THIS MONTH:

• Total plant health and reliability solutions
• Isigayo: the maize mill for South Africa’s SMEs
• New nanofibre technology and extreme performance filters
• The ‘proudly South African’ HVAC component manufacturer
Johannesburg, accountability and consequences

On 9 May, 2013, at the Linder Auditorium of the University of Witwatersrand, Parks Tau, executive mayor of Johannesburg, delivered his state of the city address. In his opening welcome, he refers to Johannesburg as “one of the greatest cities in the world” and suggests that his 2013 address would be about positioning the city “as one of the leading global cities; a city of innovation, and economic dynamism; a city that mobilises the strengths and qualities of its diverse population; and a city that cares deeply for all its residents, through its commitment to the provision of world class services for all.”

Introducing the results of a citywide consultation process about the future. Parks Tau revealed a Joburg 2040 vision developed “for a city that is sustainable, liveable and resilient. This is a vision of a city that talks to its people and creates places that they want. It is sustainable because it delivers infrastructure and ensures everyone has services. It is resilient because we have the capacity to respond to unexpected and unpredictable events.”

Stirring stuff from a mayor with sound political sensibilities. But what of the service delivery and billing issues that have dogged Johannesburg for so many years?

Tau calls these “current challenges” and assures us that Johannesburg councillors are committed “to transform this city and to leave a sustainable and lasting legacy for future generations. We hear your concerns about the quality and effectiveness of service delivery. We are winning the war against crime and urban decay and we are attracting new investments across the city,” Tau insists.

Quoting statistics, he says that Johannesburg has drastically reduced the number of unresolved queries on its billing system; improved its collection rate by 91%, giving the city cash in excess of R800-million for the ten months up to 30 April 2013; reduced the average waiting time on its call centre from 164 seconds to 24 seconds; and improved the call abandonment rate from 27% to 6%.

I have no doubt that Johannesburg is a steadily improving city. The city is cleaner and more vibrant than it was 15 years ago, and the housing, transport and commercial infrastructure developments around Ellis Park, Ghandi Square, Mary Fitzgerald Square, the mining quarter and up into Braamfontein have significantly improved inner city ambiance. As Parks Tau points out, over R100-billion has been committed to improving infrastructure over a period of ten years and, inline with this target “we have budgeted an amount of R30-billion on new replacement and maintenance of infrastructure, which will be spent over the next three years.”

But corruption, incompetence and complacency among the employees responsible for service provision remain critical obstacles. “We are working with residents, businesses, clients and the media to root out corruption... In the past year I announced the Fraud Hotline to address corruption to expose corrupt officials and take action,” Tau insists.

But it is the face-to-face and telephonic interactions between residents and municipal employees that dominate our sense of the health of Johannesburg. Are these interactions ever monitored for accountability purposes? Are municipal employees ever sanctioned or rewarded for the effort and enthusiasm they put into solving peoples’ legitimate problems?

In any talk on parenting skills, the message is to establish clear boundaries and then to link them to a set of consequences should they be breached. It is hard to believe that consequences are being applied to South African municipal or government employees. Accountability, as described by Parks Tau, is limited to monitoring the numbers generated by the IT and call centre systems and hoping these numbers go down via transparency alone. But these metrics cannot reveal the quality of a service delivered by municipal employees. It is like asking us to trust our police force because crime is going down, regardless of the unreasonable and often brutal actions of individual officers.

Johannesburg can be a great city. It is hard not to support Parks Tau’s visions: of an undivided and reconnected city with transport corridors that obviate the need for private cars; a liveable city, with good access to clean air, food, safety and cultural expression; an economically vibrant city; and a city that encourages change and opportunity for its citizens.

It is the first right in his vision that seems the most elusive though, ‘the right to developmental service delivery’, where citizens have the “right to hold us accountable and become active participants in the delivery of services.” In this regard, we need much more action from our mayor to ensure that appropriate consequences are applied to his employees when they fail to deliver acceptable services in an acceptable way. A world class city has to have employees that are able and willing to deliver world class services.

