cape TEL: 021 852 6133, Eastern Cape TEL: 041 364 2544, Free State TEL: 018 293 3333, email info@imp.co.za or visit the website www.imp.co.za
Foseco has developed a new, insulating lining system for use in dosing and low-pressure furnaces in aluminium foundries. The system, based on Foseco’s Insural range of non-wetting and insulating refractories offers numerous benefits to the foundryman.

The adoption of energy efficient furnaces in aluminium foundries is widely regarded as best-in-class. However, the efficiency of these furnaces is often undermined by the choice of refractory lining. Foseco is now able to supply a new, multi-part and highly insulating lining made of Insural. The lining, which is delivered ready to install, combines energy savings in combination with long service life and resistance to oxide build-up.

As the majority of the lining system is made of pre-cast Insural shapes, the installation can be completed in just three days, either by the foundry or by a refractory installation company.

Unlike traditional linings, no sintering is necessary! The furnace just needs to be pre-heated and maintained at working temperature for 48 hours. It is then ready for service.

The Insural furnace lining system is completely dry. As a consequence, hydrogen pick-up from a new lining system is negligible and the melt density index goal can be achieved within a very short period following installation. Furnace downtime is dramatically reduced and the risk of increased scrap avoided. Due to the inherent non-wetting behaviour of the lining system, corundum growth is minimal and cleaning of the furnace simplified.

The target: Fast turnaround. The solution:
Dry installation of Insural precast, insulating shapes.
The benefits are:
• No sintering required
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• Immediate achievement of a constant density
• Easy to clean

For more information contact Foseco South Africa on TEL: 011 903 9500 or visit www.foseco.com
A vast amount of literature and advice is written on the best ways to nodularise ductile iron with magnesium ferrosilicon ladle design, pockets, alloy compositions and so on. However, little is said about the Mg alloy reactivity management to get the best magnesium recovery.

Elkem has developed a family of specialised materials designed to optimise the magnesium recovery and reduce reactivity, provide a better nucleation level in the iron and improve the cleansing of iron and change the slag condition to one that is easy to remove.

Many foundries use steel coins often covered with oil, cast plates or even machining swarf as a cover for the MgFeSi in the ladle to try to delay the start of the Mg reaction and increase the ferrostatic head in the ladle to increase the Mg bubbles/iron contact and improve recovery of the magnesium. Many foundries use no cover at all.

The Topseed conditioner range is based on a high density FeSi containing a balanced amount of active elements like calcium, barium and aluminium. The active elements act as a deoxidant when added as support for the MgFeSi and also add nuclei to counter the negative effect on nucleation of adding magnesium. Even a small addition of Topseed will delay the onset of the reaction and provide measurable consistent improvements in the Mg recovery and metallurgical quality of the iron.

The improved performance of MgFeSi has, in many foundries, led to either a reduction in the amount of MgFeSi added or a reduction in the magnesium content of the MgFeSi alloy, in itself a mechanism for improving the metallurgical quality of the iron, the Mg reactivity and recovery.

Often, the reaction slag is liquid and difficult to remove, almost invariably involving the use of unexpanded perlite as a coagulant. The additions of a proper amount of balanced active elements through Topseed improve the cleaning of iron and transform the slag into a dry, “popcorn” type, which is very easy to skim. Some foundries have eliminated the use of the environmentally unfriendly coagulants through the use of Topseed.

Three grades of Topseed conditioner are available, each with different levels of active elements and this provides the opportunity to use Topseed in most operating conditions.

For further details contact Ceramic and Alloy Specialists on TEL: 011 894 3039 or visit www.ceramic-alloy.co.za

Elkem’s Topseed conditioner helps to improve nodularisation
Spectro Analytical Instruments has introduced the Spectro Midex MID05 spectrometer — a fifth-generation, fast, accurate, small-spot energy-dispersive X-ray fluorescence (ED-XRF) analyser for precious metal testing.

The new, compact Spectro Midex MID05 spectrometer delivers improved sensitivity and speed, and represents a smart alternative to fire assay testing. Incorporating the latest developments in ED-XRF detector technology using high count rate and high resolution, the Spectro Midex spectrometer is one of the most-advanced laboratory benchtop XRF analysers available for precious metals testing.

The new analyser offers users the choice of significantly increased precision, even for minor and trace element content, or substantially faster testing for higher sample throughput. The features and benefits of the new Spectro Midex MID05 spectrometer include:

• Exceptional performance in terms of high precision and accuracy for a wide range of concentration levels, plus record-setting testing times (as low as 15 seconds). For small jewellery items or drill cuttings from remelted samples, the new spectrometer analyses a small spot (typically 1.2mm). For silver samples, which may be relatively inhomogeneous, averaging results from an optionally larger spot size maintains high-accuracy results.

• Excellent ease of use for even minimally trained operators. Intuitive software presents relevant information on one screen. An integrated video system aids in sample positioning and in documenting the testing spot. Analysis starts with a single screen click, or one touch of the new instrument-mounted start/stop button. Display, printout, and transfer of analysis results support later data use and/or proof of compliance.

• High-reliability, cost-effective analysis for precious metals testing offices, assay labs, hallmarking centers, and refinery labs. The new spectrometer’s accuracy and speed reduce costly additional fire assays and ICP-OES testing that requires sample digestion.

• Greatly improved speeds, even compared to previous methods that yielded complete analysis, in as little as 30 seconds. With comparable accuracy, fast new scans may take only 15 seconds.

• More compact, robust design to meet customer requests. A new, significantly smaller housing fits tighter benchtop spaces, yet accommodates samples from tiny jewellery pins to large silver pieces.

For further details contact Spectro Analytical South Africa on TEL: 011 979 4241 or visit www.spectro.com.
Isocure 372 & 672

Isocure 372 and 672 are the trusted Cold-Box binder systems from Chem Systems. This system provides the improved level of tensile strength that is needed for delicate, detailed cores and is relatively insensitive to sand type. Greater dimensional accuracy can be achieved as a result of higher immediate strength and improved early and long-term strength development. Look at the advantages -

**Improved Strength**
- Higher immediate strength
- Improved early and long-term strength development

**Improved Efficiencies**
- Reduced resin wipe-off on tooling
- Lower binder consumption

**Improved Performance**
- Greater bench life
- Better sand flowability and compaction
- Reduced scrap rates especially on thin walled cores

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