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**Castings SA**

Volume 13 number 4

December 2012

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ABP Induction Furnaces strengthens its position in South Africa

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Castings SA, published every second month, is the official journal of the South African Institute of Foundrymen (SAIF). The information and ideas presented in Castings SA do not necessarily reflect the position of the SAIF staff, executive, advisors, sponsors or members.
The aim of the SAIF is to promote and develop within Southern Africa the science, technology and application of founding for individuals and involved industries.

**Fees**

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- Individual Membership (country) – R380.00
- Junior Member – R100.00 – must be enrolled as a full schedule student, in an accredited educational institution in the Metals Industry as a trainee, and who has not reached his 23rd birthday.
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- Vice President - Takalani Madzivhandila
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**Address Details**

- University of Johannesburg
- Metal Casting Technology Station - Metallurgy
- Room G101, John Orr Building,
- Corner Siemert and Beit Street,
- Doornfontein, Johannesburg, Gauteng.
- Postal Address: P.O. Box 14863, Wadeville, 1422.

**John Davies** - Tel: +27 (11) 559 6468;
- Cell: 083 630 2809; email: jdavies@uj.ac.za

**Executive Secretary** - Tel: +27 (11) 559 6455;
- Fax: +27 (11) 559 6526; Fax to email: 086 509 7045;
- email: saif@icon.co.za / mbiljon@uj.ac.za

Website: www.foundries.org.za

Contact details for Western Cape:

- Tel: 021 573 7311; Fax: 021 573 7296; Cell: 072 313 8375

**EDITOR’S COMMENT**

What’s the state of your capital equipment?

I was very upbeat about our industry when I wrote my editors comment in the last issue of Castings SA (Volume 12 Number 3 October 2012). I had reported on a large, state-of-the-art investment that took place at Zealous Automotive Castings and I even wrote that I do not recall this amount of capital equipment investment by a number of local foundries since I have been involved in the industry, which goes back to 1991.

Well it soon comes back to bite you. Since that article was published there has been the liquidation of Crown Cast, a ferrous foundry that has been in operation since 1992. For a foundry that was producing over 100 tons a month to close its doors will have repercussions, from the losses that the suppliers will incur to the clients that will have a huge disruption in finding a new foundry to produce their castings. Let’s not forget the approximately 100 staff that were employed by Crown Cast.

Then there is talk of an aluminium foundry and general engineering company where the owners are planning an exit strategy, which as I am led to believe, will see the company ultimately close its doors. Here we are looking at another 40 staff that will join the ranks of the unemployed.

It needs to be analysed why all of sudden this has happened? Or is it all of a sudden? In both cases that I have mentioned, as far as I can determine, the reason for the equipment was not in very good shape and there had not been any modernisation or upgrading. The result is that the level of performance of the equipment has slowly been eroding and the ‘no-return’ date had been reached or is about to. The challenge for the two companies was to find the money to purchase new equipment, and I am assuming that was too great or there is no inclination to invest.

It is not for me to speculate because there could be many other reasons why they have taken this route. But it is the complete opposite to the other foundries that I mentioned in the last issue whereby management has seen a clear and positive way forward.

The best companies spend time in their businesses to strategically determine how to get incremental capacity from their existing equipment. This is being done through elimination of waste, different scheduling patterns that may even drive some inventory, but are increasing throughput, and a focus on understanding demand from the customer to enable better planning. Once these segments are optimised, they are looking toward new equipment purchases. These moves have allowed many of them to purchase equipment with cash because of the increased throughput and profitability.

For all foundries, equipment and raw materials are two of the biggest costs that affect their ability to manage cash flow. Yet those that boast the latest technology are driving profitability and freeing up the necessary capital to make the right investments and ensuring long-term success.
Efficient and environmentally friendly foundry processes

SIGroup HA conducts intensive research to combine the special foundry chemistry knowledge acquired over many decades with completely new approaches. Together with our customers we want to create even more efficient and environmentally friendly foundry processes. Our team is at your service.
ABP Induction Furnaces strengthens its position in South Africa

One of the world’s leading designers and manufacturers of induction heating systems for the foundry, steel, forging, tube and pipe, and heat-treating industries, ABP Induction Furnaces has decided to strengthen its position in South Africa by acquiring the assets of Induction Furnaces, a company owned by Werner Nisi, that has represented them in South Africa for a number of years.

“The development took place earlier this year and represents our commitment to the industry in South Africa,” said Dr. Wolfgang Andree, President of the ABP Induction Group, which has a centre of excellence in Dortmund, Germany and operations around the globe in Japan, China, Thailand, India, Russia, Sweden, Germany, Brazil, Mexico and USA.

“The company Induction Furnaces has changed its name to ABP Induction Furnaces and, although there is new ownership, fundamentally it will continue to operate as it has done while under the stewardship of Werner Nisi. This includes remaining in Heidelberg Road, City Deep, Johannesburg,” continued Dr. Andree.

“We have had a very successful relationship with Werner over the last 12 years. He will remain on as a consultant to the company as long as is necessary as he has built up an enviable reputation in the South African market for sales of our products, servicing and coil repairs.”

“Taking over from Werner, as General Manager of the local company, is Byron McCall. Byron joined the company in 2011, having spent the previous eight years working in a foundry.”

“ABP has over 100 years of serving the metal casting industry. What began in 1903 with the first channel induction furnace from ASEA, continued in 1988 with the merger of ASEA and BBC into the company ABB. With these roots the foundry systems business of ABB became ABP Induction in 2005 as an independent, worldwide operating company focused on induction technology.”

“Despite the economic woes we have had a very successful period over the last two years. A notable contract was to build ‘the largest induction melting plant in the world’. The project at Taiyuan Iron and Steel Group Ltd. (Tisco), at Taiyuan in China’s Shanxi Province, was completed earlier this year.”

“Tisco’s order called for a melt shop capable of producing 180 metric tons per hour of ferrochrome, pouring at a temperature of 1,670°C, to produce stainless steel. The determining factor in the design of this high-volume melt shop was the economic advantage of induction melting over arc melting (which is more common in steelmaking operations), based on significantly lower material losses as a result of the combustion process — specifically, the chromium used to produce stainless alloys.”

“Fifty metric tons from an induction furnace
The Backbone of Ceramic Fibre

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- Calcium Silicate Boards
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Contact the company closest to you.
with a tap-to-tap time of 60 minutes is a tremendous achievement, and requires a lot of power,” noted Dr. Andree.

“The furnaces installed include two IFM 9 vessels, from ABP’s line of medium-frequency coreless furnaces for melting and holding ferrous or nonferrous metals. The two units installed have capacities of 30 metric tons, powered by 24,000-kW and a 3,000-kW induction power source. In addition, six IFM furnaces were supplied with capacities of 65 metric tons and powered by three 42,000-kW power supplies and three more 1,800-kW sources.”

“The melt shop design was enhanced by inclusion of the Ecotop system — a welded steel, refractory-lined furnace hood that attaches to the vessel with a floating system to seal the melt from the atmosphere. A telescoping duct optimises exhaust gas removal.”

A similarly large-scale induction melting installation took place in India.

“Nalwa Steel & Power contacted ABP Induction to build a melt shop capable of producing 700 metric tons/day of direct reduced iron. It is one of the largest DRI operations in India. The plant melts 85% DRI to a tapping temperature of 1,640°C, and the liquid metal is transferred to 32- and 38-metric ton ladle furnaces for refining, to produce steel.”

“ABP supplied two 30-metric ton capacity IFM furnaces with a 16,000-kW power source based on ABP’s Twin-Power concept: a single power source that distributes the energy supply ‘steplessly’ to two induction furnaces, with no switch time losses or overheating in the melt.”

“The two furnaces have the Ecotop fume-extraction system, as well as an automated slag-skimming capability.

Also, ABP provided two ladle refining furnaces, 32 metric tons and 38 metric tons, with an electrical rating of 7.2 MVA.”

“The major deciding factor for the decision in ABP’s favour was its advanced automation, high-energy melt process, ABP’s Ecotop system, and the automated slag remover that reduces the number of operating personal. Thirty metric tons from an induction furnace with a tap-to-tap time of 120 minutes for 85% sponge requires a lot of automation,” Dr. Andree added.

High powered coreless induction furnaces type IFM

The pictures on the cover depict the ABP Induction medium-frequency coreless induction furnaces Type IFM, which is utilised for melting and holding ferrous and non-ferrous metals and has a melting capacity of 8 to 65 tons. Its connection capacity is rated at 3 to 42 MW.

“ABP has over 100 years of serving the metal casting industry. What began in 1903 with the first channel induction furnace from ASEA, continued in 1988 with the merger of ASEA and BBC into the company ABB.”

Coreless induction furnaces of Type IFM are available in various different configurations.

Type IFM has a high melting rate of up to 52 tons an hour, continuous automatic furnace monitoring and low noise emission.

“Essentially we offer turnkey solutions to industry and our strategic aim is to establish ABP Induction Furnaces, Johannesburg as a service hub for the whole South African market. Sustainable technology plus sustainable partnership will be the main reasons of our future success,” concluded Dr. Andree.

For further details contact ABP Induction Furnaces on TEL: 011 623 1814/17 or cell number 072 158 1117 or email byron.mccall@abpinduction.com. You can also visit www.abpinduction.com
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The Scaw Metals Group is a South African company serving international markets.
A round the world one dream unites metalcasters, regardless of their experience or specialty: greenfield capacity. It’s fine to add new melting or moulding machinery, or to update cleaning and finishing systems, but there are limits to expansion and modernisation. Cost and market opportunities are obvious constraints to many operators’ potential, but plant infrastructure, inaccessibility, and local zoning rules are often overlooked as the limiting factors to a foundry’s growth opportunities.

The experience of Viking Foundry shows how much can be accomplished with a clean slate. Four years ago Viking Foundry management took the brave decision to uproot its complete foundry and move to a much larger facility.

“We did not have far to go. It is literally up the street but the logistics involved in moving capital equipment can be a nightmare. But if we were going to grow the business and add value and quality to our products, as well as become faster and smarter in our delivery times, we needed to move. So when the

Main image: Viking Foundry installed a Haas GR-510, which is a gantry-style router with 3,073 x 1,549 x 279 mm travels and a 40-taper milling head, three and a half years ago in the patternshop. Its 10 000-rpm spindle and powerful 11 kilowatt vector drive system provide the power and speed to cut patterns.
opportunity arose to purchase the building in Van Lingen Street we did not hesitate,” said Grant Estman, MD of Viking Foundry.

“We were operating in an environment where everybody was falling over machines, patterns and castings. The 3500 m² under roof facility had served its purpose since my late dad George and I started the business in 1994. Keeping it in the family Greg, my son, joined the company in 2008. He is a qualified patternmaker.”

“The move in 2008 represents another significant milestone in the company’s history. We now have 10 000 m² under roof at our disposal. The increased space and separate buildings that we moved in to gave us the opportunity to locate the ferrous and non ferrous foundries in their own buildings. The fettling shop and patternshop are also housed in their own buildings. An added bonus is that we have a completely separate building for management and administration, one for all the production staff and one for where we store all our patterns.”

“Eight years ago we had no plans to expand but rather to focus on what we do best, which is to continue to operate primarily as a jobbing and mixed metal foundry. However with the increased orders it soon became inevitable that we would have to move and now that we are settled in our new facility we have not looked back.”