Peter Middleton
Afrox’s R1,5-billion rejuvenation
Afrox officially launched its new high efficiency air separation unit (ASU) in Pretoria West on 20 April, 2013. Peter Middleton attends and talks to Afrox’s Donal Mackinnon about modern air separation technology and Brett Kimber, the new managing director, about the company’s reinvestment vision.

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Afrox’s R1,5-billion rejuvenation

Afrox officially launched its new high efficiency air separation unit (ASU) in Pretoria West on 20 April, 2013. *Peter Middleton* attends and talks to Afrox’s Donal Mackinnon about modern air separation technology and Brett Kimber, the new managing director, about the company’s reinvestment vision.

Iscor shut down its Pretoria West steel mill in 1997 and moved production to Saldanha, leaving the over-the-fence Afrox oxygen and nitrogen supply from its 2 x 750 tpd air separation facility relatively redundant. Since then, Afrox has continued to operate one of its two ASUs on the site in maximum turndown mode. “But this is energy-inefficient, and taking into account the age of the plant, we saw this as an ideal opportunity to replace an existing plant, originally commissioned in 1987, with more modern and efficient technology,” says Kimber.

The new R200-million air separation unit (ASU) at Afrox’s Pretoria West site is part of a capital investment programme by the Linde Group, the company’s parent, of R1,5-billion over the next three years. The new ASU will produce high purity oxygen, nitrogen and argon to service the industrial and medical markets in South and sub-Saharan Africa.

The engineering division of the Linde Group was responsible for the design, supply and building of the new ASU, importing the best in modern technologies into South Africa. “The ASU is remotely controlled from a global operations facility in the UK, ensuring optimal output and quality. The development also included integrating an existing nitrogen liquefier unit into the new ASU and linking production from the ASU to existing cluster storage tanks. The cooling water system, the electrical supply and instrumentation have also been upgraded,” Kimber announces.

Three cold boxes, an air compressor, coolers, pump skids and PPU skids were shipped from Germany to Durban and then transported to Pretoria. The extraordinary length of the main cold box made it a challenge to transport as an abnormal load and to lift it into position on site. “The number of role players involved also rendered this project highly complex,” comments Kimber. “However, execution was streamlined and activities fell into place as scheduled. The R200-million project was completed on time and under budget, which is unusually impressive for large capital projects in South Africa,” he adds.

**Cryogenic air separation technology**

Carl von Linde developed the first continuous process for the liquefaction of air back in May 1895, and this relatively simple process, at its fundamental level, remains the foundation stone of all cryogenic air separation technology. At atmospheric pressure (1,01 bar at sea level) air must be chilled to -192°C (81,5 K) before condensation begins. This boiling/condensation temperature rises as pressure increases, so air at a pressure of 6,0 bar can be condensed at -172°C (101 K).

Since dry air is a mixture of gases – mostly nitrogen (78%), oxygen (20,95%) and argon (0,93%) – the boiling/condensation points of each gas in the mixture are not the same. It is therefore possible, by tightly controlling the temperatures and pressures involved, to liquefy or evaporate individual gases from the mix to separate them.

At the starting point of Afrox’s new ASU in Pretoria West is a modern 3,0 MW Atlas Copco air compressor that sucks in atmospheric air and compresses it to 5,5 bar. “In Durban, atmospheric pressure is at around 1,01 bar, but because we are on the Highveld (0,85 bar) more energy is required of the blower,” Mackinnon points out.

The compressed air is passed through a direct contact air cooling tower, where moisture is condensed out and the air is cooled to between 10 and 12°C. “At cryogenic temperatures, water in the air will freeze and cause blockages, so it is very important to get all of the moisture out. We use some of the dry gaseous nitrogen off the main process to chill water. This chilled water is then trickled in direct contact through...
the air, which is a very efficient way of cooling the air and condensing out the moisture at the same time,” Mackinnon informs MechTech.

The cool air is further purified by passing it through a molecular sieve consisting of three layers. The first removes any remaining water. Then a catalytic layer converts hydrocarbons into CO₂ and water, while the final molecular sieve traps these. “This is an exothermic process, so the purified air comes out of the sieve at about 14°C,” he adds.

The air is then cooled to cryogenic temperatures in the main heat exchanger against outgoing cryogenic nitrogen and oxygen. But to achieve optimum control, the air stream is split into two. One path passes through the main exchanger and directly into the separation column, while a second stream passes through an expansion turbine with an adjustable brake before entering the column. “The flow through this stream is carefully controlled to achieve an air temperature of -175°C at the inlet to the column,” says Mackinnon.

Air separation in ASUs occurs through a process called rectification, commonly known as countercurrent distillation. Because of the different condensation temperatures of the different gases (oxygen liquefies at higher temperatures than nitrogen) along with the different partial vapor pressures of each gas in a mixture (nitrogen has the higher vapor pressure), oxygen will condense to liquid first, and any nitrogen in liquid form will evaporate first. “So when condensation starts, the liquid develops a higher oxygen concentration. By continuously repeating the condensing/evaporation cycle, the liquid becomes increasingly pure in oxygen and the gas becomes increasingly pure in nitrogen,” Mackinnon explains.

The main distillation column is split into two, a low pressure upper section at 0.3 bar and a high pressure lower section at 5.0 bar. The liquefaction process begins in the high pressure lower column. A series of interlocking sieve trays in the column provide condensation sites for the oxygen-rich liquid. As a tray fills with liquid, it overflows into the tray below. At the same time evaporation, of mostly nitrogen, is occurring and gas is rising up between the trays. In the bottom of the high pressure lower section of the column, a liquid consisting of 35-40% oxygen accumulates.

The two sections of the column are separated by a liquid oxygen bath, which is used as a heat exchanger. “The low and high pressure sections enable the boiling temperatures of oxygen and nitrogen to be manipulated. The liquid oxygen in the low pressure liquid bath has a higher boiling point than the nitrogen rising in the high pressure column below. It therefore becomes possible to use liquid oxygen to condense nitrogen, which is essential to provide reflux for the high-pressure column,” says Mackinnon. The heat exchanged in condensing the nitrogen also boils the liquid oxygen from the low pressure bath to provide gas upflow in the upper section of the column.

By repeating the counter-current distillation process at low pressure in the upper column, high purity oxygen forms in the centre of that column, while high purity nitrogen gas accumulates at the very top of the column.

Argon, which has a condensing temperature between that of nitrogen and oxygen, is further processed in a second column alongside the main separator. An argon-rich mixture of oxygen and argon is tapped off from the upper column into the adjacent argon column. “To optimise the efficiency of this ASU, the argon column uses structured packing instead of trays,” Mackinnon tells MechTech. This was a significant ASU development that works similarly to the sieve trays but offers much better contact between liquid and vapour, because of the relatively high surface area of the packing material. In the argon column, liquid flowing down becomes increasingly rich in oxygen, while the ascending vapour product is high purity argon. And because of the use of packing instead of trays, there is a lower pressure drop between the top and bottom, resulting in lower power consumption for the separation process.

When asked about other reasons for the better efficiency of this ASU, Mackinnon points towards much better process control: “Traditional plants have very few monitoring points, but on this one, we are monitoring every possible part of the process, so we are much better able to optimise the performance and respond to variations. And Linde’s engineering capability is amazing!” he exclaims. “Everything they install works first time and well,” he adds.
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Investments for Africa’s future

“Afrox is an 85-year-old proudly South African gases and welding company with thousands of customers and turnover of R5,6-billion per year,” continues Kimber. “But recession and policy uncertainty can freeze investment in a company like ours. We generally can’t make investments unless there are opportunities: piggybacking with an over-the-fence supply, for example, or an expanding industrial market sector. For several years prior to this investment, opportunities have been rare. There was never enough development to justify new plants and we have had to rely on ageing infrastructure.

“But we are here to stay and so we had no option but to reinvest. Globally, we understand that the most expensive gas is no gas. Reliability of supply is critical and to achieve that, we need upgraded facilities at multiple plants so that we are able to offer a 24/7/365 service. In my previous appointment with Linde in South Korea, we had to guarantee supply to Samsung Electronics, for example, at all times and at a level that we are not yet used to here,” Kimber says.