**Additional equipment**

“Besides the obvious advantage of having the space to streamline our production flow in the various areas we also knew that we needed to upgrade and introduce extra equipment if we wanted to increase our output. The first area to experience investment was the patternshop, shortly after we moved.”

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A general view of the ferrous foundry

A general view of the non ferrous foundry

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“Here we installed a Haas GR-510 which is a gantry-style router with 3,073 x 1,549 x 279 mm travels and a 40-taper milling head. Its 10,000-rpm spindle and powerful 11-kilowatt vector drive system provide the power and speed to cut patterns.”

“The machine’s 1.5 x 3 metre fixed table provides plenty of support for large workpieces. We use EdgeCam as the machining programme and at the moment we have two fully trained operators that are working on the machine. Not only has the machine increased production for us, it has improved the quality and repeatability.”

“In total we have five qualified staff in the patternshop and two apprentices. We are also registered with the relevant authorities to train apprentices.”

Melting capacity

“We have also increased our melting capacity in both the ferrous and non ferrous foundries. From a total of 130 tons a month we are now able to produce in the region of 220 tons a month. The majority of this is made up of ferrous metals but on average we cast 25 tons of aluminium, copper, brass and the bronzes a month. Stainless steel comes in at about 10 tons.”

“More importantly with the addition of new furnaces, one of which has just been installed and another commissioned at the end of November, we can now manufacture a steel casting up to 4,25 tons in steel and double that in iron.”

Phenolic resin introduced

Throughout the company’s history it has used greensand and CO2 moulding techniques. However with the acquisition of some equipment purchased at an auction, Viking has introduced chemically bonded sand moulding into its production process in both foundries.

“We have done this so as to become more competitive by reducing production costs and improving casting quality. In the last month the SI Group have been implementing and training our staff to use the new system.”

“We have had to purchase new equipment such as a 20 ton an hour continuous mixer supplied by Lauds Machinery and a vibrating table to compliment the shakeout, classifier and other equipment that we acquired on the auction. We built our own silos, both with 30 ton capacity and did most of the installation ourselves.”

“The ferrous side is up and running very successfully and the non ferrous side should be completed by the end of the year.”

“We will continue to offer greensand and CO2 but with the changing times we have to adapt as well.”

The company regards itself as a jobbing foundry because it is recognised for its ability to cast a very diverse range of materials in small quantities in a very short turnover time. Typical industries serviced in the foundry are those in the crushing, mining and engineering related fields including pump components. It is a varied base, with SG forming the bulk of the work, followed by iron, steel, manganese, chrome and stainless steel.

Although Viking Foundry has no intention of becoming a high-tech foundry, the company does intend to become faster and smarter to improve delivery times. With an existing customer base of over 150, Viking Foundry intends to become more service and quality oriented. Currently the company employs 130 staff.

For further information contact Viking Foundry on TEL: 011 873 5093
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This time the conference theme is: The Challenge of Green Manufacturing.

In a small world where trade is the new global driving force conquering countries and continents alike, international competitiveness is becoming the ultimate challenge of the new millennium. It requires high quality products manufactured with state-of-the-art technologies at low cost under the assumption of highly efficient operations management as well as clear corporate goals and strategy. This in turn is based on improved engineering training and education, relevant applied research and an active interaction between academia and industry.

The International Conference on Competitive Manufacturing (COMA ‘13) is taking place for the fifth time. The main objective of the conference is to present recent developments, research results and industrial experience related to the improvement of competitiveness in the field of manufacturing. A further objective of the conference is to be a generator of innovative ideas and fruitful collaboration both locally and abroad.

Participants
The Organising Committee invites participants from among the international and local communities of manufacturing and academia, national educational institutions, researchers, industrial designers, managers, engineers, scientists and senior technical personnel from manufacturing related companies.

Registration Fee
This includes full conference participation, proceedings, lunches, refreshments, reception and conference dinner and is priced at R5 300.00. A special discount of 30% applies for students.

Venue
University of Stellenbosch, located in Stellenbosch, Western Cape - in the heart of the winelands region.

Sponsorship
The conference is being sponsored by CIRP, the Southern African Institute for Industrial Engineering and the Global Competitiveness Centre in Engineering (GCC) and The South African Institution of Mechanical Engineering.

For further details contact the conference secretariat - Karina Smith and Anel Uys - Department of Industrial Engineering, University of Stellenbosch, Private Bag X1 Matieland, 7602, South Africa or TEL: 021 808 4234 or E-mail: coma13@sun.ac.za or visit www.coma.org.za

Omega Foundry Machinery appoint new South African agent

Omega Foundry Machinery based in Peterborough, UK is pleased to announce that they have appointed Mondeco Solutions as their agents to service the foundry industry in Southern Africa.

Mondeco Solutions is a relatively new company in the foundry industry having only been established by Peter Petersen earlier this year.

Mondeco works closely together with Krier Africa and acts as the recognised sub-agent for DISA, Wheelabrator, Clansman Dynamics and Nederman Filtration.

In addition, Mondeco has started direct cooperation with well-known principles such as Otto Junker, IBO Anlagenbau (Tornado), SERT Metals and others.

Omega Foundry Machinery Ltd. was formed in 1984 from the result of a management buy out from parent company Baker Perkins. Since that time, the company has continued to specialise in the manufacture of equipment for the 'chemically bonded' or 'no-bake' process. This includes a range of sand mixing, mould handling, sand reclamation, coating plants and core making equipment and ancillary items.

For further details contact Peter Petersen on 079 448 1277
SA government extends lifeline to SA TDM sector

Government has committed funding worth R5.7 billion to encourage enterprises to upgrade their production facilities, processes, products and up-skill workers.

These funds will be distributed through the newly launched Manufacturing Competitiveness Enhancement Programme (MCEP) under the administration of the Department of Trade and Industry (DTI).

Speaking at the third annual AfriMold conference, Tshepiso Makgothi, Chief Director of the Competitiveness Cluster for the DTI said the incentive is aimed at promoting enterprise competitiveness and job retention within the manufacturing sector.

She added that the programme was established to curb job losses in the manufacturing industry as the economy had lost some 200 000 jobs during the 2008/2009 recession.

The fund will inject cash into waste management, cleaner production, information technology, logistics, agro-processing and renewable energies, with the exclusion of automotive manufacturers, clothing and textile industries, which currently have a separate incentive specifically aimed for those sectors.

The MCEP will be in the form of a grant that is based on a company’s Manufacturing Value-Added (MVA).

“The grant is designed to promote enterprise competitiveness and job retention so going forward, smaller companies will get a bigger share of their MVA while big companies will get a smaller share,” she said.

A 100 percent black owned company with total assets of below R5 million would qualify for a 15 percent MVA, whereas one with total assets with a historic value of R200 million and above would only qualify for a 7 percent MVA.

Divided into a production incentive and loan facilities, the incentive is not meant for office equipment, land costs, vehicles or second-hand assets. “We will only reimburse businesses for manufacturing related products and goods utilised in the company, nothing else,” said Makgothi.

The National Tooling Initiative Programme (NTIP) CEO, Dirk van Dyk, said the programme is a strong inducement for enterprises to upgrade their production facilities, processes, products and up-skill their workers.

He urged all role players in the South African manufacturing industry to take advantage of this initiative. He further thanked the government for being a major role player in an effort to revitalize the ailing South African TDM sector.

The closing date for the six-year programme will be the end of March 2018. Companies will be given the opportunity to apply for other incentives within the programme after two years of the initial application.

Further conditions of MCEP and the application form can be downloaded from the departmental website – www.thedti.gov.za/financial

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Industries are under increased pressure to improve energy efficiency and reduce carbon emission. With this in mind Natal Refractories (based in Durban and Richards Bay), Cape Refractory Industries (based in Cape Town) and Resistant Materials Services (based in Boksburg) have combined forces to become one of the largest and most comprehensive networks for ceramic fibre and allied products in South Africa and the neighbouring countries.

Together these companies supply a broad range of ceramic fibre blanket, modules, paper, boards, felts, ropes, braids, tapes, laggings, bulk fibres vacuum-formed shapes and various cements and coating materials. They are also suppliers of a further range of insulation products that serve both a lower temperature range (such as calcium silicate and mineral wool) as well as products that operate in a higher temperature range (up to 1600 °C).

Value-added ceramic fibre products are manufactured by the Thermal Fabricators Division of Resistant Materials Services. These include compensators, expansion joints, modules, bellows, tadpole seals, thermal insoles and mittens, heat shields and gaskets.

Allied products such as insulating bricks, crucibles, silicon carbide (clay and nitride bonded) bricks and special shapes and glass insulating products (tapes, braids, ropes and cloths) are also supplied by any one of the three companies. Should value-added fabrication of the glass insulating product be required, this can be done to suit the customers’ needs.

Each company has technical staff with a wealth of experience in all aspects of insulation with some members of the technical staff having spent at least twenty years in the ceramic fibre industry. Solutions for most high temperature insulation applications can be engineered for the market at any one of the three entities.

Natal Refractories and Cape Refractory Industries both have contracting divisions that undertake the installation of ceramic fibre and ceramic fibre module linings using tried and tested anchoring systems. In addition to ceramic fibre installations, these companies also install shaped refractory products such as bricks and precast shapes and unshaped refractory monolithic products by methods such as casting, ramming and gunniting. Both of these companies also manufacture ceramic fibre modules, mild and stainless steel anchoring systems, refractory precast shapes, furnaces and kilns.

The three companies pride themselves on being a “one-stop shop” for all industrial insulation requirements, with service being a priority.

George Justus runs Natal Refractories whilst Jean Lopez heads up Cape Refractory Industries. Kevin Nesbitt and Mike Robinson are responsible for the operations of Resistant Materials Services.

For more information contact Cape Town on TEL: 021 9827484, Johannesburg (Boksburg) on TEL: 011 917 0702 and Durban on TEL: 031 4681474.
Pilot plants on way for platinum, titanium value-add – Science Minister

Pilot plants were on the way for both platinum and titanium beneficiation, Science and Technology Minister Naledi Pandor has revealed.

Delivering the inaugural address at a beneficiation workshop of the Centre for Science and Technology of the Non-Aligned Movement (NAM) countries held in Boksburg, Pandor said a fledgling company had already sold 18 platinum-using fuel cells to South Africa’s mobile phone sector, and that determined mineral beneficiation efforts under way were aimed at the country, giving birth to new fully fledged industries as progressions of South Africa’s leading positions in platinum and titanium.

She spoke to strong applause after NAM Centre for Science and Technology New Delhi Professor Arun Kulshreshtha told the workshop that South Africa had been selected to host NAM and that determined mineral beneficiation efforts under way were aimed at the country, giving birth to new fully fledged industries as progressions of South Africa's leading positions in platinum and titanium.

Science and Technology’s thirteenth general council meeting next September, after which it would assume the presidency of the institution until 2016.

Pandor said it was now the turn of Africa to make the best of its considerable resources while at the same time steering well clear of the resource curse through the introduction of beneficiation and localisation, two overlapping processes, which the Minister conceded were both “complicated and complex”.

But South Africa had introduced policies for both, aimed at “promoting development at home”.

In platinum, South Africa had established Clean Energy, a South African fuel-cell company that would initially market and eventually assemble and manufacture fuel cells in sub-Saharan Africa in partnership with Anglo American Platinum and Altery Power Systems.