“Afrox has underinvested in key facilities for several years. But we are part of the global Linde Group and our German CEO wants us to be part of Africa’s future. Linde’s strategy is informed by clear global megatrends: clean energy, healthcare and emerging markets. There is absolutely no nervousness about investing in Africa,” Kimber reveals.

In addition to the Pretoria West facility’s new ASU, Linde has also committed to two greenfield developments: a R500-million, 111 000 m² super site in KwaZulu-Natal and another new R250-million ASU in the Eastern Cape. “The KZN development will be the most modern and biggest single project we have ever undertaken,” says Kimber. It will include: an industrial and medical gases filling plant; a dissolved acetylene production plant; an upgraded LPG filling facility; a customer engineering support services centre, an Afrox Gas & Gear retail outlet and an allowance for a future investment in a new ASU. “We already have excellent relationships with the KwaZulu-Natal Department of Health on the medical gases side and the LPG facility will go a long way to supporting the local tourism and hospitality industries,” he explains.

The Port Elizabeth development in the Eastern Cape will include a 150 tpd ASU that will come on stream during the first quarter of 2015 to support the region’s automotive and related component manufacturing industries as well as the food and beverage, hospitality and medical sectors. “We believe this development will secure supply in the Eastern Cape and foster future growth. The Coega IDZ and the modern deep water harbour will benefit – and it will make long distance trucking a thing of the past.”

Turning his attention to the local manufacturing side of Afrox’s business, Kimber says that Afrox is unique in the Linde Group because of its welding consumables and gas equipment manufacturing capability. “This is a key opportunity for us to influence Linde’s global portfolio,” he advises. “As long as we have innovative, cutting edge technology and we can manufacture products that the world needs, then South Africa can become a manufacturing base for the Group. We have the R&D capability and, to make sure that we remain globally competitive, we are benchmarking ourselves against all of the best practices adopted by Linde Group companies around the world, and we will be adopting these to ensure that our local activities achieve the best international standards.”

From its Gas Equipment factory, Afrox is about to launch a revolutionary new regulator that Kimber suggests is a “step change” within the Linde Group. “With these technologies, we are emerging as an OEM manufacturer in our own right, providing leadership and vision on the manufacturing side. And our product will be distributed not only through our Afrox channels, but also through the entire Linde Group – and we will be manufacturing to the standards required for this,” he assures.

When asked about African developments north of our borders, Kimber says that Afrox is already involved in upgrading a small plant in Nigeria. “Afrox has been active in sub-Saharan Africa for 50 years, and many of those facilities also need upgrading. We are developing our branch activities to better support local industry and construction, and wherever big project opportunities present themselves, we will connect through our global parent.

“While the committed investment is mostly in South Africa, we do not intend to stop there. The R1,5-billion is just the money that has been committed so far. We will continue to prioritise investment destinations across Africa to better position Afrox for future growth,” Kimber concludes.
Zest WEG Group incorporates genset business

As part of its continued growth across the African continent, the Zest WEG Group has drawn subsidiary company IMS Cape, the oldest and largest generator set manufacturer in Cape Town, into its corporate brand. The business is now known as the Zest WEG Group’s Generator Set Division.

“As a Group we’re experiencing real growth, both in South Africa and in other parts of the continent, and our brand is becoming well recognised in the region,” explains Gary Daines, Zest WEG Group’s sales and marketing director. “At the same time, the genset business has evolved into a genuine solutions provider and, as such, is very much a part of the Group’s total solution. At this point it makes sense to incorporate this business into the group brand.

“We have a vigorous business development team active from our Johannesburg headquarters whose responsibility is to expand our footprint into Africa. Integrating the genset business into the main brand will also strengthen the presentation of our Group offering, particularly since many mining operations in remote areas of the continent are running off alternate energy sources, such as diesel and HFO (heavy fuel oil).”