Although Clean Energy was still in its market development stage, it had already sold 18 fuel-cell back-up power systems to mobile phone service provider Vodacom. Platinum serves as a catalyst in the hydrogen fuel cell process.

South Africa had also made progress with Hydrogen South Africa (HySA) Catalysis and HySA Systems, its two four-year-old centres of platinum-linked competence, which had secured partnerships with the private sector abroad.

Those partnerships would enable HySA to penetrate the global fuel market, following an agreement being negotiated with a Norwegian partner for the commercialisation of a hydrogen storage material, plus the co-funding and upscaling of the pilot plant into a fully-fledged manufacturing plant.

In titanium, the Department of Science and Technology was championing the development of an industry across the entire titanium value chain, from the raw mineral to primary metal powder and ultimately to the forming of metal mill products – plates, bars and tubes – and components, such as titanium castings as well as their machining and components manufacturing.

The titanium metal powder industry was estimated to have the potential to generate a turnover of R3.5 billion a year, which further beneficiation could increase to a downstream industry that would have the potential of turning over some R30 billion a year.

A titanium industry would require 450 workers, engineers and technologists in metal production and 2 000 workers, engineers and technicians in downstream component manufacturing.

The Council for Scientific and Industrial Research (CSIR) has developed a novel process in which titanium metal could be produced from titanium mineral ore, of which South Africa was the world’s second-largest supplier, but currently with negligible value added to the mineral before export.

New capabilities could position South Africa as a world leader in the cost competitive production of high-grade titanium metal powder.

“Titanium is a sought-after metal especially in the aerospace industry where aircraft and satellites need to be lighter in weight to consume less fuel,” Pandor said.

The pilot plant to be built at the CSIR in 2012 would accelerate the development of strategic capability.

“These efforts mean that, in the near future, South Africa will have a new industry built around titanium,” Pandor forecast, adding that a third mineral with beneficiation potential was fluorspar, of which South Africa hosted the world’s largest reserves.

South Africa’s rich fluorspar endowment had given rise to the planned 2013 listing on the JSE of a company which mines fluorspar 80 km north of Pretoria and which intends using it for the manufacture of fluorochemicals 52 km away, in Bronkhorstspruit.

Prof Kulshreshtha told the workshop that minerals beneficiation was an area of “immense potential” for developing countries well endowed with abundant mineral resources, which needed to share know-how and skills with one another.

It was unfortunate that a lack of skills, innovative research and technology, infrastructure and a new world trade regime were preventing developing countries from exploiting their mineral endowments to the extent that economically benefited a far greater number of citizens.

For example, mineral-rich Africa was lagging behind mineral-poor countries on a wide range of developmental indicators.

He said that India had woken up to the folly of exporting vast quantities of iron-ore at dirt-cheap prices to Japan and buying back steel at prices infinitely higher.

There was a need for policy makers, scientists, academics and technologists to address ways of filling the skills gap.

The NAM Science and Technology Centre, made up of 46 developing countries, had conducted 59 international workshops and 26 training programmes and published 54 technical books in the last 15 years.

It would be adding to it five fellowships with a new expenses-paid research fellowship scheme for scientists of developing countries.
Mittal shuts Vanderbijlpark electric-arc furnace

Instead of completing the R230 million dust-extraction system at its Vanderbijlpark plant to abate fugitive emissions that escaped from electric-arc furnaces, steel producer ArcelorMittal South Africa (Mittal) has taken the decision to close its furnaces indefinitely, CEO Nonkululeko Nyembezi-Heita said.

The plant’s three electric arc furnaces were shut on October 16, reducing Vanderbijlpark’s 4.7-million-ton-a-year production capacity by 500 000 t/y.

Nyembezi-Heita said the electrical furnace was the fourth unit cited in the Gauteng Department of Agriculture and Rural Development compliance notice issued in October, which alleged that various units at the Vanderbijlpark works did not comply with certain conditions stated in its atmospheric emission licence.

Other units cited were the coke battery, baghouse and sinter plant.

“We had a deadline of October 16 by which to comply, but given the cost of doing so, as well as a much weaker consumption environment, we decided to rather shut the unit,” she said in a conference call.

Mittal had lodged an application to suspend the compliance notice where after an appeal process would follow.

“We are complying with the conditions in our licence that were allegedly breached and are therefore contesting the compliance notice. We remain fully committed to maintaining and improving our environmental performance and the recent completion of various improvement projects bears testimony to this,” Nyembezi-Heita commented.

In efforts to abide by set emissions standards, the company also recently completed the R250 million emission abatement system for the sinter plant at Vanderbijlpark works, which would reduce particulate emissions from this facility by 80%.

Nyembezi-Heita said Mittal experienced commissioning problems with the abatement equipment at the sinter plant, which had led it also being cited in the notice.

“By the time that the compliance notice was issued, we had ironed out all the commissioning problems and the abatement equipment was operating to design specifications,” she pointed out.

Commenting on the coke battery at the Vanderbijlpark plant, which was also at fault, COO Hans-Ludwig Rosenstock said the company was looking at upgrading it in 2013.

He added that the plant’s Blast furnace 3, which was shut down for repairs, would be restarted before Christmas.

Steel sales down, loss narrows

Meanwhile, the company managed to narrow its headline loss for the quarter under review to R168 million from R177 million in the previous quarter, as the negative impact of the challenging global and local steel market was somewhat offset by a softening in some raw material prices.

This was especially evident in coking coal, pellets and scrap, with commercial coking coal sales rising 24% owing to ferrochrome operators restarting furnaces following the end of State-owned Eskom’s electricity buy-back period in which Mittal participated.

The quarter’s loss marked a significant improvement on the loss of R460 million recorded during the corresponding period in 2011.

Similarly, Mittal’s net loss also improved to R148 million for the quarter from R177 million in the June quarter.

The company’s earnings before interest, taxes, depreciation and amortisation increased to R238 million, marginally up from R224 million in the previous quarter, while showing a recovery from the R3 million reported during the same period in 2011.

However, revenue decreased 12% quarter-on-quarter to R7.6 billion, as total steel shipments declined 12%. Domestic and export shipments fell 5% and 27%, respectively, with flat and long steel products posting declines of 12%.

Liquid steel production increased by 140 000 t, resulting in capacity utilisation for flat steel rising to 67%, compared with last year’s 64%, and for long steel, 63% compared with 46% a year earlier.

With the exception of the Newcastle plant, production levels were stable at all operating units. The KwaZulu-Natal operation experienced a longer-than-anticipated restart of the blast furnace following a scheduled stop to repair a taphole.

“One big issue in our lives is the imminent reline of the blast furnace at Newcastle, as it is coming close the end of its life we do pick up additional difficulties keeping that alive. This remains a source of concern into 2013, but mid-2014 remains the time of reline,” Nyembezi-Heita indicated.

Total steel sales were 152 000 t lower quarter-on-quarter at 1.1-million tons, with the domestic component declining by 42 000 t to 802 000 t, while exports were 110 000 t higher at 295 000 t.

Further, rand-denominated net realised prices were higher compared to 2011, but were offset by lower dispatches.

“We have had higher operational stability across the group in the first nine months of the year, compared to almost any other period over the last four-and-a-half years,” Nyembezi-Heita noted.

Looking ahead, she said seasonal slowdown in domestic demand during the December month, aggravated by production losses following an extended taphole repair of the blast furnace at Newcastle, fuelled expectations that the fourth-quarter earnings loss would be substantially more than the third quarter’s loss.

However, she maintained a bullish medium-outlook, saying lower prices for some raw materials, as well as the recent weakening of the rand/US dollar exchange rate would partially offset the negative impact on earnings.
The Italian machinery manufacturers association Amafond and the Italian Trade Commission recently sponsored a South African delegation of foundrymen to attend a seminar and visit various manufacturing facilities in Italy. The South African delegation was made up of delegates from five foundries including McWade Productions, High Duty Casting, ZF Auto Industrial, Viking and KPL Die Casting.

After being welcomed to Italy by Mr. Fabio Pizzullo from the Italian Trade Commission and Dr. Francesco Savelli, President of Amafond, the delegation visited IDRA who manufacture high pressure die cast machines, tooling manufacturer SAPP, foundry equipment manufacturer Savelli, Colosio, a high pressure die cast machine manufacturer just outside Brescia, Simi, a machine manufacturer for the core shooting industry, OMSG, a designer and manufacturer of shot blast equipment, shot blast machine and surface treatment specialists Pangborn Europe, Fritz Hansberg, who are in the core making and green sand molding business and MEC Master, a company that manufactures and installs complete moulding plants, sand preparation plants, coolers, conveyors and furnace loading systems.

A trip to the Ferrari museum in Maranello and sight-seeing tours to Milan and Venice were also included on the schedule.

For further details contact Fabio Morettino of the Italian Trade Commission on TEL: 011 880 8383
Hevi-Sand® plant gets $5 million (R40 million) upgrade to improve quality and throughput of foundry grade chromite sand

Capex spending by AMCOL International Corp. at its Rustenburg, North West Province mine in its manufacturing plant is in line with the company’s desire to produce foundry chromite sand that has little or no fines and impurities (very low silicates) and high chrome content, which can be supplied to any desired customer’s grain size for distribution worldwide by AMCOL, including South African subsidiary Volclay Trading.

New York Stock Exchange listed AMCOL International Corp., a leading international producer and marketer of value-added specialty minerals and related products, has invested a further $5 million (R40 million) in processes and equipment at its plant dedicated to producing Hevi-Sand® foundry chromite sand as a primary source. This follows an initial $50 million (R425 million) investment when the plant was commissioned in 2010.

Up until the commissioning of the South African plant in 2010, foundry chromite sand had been produced as a by-product of the ferro-chrome industry, typically resulting in less than 3% of mine production going to foundry sand. The ore is sorted by size from lumpy, to small lumpy, to fines. The lumps are sent to the ferro-chrome smelter while the fines can then be further processed to produce foundry grade chromite sand. These fines are especially challenging to process due to their low chrome content and high silicates content.

The traditional method to process those fine sands, the Humphrey Spirals, was developed in 1930’s and utilises a high volume of water to sort out the chromite into usable product. The process relies on gravity to separate the heavier chromite particles from the lighter impurities such as clays and silicates and is a difficult process to control. It takes approximately one ton of water for every one ton of chrome processed, resulting in a low output of product for foundries and a high volume of wasted water.

This left the foundry industry very dependent on the ferro-chrome industry’s needs with supply, quality and pricing being extremely variable.

In 2010, AMCOL decided to take control of supply quality and maximise the sources and yields of their foundry chromite sand. To accomplish these goals, several groups under AMCOL came up with a new and fundamentally different process than anything that processing companies were doing before. The resulting Hevi-Sand® process uses a unique combination of liberation, separation and classification processes, including electrostatic and rare earth magnet separation, to produce an ultra-low impurity chromite foundry sand in a variety of size ranges.

The process is differentiated in that it controls the liberation of the chromite grain from the silicate impurities in order to maximise the yield of foundry quality product.

The unique combination of innovative processes created by the groups at AMCOL resulted in a 75% yield of saleable foundry product compared to a 30% yield from the traditional spiral process, ultimately reducing the waste from chromite...
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resources. By recycling the wash water at the wet plant and eliminating water usage after the dry separation, AMCOL was also able to reduce water consumption and waste by 70% along with a 50% reduction in power usage compared to the traditional spiral process. The unique Hevi-Sand® process also allowed for foundry products to be sorted into a range of sizes with fewer impurities, a service not previously offered in the market.

The open-cast mining operation that was set up is unique in that it is the first of its kind in the world, that AMCOL knows of, whereby the company liberates the chrome ore to manufacture exclusively foundry grade chromite sand. At the same time AMCOL implemented the new and exciting process to convert the ore into high quality foundry chromite sand with the trade name Hevi-Sand®.

The mine that AMCOL acquired has two seams with an approximate 15 to 20 million tons of ore available to be processed.

**Properties of Hevi-Sand®**

- With exceptional low Silica content, the Chrome content is higher than traditional Chromite sand. Consistently low SiO2 (typical 0.6 %) and high Cr2O3 (typical 47%) will characterize the product as superior than anything else available on the market.
- Its density, compared to silica sand, provides the mould or core with a high rate of heat transfer, giving excellent chilling characteristics and eliminating the need for metal chills.
- Chipping, grinding and overall cleaning costs are significantly reduced through the reduction or elimination of burn on surface defects.
- Minimal binder requirements and excellent permeability reduce the possibility of scrap caused by gas problems.
- Resistance to penetration - high thermal stability and heat transfer when compared to silica sand makes it the preferred aggregate for large iron, steel, copper base and high alloy castings.
- Hevi-Sand® is successful in reducing or eliminating penetration, burn-on and veining in castings of this type.

**Additional Capex spending**

The additional Capex spending, of which construction was concluded in August this year, as well as the maturing of initial process controls, will now allow the facility to manufacture Hevi-Sand® foundry chrome sand up to 35 tons an hour and the annual targeted output of 150 000 tons.

The investment entailed upgrading and additions to both the wet plant and the dry plant, as well as the construction of new administration and stores buildings.

The wet plant has had four additional high-powered attrition type sand washing machines installed, which now takes the total number of attritioners to eight units.
Other equipment installed in the wet plant includes a second upstream classifier, as well as a dewatering screen.

In the dry plant five air-separating tables, a rotary drum blender, as well as additional dust extractors and screening units have been installed.

At the end of the line new weigh feeder equipment, designed to maintain a pre-determined flow rate of product and eliminate over and under supply of product when bagging, will ensure higher accuracy during dispatch and give the company traceability of product over any given time.

However the aim of the sizeable investment in equipment is to improve throughput and especially to improve quality. The new equipment will enable the company to liberate and remove more of the harmful silicates and other impurities thus lowering the silicate content, remove dust/fines, lower turbidity and stabilise grain sizing.

Administration and stores buildings

A large store building and office block with ablutions and laboratory was also built. The stores building was needed to enable stocking of product before shipping and to keep bagged product dry.

A fully equipped laboratory enables complete sand testing, chemistry analysis and certification. The laboratory function is sub contacted to the internationally renowned Stewart Group.

The result of the above Capex spend is that the company is now able to produce exceptional high quality chromite sand with low silicate (SiO2) levels consistently below 0.6 %, turbidity at a maximum of 300 JTU (Jackson tube units) and grain size (AFS sieve analysis) reliably to customer specification.

The plant can now produce a range of standard sieve analysis specifically to customer order, which are distinguished by different bag tag colours. These would range from coarse grained refractory grade AFS 25-35 (white tag), up to glass grade AFS +66 (grey tag). Foundries would predominantly order red tag (AFS 45-50) or yellow tag (AFS 40-45). The colour tags are attached to the one-ton bulk bags at the automatic weighing and bagging station.

For further details contact Volclay South Africa on TEL: 011 958 1667 or Arrie Schriek, who was appointed the technical sales representative for the South Africa region, on 082 798 5219 or email schriek@execnet.co.za or visit www.hevi-sand.com.
Foundrymen, industry suppliers, casting buyers and all other stakeholders in the domestic metal casting industry, will be looking forward to the forthcoming Metal Casting Conference (MCC), to be hosted from 13 – 16 March 2013 at the Kwa Maritane Bush Lodge in the North West province of South Africa. The MCC is a joint venture between the National Foundry Technology Network (NFTN), the South African Institute of Foundrymen (SAIF) and the University of Johannesburg Metal Casting Technology Station (UJ MCTS).

With high level international keynote speakers such as Dr Robert Dungan (Northwest Irrigation and Soils Research Laboratory, U.S. Department of Agriculture-Agricultural Research Service), Alfred Spada (Editor/Publisher of Modern Casting and Metal Casting Design & Purchasing magazines and AFS Director of Marketing, Communications and Public Relations), Brad Harris (Director of Quality at Bremen Castings) and Dr Horst Wolff (Institute for Foundry Technology - IFG, Düsseldorf/Germany), the event promises to provide a unique forum to share the latest international and national technological developments driving competitive advantage in the foundry industry.

The metal casting industry is a vital component of any developing or developed nation, helping to generate significant revenue and employ hundreds of thousands of people worldwide. In today’s economic climate, however, the number of foundries is on the decline and foundrymen are left with very few cost-saving strategies.

“Recent research by scientists around the globe has shown that foundry sands, for example, contain metal and organic concentrations similar to those found in native soils and pose no risk to human health and the environment. Where applicable, beneficial use of foundry by-products should be encouraged, as it can aid in the preservation of natural resources by decreasing demand for virgin materials, conserve energy and reduce greenhouse gas emissions through reduced mining activities, and decrease the economic and environmental burdens of disposal,” says Dr Dungan.

While all metalcasting nations are different in terms of their cultures, the bond as metalcasters is defined by the similarities that exist between all metalcasting industries. As the global economy tries to recover from the recession, each nation faces the obstacles of low-cost competition, an intense regulatory environment, and customers demanding quality increases and price decreases. The key is how to address these obstacles and continue to push the industries forward to profitability.

Foundries are energy intensive production units, where adaptation of best energy solution provides great energy saving potential. The “Foundrybench” project’s overall goal has been to foster energy efficiency and rational energy use in the metal casting sector. The German Institute of Foundry Technology IFG has been a partner in this project and Dr. Horst Wolff, IFG, will summarise the results of the project and describe measures for improving energy efficiency and reducing costs in foundries.

Alfred Spada’s presentation will examine the current state of the global metalcasting industry and assess its strengths, weaknesses, opportunities and threats. He regularly speaks to both metalcasters and casting buyers about the present and future of the global metalcasting industry, casting applications and casting design.

Brad Harris will be discussing the importance of continuous improvement in the metal casting industry along with applying the newest technological advances within the industry. Topics will include streamlining work-in-process and knowing exactly what each customer’s specifications are through software applications, grinding robotics, and advancements in machining applications.

Rand York Minerals, Xstrata Alloys, Foseco South Africa, Cerefco and Inductotherm are proud sponsors of the MCC 2013. Early bird conference registration is now open.

For further information please visit the website http://metalcastingconference.co.za
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lthough various steps of the metalcasting process have
grown more and more automated, the process of
cleaning castings in most cases remains labour
intensive. It is estimated that anywhere from 20-35% of the
manufacturing costs associated with an average casting can
be attributed to cleaning and/or finishing. Controlling
production costs and maintaining profit margins is a constant
effort, so many metalcasters are on the lookout for strategies
for reducing machining costs.

B.V. Products has been involved in the surface finishing
industry in South Africa for the past 15 years. The company
offers a wide range of products and services including
abrasive medias, shot blast and air blast and vibratory
finishing equipment, to clients nationwide.

“Improving surface finishes is what we are about,” said
Mark Maritz, one of three partners in the company that has
been in operation since 1997.

“Proper abrasive selection can have a dramatic effect on
the efficiency and productivity of any surface preparation
application. Desired finish, coating or contaminant being
removed, type of equipment used, work-piece material, and
ability to reuse the abrasive all have a significant impact on
abrasive selection.”

“Whether you’re in need of blasting abrasives, specialty
sodium bicarbonate, precision powders for lapping and
grinding, vibratory media and compounds, or bonded and
coated abrasives, surface preparation can help you sort it
all out.”

“Surface preparation offers a comprehensive range of
mass finishing media. Mass finishing media (also called
tumbling media) is available in numerous shapes, sizes
and configurations. Media can be ceramic, plastic, metallic
and even organic.”

Glass beads

“The company originally started importing glass beads
from the UK. Glass Beads are a round, non-ferrous abrasive
suitable for a wide range of applications in both pressure
and suction blasting equipment. Glass beads will produce a
cosmetically attractive matte finish and are an excellent
choice for carbon removal from automotive parts, finishing
aluminium, cleaning certain types of cast moulds, and many
other cleaning or surface finishing applications,” explained
Maritz.

Aluminium oxide

“Aluminium oxide (brown and white) was another product
we were importing and, like glass beads, still forms part of
our product portfolio.”

“Aluminium oxide is one of the most economical
processing medias for many dry and wet blasting applications
where anything from a coarse to a micro profile finish is
required. Its high density and sharp, angular structure makes
it one of fastest cutting abrasives. Typical applications include
surface preparation prior to plating, painting, enameling and
Teflon coating, descaling and deburring of aluminium and
alloy parts, mould cleaning, deflashing, surface profiling prior
to metal spraying, glass etching and added to paint to form
non slip coatings.”

“Industry users include aerospace/aviation,
automotive, foundries, dental and catering equipment
manufacturers.”

Steel and stainless steel shot and grit

“It did not take us long to venture into marketing steel
and stainless steel shot and grit locally. We set up a
distribution agreement with the Sigma and continue to
source product locally and internationally.”

“Shot typical applications include preparation of metal
surfaces prior to subsequent coating, removal of sand from
castings, descaling of steel strips, bars pipes, shot peening
and a host of other applications. Industry users include
foundries, automotive, aviation, shot/paint contractors,
pipeline manufacturers and steel fabricators for example.”
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- Over 130 units in operation worldwide
- Suitable for greensand back to core in conjunction with 2-stage mechanical scrubbing

Chromite Recovery
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- Greater than 98% purity

Secondary Attrition
- Ideal for Alkaline Phenolic and Silicate applications
- Typically 98% reclamation rate at the mixer
- Also suitable for Greensand back to core
“Grit applications are similar to shot, depending on the desired finish, and include preparation of metal surfaces prior to subsequent coating, surface profiling prior to rubber bonding and lining, removal of sand from castings, descaling of bars and strips. Industry users are very similar except that we can add ship builder and plant maintenance.”

“Stainless steel shot and grit is used in the same applications and industries as steel. However stainless steel shot and grit is more expensive and as a result it is only used where surface preparation and finish are considered for safety critical reasons such as in the aerospace and automotive industries or where an aesthetic finish is required.”

Cut wire
Another product that the company has marketed from the beginning is carbon steel cut wire. However, whereas we used to source locally and then internationally, because of quality and supply problems we now manufacture this product ourselves.”

“Cut wire is a popular alternative to cast steel abrasives due to its constant particle size, hardness and density. Available as “As Cut” or “Rounded” particles, applications include shot peening ferrous and non ferrous components and springs, deburring and polishing of non ferrous components and surface finishing critical surfaces. Industry users include automotive and spring manufacturers, automotive and aviation component manufacturers.”

“Other media that we supply includes silicon carbide, sodium bicarbonate and natural abrasives such as peach pips. These media all have their uses depending on the application and surface finish required.”

Shot blasting and surface preparation equipment
“Although supply of media makes up approximately 70% of our business, manufacturing and importing the equipment used in the applications and processes for shot blasting and surface preparation are very integral to the solutions we provide.”

“The range includes pressure and suction air blast tanks available in different capacities and configurations in standard sizes as well as manufactured to client requirements and specifications, batch type rotoblast machines and vibratory finishing equipment including bowl vibrators, tub vibrators, high speed centrifugal disc machines and cob driers.”

“Purpose built equipment is 100% locally manufactured and spares are available ex-stock with full technical back up and maintenance services offered.”

Acquisition of Comatra
Just over two years ago B.V. Products acquired the complimentary business Comatra, a business that had been in existence for 40 years supplying and manufacturing vibratory and mass finishing equipment and systems, abrasives and compounds, all products that are used extensively for mass finishing, deburring and polishing of various castings, pressings and machined parts.

Comatra represents Walther Trowal, a German manufacturer of standard and special machines as well as system solutions in the field of surface finishing technology and vibratory machines for deburring and surface finishing, Walther-Präzision, a specialist in the field of quick coupling systems, and Frech, the well-known manufacturer of hot and cold chamber die casting machines used by zinc, magnesium and aluminium die casters.

With 16 staff B.V. Products operates from their own 1200 m² factory in Boksburg, Gauteng.

For further information contact them on TEL: 011 826 4370 or visit www.bvproductssa.co.za
Cuperex technology makes copper breakthrough

Cuperex aims to boost copper beneficiation locally with its breakthrough in a patented hydrometallurgical technology.

Over the past six years the unlisted company has invested R50 million in the process that is able to produce high-grade copper from small, medium-sized or remote deposits.

Unlike the conventional smelting process, the potential of the project was its ability to extract copper concentrates with minimal electricity consumption, Cuperex said. The copper-making process was scalable, making it suitable for small or large copper plants.

“The hydrometallurgical process is essentially tank farming. The ease of construction substantially reduces lead times; a plant can be built and be operational in close to six months,” Cuperex chief executive Dave Lake said. “Our capital costs per ton are less than half of those for conventional smelters.”

Cuperex has secured rights to seek and mine the resource in the Northern Cape.

The company is working on a plant to produce 2 400 tons of copper a year near the old Spektakel mine near Springbok. The project was launched in November and is expected to create 50 jobs.

A second plant is planned for Concordia in the Northern Cape and will produce about 12 000 tons of copper a year.

Lake, a former investment banker, said the company had entered into a partnership with empowerment firm Matemeku through a vendor-funded transaction.

The Matemeku Group is a diversified equity investment group with interests in transport, financial services, tourism and industrial sectors.

Lake said he was positive about the copper industry, and a turnaround in the international financial market.

“There is a greater demand than supply of copper and at $8 000 (R67 208.6) a ton, we are comfortable at this level,” he said. China, accounted for 40 percent of refined copper demand last year. The country was expanding its infrastructure as the country urbanises its 1.3 billion population.

Lake said the project was exciting for the beneficiation of copper in South Africa.

He said international copper mining firms and refiners had shown interest in the technology. The company was raising money from the private sector and investors, including the Industrial Development Corporation.
The gap between artisan training and industry requirements remains a core area of disquiet for business, which believes that urgent measures are needed to foster greater integration between training colleges and workplaces to deal with the deficit.

This concern was again aired at the recent Accelerated Artisan Training Programme (AATP) Symposium, hosted by the Manufacturing, Engineering and Related Services Sector Education and Training Authority (Merseta).

The AATP was established five years ago to meet the growing demand for artisans in South Africa, with research showing that the country is in dire need of qualified artisans to replace the existing cadre, many of whom are approaching retirement age. The country’s New Growth Path goals stipulate that the artisan development system should have produced 90 759 new artisans by 2016.

Trade artisans are workers in a skilled trade that usually involves making, building or repairing things by hand, such as boilermakers, fitters, masons, builders, painters, jewellers, glassmakers, goldsmiths, mechanics, carpenters, plumbers, electricians, millwrights, chefs, panelbeaters, riggers, shipbuilders and toolmakers.

A report by the South African Oil and Gas Alliance (Saoga) states that, as technology advances, the gap will continue to increase unless new measures are put in place. Saoga, itself, is partnering with the Western Cape Department of Economic Development and Tourism, participating further education and training (FET) colleges and industry to launch skills development projects to bring college and industry together.

On a broader scale, Merseta is moving to establish new partnerships between FET colleges and industry in a bid not only to narrow the skills gap but also to ensure that training remains relevant to the needs on the factory floor.

The role of FET colleges in these partnerships is to align themselves with industry requirements, offer improved career guidance to students, keep lecturers informed about industry advances and create more realistic expectations of the job market among students, as new graduates often demand the salary of an experienced artisan.

Colleges have been requested to allow industry to secure a seat on college boards, which will allow industry to be more involved in the training material used at colleges. This will contribute to artisans being work-ready when they finish their training.

Companies are urged to offer training to college lecturers and work through the curriculum and amend it where necessary.

Employed and experienced artisans could also be released to participate in mentorship at colleges. It has also been suggested that companies host students on tours of their plants so that they can get a better understanding of the job requirements and risks.

Participants in the discussion recommended that sector education and training authorities (Setas) help shorten the turnaround time of training by means of a fund to help students that have not completed matric gain work readiness and build an understanding of the minimum requirements for internship and apprenticeship programmes.

The effectiveness of this emerging college-industry partnership will be measured by the number of graduates being absorbed by industry and an assessment of the costs and investments of the training programmes.

Swiss South African Cooperation Initiative (SSACI) CEO Ken Duncan suggested that an ideal artisan training programme entails a week of work where the days are divided between college and in-service training. In this way, problems at the college can be quickly identified and rectified to make the curriculum employer and market driven.

Collaboration piloted

SSACI, in association with Merseta and the Joint Education Trust, implemented a six-month pilot internship programme to provide National Certificate Vocational (NCV) engineering graduates with access to the world of work through relevant, structured and appropriate workplace learning and to demonstrate an alternative pathway to the workplace for these graduates through the successful implementation of this internship programme.

The outcomes of the pilot programme were that interns felt that their internship was well managed and adequately supervised and they had access to the necessary resources.

Companies involved with the colleges prior to the pilot programme said it strengthened their partnership and allowed for links to be explored beyond the pilot programme.

Duncan concluded that the companies confirmed that the pilot programme improved, specifically, the technical skills and knowledge of the NCV engineering students.

The benefits of such pilot programmes for apprentices include the close integration of theory and practice, the immediate reinforcement of learning, real working conditions at all times, fewer gaps between colleges and companies in terms of technology, practice and ethos, as well as an early sense of responsibility and productive value.

The advantages for colleges include the promotion of a closer alignment of the curriculum with industry needs and regular interaction between colleges and companies, which often leads to income-generating contracts. It will also foster skills development among college staff and provide higher pass and employment rates.

“Colleges can offer training to lecturers, but companies must be dedicated to put in the work in the college-industry partnerships,” he says.

Lecturers’ competence also needed to be assessed, said the University of Bremen’s Professor Felix Rauner, who presented the findings of the Comet Competence Model deployed in Germany.

The model is a method of measuring the teaching competence of vocational education and training (VET) teachers by evaluating functional (subject knowledge and methods), procedural (the ability to organise training efficiency and sustainability) and holistic shaping competence (creativity, sociocultural integration and social compatibility with students).

The model made it possible to identify the strengths and weaknesses of VET teachers’ competence. Valid and reliable data was a precondition to develop a strategy for reform, said Rauner.

“The most influential determinants for successful vocational learning are VET teachers and trainers,” he argued.

Through the AATP programme, Merseta is focusing on...
pacing and structuring the development of competent apprentices over two to three years.

Apprentices entering the programme have higher entry qualifications than those of the standard four-year apprenticeship and the structure of exposure to the curriculum is highly regulated and monitored. To participate in the AATP programme, employers must have an apprentice intake of ten or more candidates and enough qualified artisans to mentor them.

A survey was done in July and August, in which Merseta sampled 500 artisan graduates. Its findings show that the number of students who pass their trade test on their first attempt and who finish their apprenticeship within the specified time is increasing.

The most common reason for not passing the test on the first attempt is that students were not adequately prepared, followed by 42% of the training providers blaming employers and 6% of employers blaming training providers, which is a significant motivation for the call to implement college-industry partnerships.

A total of 15% of the 500 artisan graduates surveyed remained unemployed.

Based on the findings, it was recommended that Merseta play a more active role in facilitating the finding of employment for graduates – for example, creating a database of its artisans so that companies that need qualified artisans can do a search.

The survey also indicates that most artisans and employers still regard the duration of the programme – 24 months – as a crash course and there is evidence of a stigma attached to the word ‘accelerated’. It is recommended that Merseta rebrand the AATP with a name that reflects the programme’s qualification requirements and monitor the structure where compulsory theory and training are concerned.

Other recommendations are that Merseta include an entrepreneurship and business skills component in the curriculum for trades, which will help artisans start their own businesses and thereby create much-needed employment for others.

It is also felt that the inclusion of small businesses in the training, development and employment of artisans should be a priority.

Most such enterprises do not have the capacity to cope with the rigours of the AATP and do not always employ training specialists, but they can benefit from the training grants and from employing qualified artisans.

Therefore, a collective method should be developed for small businesses in similar sectors operating in close proximity, where the management and administration of the training are handled externally, possibly by a Merseta employee or a regional office, and where an external provider can handle some of the training.

A key demand outcome, though, is that Merseta facilitate college-industry partnerships to improve the work readiness of graduates and the quality of their training, and assist them in finding employment or in starting businesses and creating more jobs.

“It is up to industry to ensure artisans are trained accordingly by partnering with colleges. Employers should have the final say in the training material because they are the end-users of the artisans,” Merseta CEO Raymond Patel concluded.
What’s the attraction?
Researchers claim success with magnetic moulding

Nine EU companies have demonstrated the effectiveness of using steel shot, in place of sand or polystyrene, to form metalcasting moulds.

Four European foundries have been part of a research team that recently completed a project to prove the effectiveness of producing castings in moulds formed of magnetic material — specifically, steel shot — rather than sand or polystyrene. The "Magnet" research project was coordinated by Fundacion Inasmet, a Spanish research center, and included four different types of foundries: ferrous (Fundiciones del Estanda) and nonferrous (W.H. Rowe & Son Ltd.) sand casting, lost foam casting (GussStahl Lienen Gmbh), and investment casting (Krolmet). Also included was a company that develops magnetic instruments, a foam pattern supplier, and an OEM buyer of castings.

In order to advance the magnetic moulding concept toward industrial use, the research was divided into segments that were assigned to different partners. Five cast parts currently produced by other moulding processes were selected for the development. A pilot magnetic moulding plant was set up, and process equipment was identified — magnetic devices, vibration and casting units, and ancillary equipment for optimisation of the process and production of samples. The design of the magnetic field was determined according to different geometrical and magnetic considerations.

Next, process optimisation was conducted at Inasmet using an electromagnet, vibrating table, induction furnace, and casting box as the pilot-scale equipment. The effect of the magnetic field on the castings’ microstructure was studied, and sample properties produced with ferrous and nonferrous alloys were measured and compared to the properties of samples obtained with the standard casting processes. Different aspects of the new process were optimised, specifically the compaction of steel shot and the casting parameters. Samples were produced for preliminary metallurgical and mechanical characterisation.

Demonstrator parts analysed
Each of the five demonstrator parts cast in the project were analysed with Magmasoft software to understand the solidification behavior of the different metals to be cast, and to suggest the best filling and feeding systems design. All five of the test castings were produced successfully at the participating foundries, according to their standard methods and using the magnetic moulding process. The finished castings were tested and evaluated, with each participant taking a different assignment.

All the project results were positive, according to the published results, and the advantages of the magnetic moulding were confirmed. Two results were called "especially relevant": the magnetic field applied during the casting and solidification established greater mould cohesion; and additional rigidity provided to the steel shot mould by the magnetic field provided greater flexibility in the selection and placement of feeding and filling systems, orientation of the casting, and thickness of the components.

Also, the results indicated that all the castings produced with magnetic moulding showed microstructures with smaller grain sizes than those from the corresponding traditional foundry processes. The ability of the steel shot to dissipate heat showed a direct link to the size of the grains and the increase in ductility and yield stress.

The results confirmed that magnetic moulding is an economically and technically valid alternative lost foam casting for producing complex shapes, with improved performance. The researchers indicated success with numerous alloys, including aluminium, bronze, gray iron, and steel.

The finished parts showed improved mechanical properties, and production cycle times were reduced – which may enhance the competitiveness and expand the range of products for foundries using the process.

Among the technical results concluded by the researchers was that applying magnetic moulding would improve the mechanical properties of both ferrous and nonferrous castings produced by the lost foam casting, mainly because of the fine microstructures that result from the reduced grain size of the alloys.

Another conclusion is that the magnetic fields chosen for the pilot project apparently do not influence the microstructure of the materials. Intensities up to 6-7 Teslas were tested with no relevant effect on the microstructure.

The magnetic fields proved to be a positive influence on the dimensional tolerances of gray iron castings. They make it possible to apply different metal flow orientations, and increase lost-foam process flexibility in terms of feeding and filling design.

The magnetic moulding process is an environmentally friendly approach, because steel shot can be reused and/or recycled, and the magnetic field has no apparent effect on the health of workers.

A shorter cycle time compared to traditional lost foam processes may make the foundries using magnetic moulding more competitive, researchers predicted. Investments needed to implement the technology are low, and no significant change is required to the facilities or equipment already in use by lost foam foundries.
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Following investments of some EUR 36 million in a 13-month building project, GF Automotive's largest iron foundry in Mettmann, Germany, now boasts one of the world's most modern manufacturing facilities. The plant's efficient and resource-sparing production is instrumental in meeting the steadily growing demand for light metal parts in the automotive industry.

The new production line – known as Aeration Moulding Robotpouring or AMR – caters to the trend towards light weight construction and is unique in this form. The new plant has a capacity of up to 60,000 tons of nodular cast iron – total production capacity in Mettmann is around 200,000 tons – and can manufacture cast parts that are exceptionally fine-featured and thus light weight.

Yves Serra, CEO of Georg Fischer, says: “The new, highly automated and very much eco-friendly manufacturing line yet again substantially boosts product quality and replaces two older facilities, thus decisively enhancing our competitiveness.”

With more than 20 robots doing the heavy work, the high level of automation relieves employees of the workload strain. The new production facility is also a benchmark in terms of energy efficiency. The built-in heat recovery system uses waste heat to warm up the production building, while state-of-the-art electro motors reduce energy consumption by more than 40 percent.

At the Mettmann plant, GF Automotive manufactures chassis parts, rear axle housings and crankshafts for passenger and commercial vehicles. Light weight components from GF Automotive are used in the new Audi A3 or the VW Golf. They help save more than 25 percent in weight compared to conventional ones.

The contractor and equipment suppliers for the improvement project were not reported. Earlier this year, ABP Induction noted it had installed a new, 90-metric ton channel furnace and 1,200-MW power supply at Mettmann.

The Mettmann foundry was established over 100 years ago. The new Aeration Molding Robotpouring (AMR) production line addresses automotive customers’ demand for lighter parts, according to GF Automotive.

“The new, highly automated and very much eco-friendly manufacturing line yet again substantially boosts product quality and replaces two older facilities, thus decisively enhancing our competitiveness,” stated Yves Serra, CEO of Georg Fischer AG.
For over 10 years we have been supplying the South African molten metal industry with a range of Ferro alloys, cored wire, aluminium alloying additions, ceramic castings and filters, minor and special metals and minerals.

These include master alloys and alloys, fluxes, coatings, insulation materials (boards, blankets, wool, cloth, bricks and other textiles), filters, inoculants and nodulisers, hollowware, tin, mercury, linings, ceramic pre-cast shapes, crucibles, slide gate systems, filtration and degasser systems, furnaces, core shooting machines, moulding plants and systems, metal treatment and automation systems.

Our international affiliation includes:

- ICP (Industrial Ceramic Products): ceramic gating components
- Selecte Corporation: filters for metal filtration
- HOESCH: grain refiners, master alloy’s
- Schaefer: non-ferrous die coats, fluxes
- Striko: aluminium furnaces
- Foundry Automation: core shooting machines
- IMF: turnkey moulding plants and systems
- Mammut: crucibles
- Progella: molten metal treatment and automation systems for grey and ductile iron foundries
- Kennecott: FeMo
- Elkem: inoculants and nodulisers
- Ceralcast: local ceramic production facility
- CEDIE: cored wire
- PATH: refractory materials
Lighter, stronger, and more resilient is what magnesium promises, and the car industry in particular is eager to take advantage of the metal’s properties. As governments worldwide implement increasingly stringent emissions targets, demand for more energy-efficient vehicles will only increase, and with it demand for magnesium is expected to surge.

General Motors is certainly betting that magnesium will be the material of choice for its future cars. In October, its China Advanced Technical Center reported that it had completed the initial low-pressure casting of a magnesium part, which GM described as a “milestone in lightweight automotive materials research.” The prototype magnesium alloy control arm is 30 percent lighter than its aluminium counterpart; lighter parts for vehicle chassis systems may lead to a 7 percent improvement in fuel economy for every 330 pound reduction in weight, GM said.

“The successful production of a part made from magnesium alloy is an important breakthrough for the ATC in lightweight automotive materials research. Satisfying the demands of our customers through new technological achievements is significant for GM’s ongoing growth in China and the Chinese automotive industry,” said John Du, director of GM’s China Science Lab.

The center has been operating since last September, and focuses on developing lightweight materials and battery cells that bolster the efficiency of electric and other advanced vehicles. The lab’s next phase is slated to open later this year, and will eventually house three additional technical and design units in addition to the China Science Lab, namely the Vehicle Engineering Lab, the Advanced Powertrain Engineering Lab, and the Advanced Design Center.

While China dominates the world’s magnesium market, excitement about the metal is particularly high in Europe as it is seen as a way to address the challenge of slashing greenhouse gas emissions. The European Union has mandated that carbon dioxide emissions be reduced to 130 grams per kilometer by 2015 for new cars, down from the average emissions rate of 140.3 grams per kilometer in 2010. Earlier this year, the European Environment Agency (EEA) found that all manufacturers must make considerable progress in meeting the necessary targets, especially as it will be imposing fines known as excess emissions premiums that will be calculated on a progressive scale for each additional gram of carbon dioxide above the target multiplied by the number of cars sold.

Toyota has not only complied with its 2012 target, but is also only one gram per kilometer short of meeting the 2015 target. Other manufacturers, including Daimler and Nissan, will need to reduce average emissions by over 14 grams of carbon dioxide per kilometer over the next five years, the EEA stated.

“There are some exciting ways to use magnesium … but what will drive the market is cars and energy efficiency. It dominated the conversation at the International Magnesium Association’s annual meeting,” said one industry analyst who participated in the conference in October in San Francisco. “By volume and by sheer need, that’s where demand for magnesium is coming from.”

To be sure, there has been no shortage of opportunities for magnesium producers to promote the metal as a key part of the solution to greater energy efficiency. At the Global Automotive Lightweight Materials conference in London in April, for instance, car manufacturers worldwide gathered to discuss the challenges of designing and manufacturing commercially-viable lightweight vehicles that also maintain structural performance. Organizers noted, however, that “significant cost barriers remain across the advanced lightweight materials cycle … clearly tackling these costs will be key to mass market application.”

Manufacturers will be gathering again in Detroit in August to exchange views on fuel economy challenges, and magnesium is expected to come under the spotlight once more.

As such, despite the lackluster performance of the magnesium market in recent months, it is unsurprising that South Korea’s POSCO will begin commercial production of magnesium plate for cars by March 2013 to supply manufacturers including Hyundai Motor and Renault Samsung Motors.
The Bühler Technology Group has announced the acquisition of the Revisions and Retrofits business of the Italian company Brescia Presse S.r.l. This opens up additional business opportunities to the company in the form of reconditioning and retrofitting die casting machines and systems.

**International reputation**
Brescia Presse S.r.l., with which the Bühler Die Casting business unit has collaborated closely since 2005, is headquartered in the northern Italian city of Brescia. The company enjoys an outstanding reputation far beyond Italy for its high quality in reconditioning die casting machines. Brescia Presse S.r.l. has some 30 employees and generates annual sales (turnover) of about EUR 3.5 million. All employees of the Business Unit will be retained by Bühler. The company will be headed by the existing managing director, and the senior positions will be occupied by the team that has existed up to now.

**Competent and complete support from a single source**
With this acquisition, Uzwil-based Bühler Group is adding the reconditioning of die casting machines and systems to its range of services. The emphasis will be on overhauling Bühler die casting machines of all types and sizes, without however excluding non-Bühler machines. Geographically speaking, the focus will be on Europe. The benefit for customers is that they now have one single source offering complete and competent support in every respect.
The world's most advanced continuous casting line, the CC7 line located at Voestalpine Stahl in Linz, has exceeded all expectations by breaking the 1 million ton record.

Soon after the line was put into operation it was clear that it would succeed beyond all hopes. Even the quality of the first melt was good enough for the market. After four weeks, the line went into full operation on four shifts. And the 1 million ton record was reached in just 11 months of operation. To give you an idea of how much this is, consider the following: Within one year so many slabs were produced that if they were lined up one after the other, they would form a 'slab bridge' from Vienna to Munich.

The optimized secondary cooling ensures excellent surface properties, even on very wide slabs. This is the first time industrial robots have been used on the casting platform. The result is improved process quality and safer working conditions. Slabs can be cast in thicknesses of 355 mm and widths of up to 2,200 mm. The production portfolio now includes heavy plates weighing up to 20 tons. Such plates are mainly used in off-shore applications.

Morgan Molten Metal Systems (MMMS), a leading designer and producer of crucibles for the non-ferrous metals industry, has signed an exclusive license agreement to have Molten Metal Products Limited (MMPL) manufacture MorganMMS furnaces. With the exception of South America and India, the new furnaces, designed by MorganMMS, will be marketed globally by both companies.

Under the agreement, MMPL is authorized to manufacture and sell the furnaces in accordance with the unique specifications, technical knowledge and quality standards provided by MorganMMS. MorganMMS has a separate private license agreement in India, and manufactures its own furnaces in Brazil for the South American market.

With a strict focus on furnace production, Molten Metal Products was established by former employees of MorganMMS after MMMS closed its Norton, Worcester manufacturing plant in the United Kingdom. According to terms of the agreement, the sales and customer service staff of MorganMMS will continue to identify global opportunities in an effort to help promote increased MMP sales of the MorganMMS-designed furnaces.
Foseco, manufacturers of a variety of metalcasting consumables, reported it recently completed “a major expansion” of production capacity for the Stelex PrO brand of carbon-bonded filters at its plant in Tamworth, England.

Carl Woolley, operations manager at the Tamworth operation, noted that the 18-month project completed earlier this year effectively doubled production capacity there.

“This highly efficient kilning process uses dramatically less energy, resulting in reduced greenhouse gas production,” Woolley said. “Product quality and consistency are also improved.”

Part of the Vesuvius family of companies, Foseco specialises in flow control and refractory products for foundry melting and metal transfer. It indicated the expansion was prompted by a rising demand for Stelex PrO filters over recent years.

“The increased demand for high-strength, low-thermal mass filters is due to rapid growth in the high-integrity, large spheroidal graphite iron market, such as hubs for wind turbines and a growing requirement for the benefits of filters in inclusion removal and turbulence reduction in steel casting applications,” explained Nick Child, International Product Manager.

Stelex PrO carbon-bonded filters have a patented design optimized to improve metal flow. “The ease and consistency of priming reduces the need for super heat, lowering the risk of temperature-related defects,” according to Foseco. It added that the filters’ structure removes inclusions from the melt and reduces the turbulent metal flow that can induce oxidation defects.
The new S1 Titan from Bruker

Bruker introduces the S1 Titan, an advanced handheld XRF analyser for metals alloy verification, recycling and scrap sorting.

The S1 Titan is among the lightest (1.44 kg including battery) tube-based handheld XRF analysers on the market today. The innovative S1 Titan features an integrated touch-screen color display, an up to 50 kV X-ray tube, Bruker's proprietary, high-speed XFlash(R) SDD detector with high energy resolution and light-element capabilities, and an ergonomic, yet tough housing that is sealed against humid and dusty environments.

The S1 Titan is available in three models:
The S1 Titan LE, S1 Titan SE and S1 Titan SP. The S1 Titan LE uses a thin film window for analysis of up to 37 elements, including light elements such as Mg, Al and Si, without the need for a vacuum or helium gas flush. The S1 Titan SE is perfect for analyzing standard alloys, as well as high temperature samples up to 500°C. The S1 Titan SP is a value analyzer with a traditional SiPIN detector. With its aluminized Kapton(R) window, the S1 Titan SP is able to measure in-process samples at temperatures up to 500 C.

The S1 Titan's patent pending SharpBeam(R) technology optimizes the detector and tube geometry. The optimized geometry has many user benefits, including improved measurement precision, reduced power requirements and increased battery life.

The new S1 Titan covers a wide range of applications and materials. Whether it's in aerospace or automotive applications, in metals processing or fabrication, in electronics manufacturing, in a refinery, in a power plant, in mining, in recycling and scrap sorting, in consumer products testing or in field environmental analysis, or in the testing laboratory - the S1 Titan will quickly and accurately identify the elemental composition or identify the alloys of your sample or parts to be tested. The S1 Titan is capable of analyzing a vast list of materials, including industrial metals, exotic aerospace alloys, e-scrap, drill core, soil, consumer goods, and more.

In addition, the new S1 Titan is available configured specifically to analyze precious metals. Given the current price of gold, the interest in trading gold is at a record high. Handheld XRF is a very quick and easy way to measure the value of the gold jewellery which is being sold or purchased.

Positive material identification (PMI)
The S1 Titan - for your PMI and QA/QC programs in the refinery, or other industries requiring high temperature and high pressure, equipment safety is routinely ensured by verification of the alloy type required for a particular purpose. More than 75% of refinery incidents are caused by having the wrong metal in service. By maintaining a strong PMI programme – based on API 578 or internal procedures – it is possible to virtually eliminate these failures.

in a machine shop, the identification of an alloy may be lost as the metal moves through the shop. Using the portable alloy analyzer allows immediate identification of the alloy and ensures that a part is the proper material prior to investing a large amount of machining time and prior to shipment to your customer.

More than 75% of refinery incidents are caused by having the wrong metal in service. By maintaining a strong PMI programme – based on API 578 or internal procedures – it is possible to virtually eliminate these failures

Handheld XRF alloy analyser
- Extremely lightweight: 1.44kg including battery
- Available with Silicon Drift Detector (SDD) or SiPIN detector
- Measure light elements Mg, Al, Si, P, S (S1 Titan only)
- SharpBeam optimised tube geometry for more precise analysis
- Provides grade ID and complete chemistry
- 50 kV X-ray tube

For more information, contact your nearest IMP branch:
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Western Cape TEL: 021 852 6133,
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Boilers can be found in nearly all areas of industry as steam generation is common in power stations, refineries, chemical manufacturing, and food processing plants. There are primarily two types of steam boilers: water-tube and fire-tube.

In both, water must be maintained at a specific level according to the boiler design as a certain height is needed above the working level to provide a sufficient area to release the steam. Additionally, as steam is generated the water in the boiler evaporates, and the boiler must receive a supply of water to maintain the level. If the boiler operates with insufficient water, severe damage could occur and there is ultimately the risk of explosion. Level control in boilers must be given special attention due to the safety requirements and extreme process conditions.

Depending on the type of boiler used, the process conditions can be as high as 300°C and 1,450 PSI and in the case of super-heated steam it can be even higher. The high temperatures and pressures create a physics problem — we see the density of the water changing as the temperature increases. This causes measurement errors when we look at traditional displacers, float gauges or differential pressure transmitters. The measured value is always lower than the real process value causing safety risks.

In the case of traditional guided radar instruments we also see a measurement error. The error is created by the increasing dielectric of the steam phase. As the temperature and pressures increase in a boiler the dielectric increases as well. The microwaves that travel through the gas phase are slowed down as the dielectric increases.

Utilising guided radar with gas-phase compensation is a way to overcome the changing density and the changing dielectric of the steam phase. Gas-phase compensation works by utilizing a reference length on the guided-radar rod. The reflection distance from this reference length varies directly with the dielectric change, and the measurement point can be continually updated to the highest level of accuracy.

Endress+Hauser recommends using gas-phase compensation if the pressure in the steam boiler is at, or greater than, 300 psi. FMP54 has CRN for both ANSI B31.1 and ANSI B31.3 making it suitable for process piping and power boilers. It is available with gas-phase compensation and can be installed on boilers up to 450°C and 5,800 PSI. There is a secondary redundant gas-tight feed-through, and the internal design of the process connection uses a ceramic-graphite seal. This ensures long-term reliability and safety in high-pressure steam applications.

For further details contact Jan Gerritsen of Endress+Hauser on TEL: 011 262 8000.
Elkem’s Lamet® nodulariser ladle grades

It has been well known since the early 1980’s that lanthanum has a beneficial effect on shrinkage characteristics when used as a part of an inmould alloy. However, until Elkem began to produce lanthanum containing ladle grade nodularisers, the advantages of this technology have not been exploited by the industry.

Lamet® nodulariser, the trade name for Elkem’s range of lanthanum containing nodularisers, is a 50% Si based ferroalloy with defined levels of Mg, La, Ca and Al. Produced to tightly controlled, narrow specifications, to give more consistent recovery of the active elements than other available materials. This means that the addition rate of Lamet® nodulariser can be minimised whilst still ensuring a good, well treated iron.

Lamet® nodulariser is produced at the Elkem Bjølvefossen plant in Norway and the Elkem Chicoutimi plant in Canada, which are specialised in the production of MgFeSi alloys. Both Elkem plants have ISO 9001 and ISO 14001 accreditations. This emphasis on quality ensures that Lamet® nodulariser is made with a uniform chemistry and grain size thus giving consistency in performance.

The use of special production methods ensures that the product is very low in residual oxide contents and tramp elements that may be harmful to ductile iron production. The production method also incorporates a rapid cooling technique that gives a minimum of chemical segregation during solidification. Thus the product is homogenous with low fines content and uniformly distributed active elements.

Lamet® nodulariser, may be produced in a variety of compositions and sizes to suit the foundry’s requirements. One commonly used formulation for ladle applications is Lamet® 5836 nodulariser.

Most commercially available MgFeSi alloys contain rare earth elements in the form commonly known as misch metal, which contains about 65% cerium and 35% lanthanum. It has been known for some time that the use of cerium to replace misch metal in the MgFeSi alloy holds many benefits in the production of thin section ductile iron castings and the Elkem Remag® nodulariser contains balanced amounts of magnesium, cerium and calcium to give excellent casting properties.

Other rare earth elements have also been well established as having benefits in specialist applications. Elkem Lamet® inmould nodulariser has a world wide reputation for well controlled sizing and chemistry, thus leading to more consistent casting production. Reference should be made to the product brochure “Lamet® nodulariser in the mould”.

Using lanthanum as the only rare earth element in the MgFeSi has a great benefit when used in ladle or flowthrough applications and this is the control of shrinkage.

All ductile iron foundries suffer from shrinkage or microporosity problems in one form or another. In some cases, this is controlled by over risering of castings, thus increasing the cost and reducing the casting yield, in other cases some microporosity is accepted.

Some common causes of shrinkage in ductile iron include inadequate mould strength, insufficient gating and/or feeding, too low carbon equivalent, excess residual magnesium, insufficient inoculation and too long time between inoculation and pouring.

For further details contact Ceramic & Alloy Specialists on TEL: 011 894 3039
Morgan Thermal Ceramics is producing fired refractory shapes, including pressed crucibles, tundishes, launders, and nozzles. Users will benefit from the manufacturers’ technology, which ensures consistency among products and continuous product improvement. Morgan’s engineering experts provide design consultation, engineered drawings and address product performance questions.

Among the products offered are Cerox® fired refractory shapes and MRI™ pressed pre-fired refractory shapes, manufactured at facilities in Cañon City, CO, Augusta, GA, and Bromborough, England. The materials are available in a range of compositions, including many used specifically for manufacturing rotating and non-rotating airplane components and automotive turbochargers.

Cerox fired refractory shapes are dense, hard, and chemically stable, offering resistance to acids, slags, and gases. The Sillimanite Cerox 200 (74% alumina, fired mullite composition), Cerox 700 (high alumina, versatile shape capability), and Cerox 720 (high alumina, high strength, fine grain for thin-wall shapes), are ideal for metal producing. Combined with precisely controlled firing and 100% product inspection, these high-quality components are ideal for the most arduous of high-temperature environments.

MRI™ pressed pre-fired refractory shapes, used in a variety of alloy melt-pour systems, meet tight tolerance specifications required by users. Precisely sized dies and detailed product inspection provide the user with a high-quality, dimensionally accurate refractory shape. A variety of compositions are available, including MRI 90V, a versatile 90% alumina mix commonly used for crucibles and furnace spouts in metal producing, and the MRI 95C, a 95% alumina, cement-bonded composition that offers a thermal shock resistant mix for tundishes, providing a superior surface finish and low-silica content.

For more information contact Morgan Thermal Ceramics South Africa on TEL: 011 815 6820
AGMA GmbH has released the latest update to its casting process simulation software, Magma5, noting that v.5.2 delivers “significant new and improved functionality.” Over 160 improvements are included with this release, which was developed with an emphasis on increasing the efficiency for evaluating simulation results.

The developer’s product and service portfolio includes the Magmasoft modular simulation software (for which Magma5 is the latest version) as well as engineering services for casting design and optimisation. Magma5 5.2 allows the direct comparison of up to four different project versions in the result perspective. Filling, solidification and stress results can be animated in a synchronised mode.

A noteworthy highlight of the new release is the option to display the geometry and all Magma5 results in 3D stereo, using shutter or red/cyan 3D glasses and to store them as 3D images or movies. Various new tools make it possible to standardise results evaluation.

New result criteria allow for a more effective evaluation of metal cooling and critical metal speeds during filling. The progress of feeding and porosity formation can be monitored and displayed continuously during the entire solidification process. A new criterion to predict cold cracks allows the user to find stress-related casting quality problems more quickly.

The implementation of user results offers a powerful tool for compiling user-specific criteria based on any Magma5 results. User results can easily be defined and created automatically during a simulation or subsequently in the result perspective.

Diecasters will appreciate an improved visualization of the process timeline and extended consideration of the heat-transfer conditions between the die and the diecasting, as a function of the local feeding conditions. Also, the Magmahpdc module now supports assessments of the real casting temperature as a function of the current shot sleeve conditions.

All users will benefit from the new “resume point” capability, which allows flexibility in re-starting the simulation with modified die casting process conditions, based on the previous or next-to-last casting cycle. Sand casting processes can be resumed with different conditions at the end of any process stage. The automatic enmeshment of complex geometries is now further simplified by new enmeshment criteria and procedures.

Stress simulation results can be prepared for faster post-processing. For the quantitative assessment of casting distortion in the measurement perspective, it is now possible to compare the virtual measurement with the real part geometry.

Finally, Magma5 5.2 makes available a new database of riser sleeves, generated by ASK Chemicals.

For further details contact Ametex on TEL: 011 914 2540.
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In today’s world where more and more pressure is being put on companies to adhere to green environment principles, the disposal of metallic waste materials is becoming a liability. Don’t let it!

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Efficient procedures, high-tech equipment and specific expert know-how form ASK Chemicals CoreTech’s successful basis for producing casting cores and packages designed for specific customers. The company’s product portfolio ranges from prototypes right up to economically and ecologically produced small and large core series. The products are manufactured in ultra-modern core-moulding plants.

The process is what it is all about – many components require intelligent approaches and specific solutions in the mould geometry. For this reason, the casting core specialist, ASK Chemicals CoreTech, always has the entire process under control. With their competent consultancy, development and performance of tests right up to the manufacturing of prototypes and professional production of small and large series, the company’s specialists create solutions for their customers that are not only technologically sophisticated but also economically attractive.

Production takes place in an ultra-modern core-moulding plant. The company invested in a powerful mixing system for the cold box procedure here. This system can process four cold box systems with seven types of sand and three additives simultaneously. This makes it easy to produce customer-specific mixtures flexibly and without long changeover times – even with special sands or special additives.

In addition, twenty hot-box core machines with a volume of up to 120 l perform series production and prototype development in the cold box, hot box, croning and inorganic process. Cores of up to 300 kg can be dried in the batch and continuous-type furnaces that are available.

The necessary dimensional accuracy and consistent quality is guaranteed by high-quality tools, even when the emphasis is placed on cost-effective production.

Increased competition and rising labour costs require absolute cost discipline.

“In keeping with this, the standard we set ourselves is based on quality and productivity,” says Jörg Knechten, Managing Director of ASK Chemicals CoreTech.

“In this regard, we have often succeeded in reducing our customers’ manufacturing costs by up to 20%,” he continues.

For further details contact Applied Solutions on TEL: 011 922 1600
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The heat-resistant furnace lining of melting and dosing furnaces makes a significant contribution to their efficiency and product lifetime. Thanks to a sophisticated relining concept in OEM quality, the StrikoWestofen Group (Gummersbach, Germany) frequently achieves characteristic values comparable with those of the latest generations of furnaces. “Work done incorrectly shortens the service life of the equipment, reduces the melting capacity and increases the energy consumption by up to 30 percent,” explains Holger Stephan, manager of the “Service und Spare Parts” department at StrikoWestofen. “Furthermore, additional cost-intensive and time-consuming work is often necessary – like operating dosing furnaces with porous plugs.”

Refractory linings of melting and dosing furnaces are high-tech nowadays. The materials, including six different types of refractory and insulating materials, as well as the entire interior furnace geometry are precisely engineered and constantly optimized.

**StrikoMelter**

In the context of the relining of melting systems, StrikoWestofen offers a complete engineering service which achieves optimum results. In a first step, the service technicians record the current performance and energy consumption of the furnace under real foundry conditions. On the basis of this assessment, StrikoWestofen compiles a forecast of the values to be expected after the complete renewal of the lining. “The use of state-of-the-art materials and the latest engineering results often allow us to achieve values comparable with those of up-to-date models – at only 20 percent of the purchase price,” Holger Stephan explains. “On the premises of our customer Skoda Auto a. s. in the Czech Republic, we were able to reduce the gas consumption per ton of molten material by 40 percent from 102 to 61.2 cubic meters by relining the furnace and training employees in a targeted way. In terms of the annual melting performance at the Mladá Boleslav location, the costs for lining a total of four melting furnaces are rapidly recouped after only ten months,” Stephan explains. Relining is not just maintenance – it is a permanent improvement of the original system as well. Once relining has finished, StrikoWestofen validates the forecast values in a field test conducted on the customer premises, thus guaranteeing optimum results.

Don’t save in the wrong place

Service lives of ten years and more are not unusual for furnace linings from StrikoWestofen. This durability is based on the exact planning of the materials used as well as angles and gradients inside the furnace. Areas undergoing particular stress are therefore lined with especially resistant refractory material and the angle of flow is optimized in order to minimize the load on the materials. However, even the most well-planned lining must be replaced at some time. Small repairs are made in situ by trained service personnel.

**Westomat dosing furnaces**

If it becomes necessary to completely reline the dosing furnaces, it is not a good idea to do so on
the customer premises, although this is in fact common practice. The problem is that all of the subsequent steps have to be taken on the customer premises as well. In particular, however, the correct drying of the fireproof lining is of crucial importance for reliable operation. If drying takes place at the foundry, it can only be done via the heating rods built into the furnace. This puts a heavy load on the heating rods and the customer has to bear the costs for the necessary electricity. In addition, foundry operation is permanently disturbed for several days. “For this reason, we are offering a totally different concept. The furnace bodies are removed and taken to our factory, where they are completely revised,” Stephan explains.

### Relining in the factory

In the factory, the body of the furnace is tested for pressure tightness and the lining is renewed. The refractory material is dried in a drying chamber specially designed for the purpose. The advantage of this is that no strain is put on the heating rods. Also, the stay in the chamber guarantees that the refractory dries completely with no residual humidity. The humidity could otherwise precipitate in the melt in the form of hydrogen, contaminate it and, in the worst case, even cause a hydrogen explosion. Costly and time-consuming initial operations with porous plugs can thus be avoided. At the same time, the drying process takes only one third of the time required for drying in situ. In this way, the furnace can be taken into operation in the foundry more swiftly. Regular heating is sufficient.

### Unique service

To compensate for failure in foundry operation, StrikoWestofen also offers a special service. The equipment manufacturer has a portfolio of Westomat dosing furnaces which can be provided for the duration of the relining process. This allows operation to continue with a minimum of disruption.

For further details contact Ceramic & Alloy Specialists on TEL: 011 894 3039
New SPECTROMAXx is now even easier to operate

Spectro has launched the third generation of its highly successful SPECTROMAXx stationary metal analyzer. The latest generation takes over where the second generation SPECTROMAXx, developed in 2009, leaves off. Spectro has improved operation of the instrument with the use of toolbar buttons, a user management system, and a separation of operation from programming of the instrument.

The SPECTROMAXx is used mainly for material testing in foundries and for incoming and outgoing inspections in the metal industry. With it, users are able to determine all of the elements used in the metal industry, including trace analysis of carbon, phosphorous, sulfur and nitrogen. Calibration modules are available for base metals: iron, aluminium, copper, nickel, cobalt, Titanium, magnesium, zinc, tin and lead.

“The SPECTROMAXx is an extremely important analytical instrument for the metals industry and can be found around the world. During its redevelopment, we took many of our customers’ ideas into consideration,” reports Kay Tödter, who is responsible for stationary metal analyzers at SPECTRO. “In this age of smart phones and tablets, users expect a completely different ease of operation from a complex analytical system, compared to a just few years ago.”

The SPECTROMAXx fulfills the users’ need for simplification in several ways: The measurement is no longer controlled through the menu, but with symbols and toolbar buttons. Once a procedure has been started, only the functions that are logical at that point in time are active in the control software – all other commands are hidden. The metal analyzer also offers a user management system that permits rights for individual employees to be determined. “Temporary workers or summer jobbers are able to start single measurements, whereas trained laboratory technicians, for example, have extended or complete access to all control functions and parameter settings,” comments Tödter.

Separation of the operating module from the method development module is another major advantage of the new instrument’s software. Information needed for operation is greatly simplified and directly accessible without having to change the method data.

The SPECTROMAXx’s analytical diagnosis system also has been improved. The instrument independently monitors all operating parameters. It even shows when the spark stand needs to be cleaned depending on the type of samples being analyzed.

“The cleaning intervals are very much dependent on the sample material being analyzed,” adds Tödter: “With smart excitation, maintenance work can be planned better, thus increasing availability of the instrument. The SPECTROMAXx’s dynamic excitation determines the measurement time required based on the given sample properties. In this way, the instrument is faster in many applications than a system with fixed measuring cycles.”

The SPECTROMAXx is delivered together with Result Manager, an analysis archive software. The Result Manager documents when a given sample was analyzed and the measurements the instrument delivered. This enables paperless documentation that is also suitable for audits. Additionally, the Result Manager provides filtering and sorting capabilities. It also shows, using trend charts, how often and for which samples quality-relevant tolerances for individual selected elements have been met or exceeded.

Improved analytical performance

The instrument’s analytical performance has also been improved. The instrument offers a new method for determining the carbon content in spheroid ductile iron for non-optimal samples that has achieved results that lie in the repeatability range of combustion analysis (<0.1%). This method offers the following advantages: 1) replaces much more complicated and expensive combustion analysis; 2) provides clear evidence as to the quality of the given sample. A sample that has been rejected due to excessive free graphite contents cannot lead to “correct” results for other important elements.

With the revised methods for the measurement of small parts and optimization of the parameters, it is now generally possible to analyze nitrogen in iron-based materials. These parameters can be easily adjusted as necessary for special cases.

For further details contact Spectro Analytical South Africa on TEL: 011 979 4241
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Coating solutions from ASK Chemicals accurately and effectively eliminate casting defects such as scabbing, veining, and penetration. The clean casting surfaces achieved in this way significantly reduce costs associated with rejection and cleaning. Fast coating processes with drip-free application and significantly less residual dirt in the component also increase productivity and economic viability in the casting process.

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