The Zest WEG Group acquired the generator business in 2007 from the IMS Group of companies and, with subsequent significant investment in both infrastructure and manufacturing plant, has developed this genset manufacturing concern to a specialist supplier capable of designing and custom-producing generator sets to suit specific applications. The division’s capacities are available in either stationary or portable configurations from 20 kVA up to 2 500 kVA and can be increased upwards with multiple synchronised sets.

www.zest.co.za

Adcock Ingram buys Bendi trucks

Goscor Lift Truck Company (GLTC), part of Imperial’s Goscor Group, has delivered three new Bendi B318 AC articulated forklift trucks to leading Healthcare company Adcock Ingram, for its new warehouse in Cape Town. While GLTC is Adcock Ingram’s preferred supplier, this is the first delivery to a Cape Town warehouse. “Working with Adcock Ingram is a privilege, and we are pleased to be extending the relationship geographically,” says GLTC MD Darryl Shafto.

Regional manager, Alan Burgess, says: “The Bendi is simply the best forklift for this application and it is very competitively priced.

“The Bendi forkift truck operates in a narrower aisle than a standard reach truck. It effectively gives us 30% more pallet space within an equivalent footprint,” Burgess says.

www.melcoconveyors.com

Melco announces B-BBEE transaction

Internationally-recognised conveyor equipment manufacturer, Melco, recently announced a 25% + 1 Black Economic Empowerment (BEE) transaction in relation to its South African operations.

Melco is one of Africa’s major conveyor equipment manufacturers and, since 2006, has been a proud member of Rulmeca, a worldwide group of companies that specialises in the production of rollers/idlers, motorised pulleys, fabricated pulleys and other components for the worldwide bulk handling industry.

Melco managing director, Gavin Hall, highlights the fact that transformation has always been a focus area for the company.

“Melco has participated and will continue to participate in opportunities to facilitate significant and sustainable growth for the business, as well as for individuals in the surrounding communities of Melco’s operations. Melco acknowledges the importance of maintaining its competitive edge with customers by ensuring that it can assist them in reaching their procurement compliance targets set out in the Broad-Based Socio-Economic Charter for the South African Mining and Minerals Industry, introduced by the custodian of all minerals in the South African State,” he explains.

GLTC branch manager in the Western Cape, Anthony Fouche, says the Bendi B318 is designed to give optimal aisle performance. “It offers significant space savings over conventional counterbalance and reach trucks. It also has excellent lift height. And of course, as a Bendi, it is well built and offers tireless performance.”

www.goscor.co.za

Clyde Bergemann and Explosion Power

Clyde Bergemann Power and the Swiss company Explosion Power (EP) will work closely together in the field of explosion cleaning under the terms of a recent co-operation agreement. As of March 1, 2013, CBPG gains the worldwide license to sell, install and service explosion generators for on-load boiler cleaning, developed and fabricated by EP.

For the intense marketing of EP’s technology, Clyde Bergemann intends to rely on its advanced worldwide sales and service network. However, some existing EP partnerships, for example, in the UK and Scandinavia, are to remain in place for a transition period.

Clyde Bergemann and Explosion Power see this co-operation as a further major step towards enhancing their offering of comprehensive and intelligent system solutions for boiler cleaning and efficiency improvement. Franz Bartels, president and CEO of the Clyde Bergemann Power Group, and Hans Ruegg, president of Explosion Power, emphasised their determination to “steer their co-operation towards global success”.

www@cbpg.com
R400-k/y payback from HVAC plant

Vukile Property Fund, together with managing agent Broll Property Group, have accessed the expertise of consulting engineering group Royal Haskoning-DHV (formerly SSI) to carry out an HVAC plant room upgrade at their Suncardia property in Arcadia, Pretoria – a project that will save the owners an estimated R400 000 per annum in combined energy and maintenance costs.

Project manager and principle associate mechanical engineer Casper Vos explains the details of the project. “Royal Haskoning-DHV – then SSI – designed the original HVAC and chiller plant installation for the Suncardia building in 1989, one of several we have designed for this client. The scope of the upgrade consists of replacing the three existing York chillers with a new air cooled chiller, which includes demolishing 24 glycol filled ice storage tanks, two cooling towers and replacing four centrifugal pumps, a heat exchanger, ±400 m of pipe work and the rebalancing of the entire chilled water system,” he says. “The three York chillers used to serve the ice storage system, but that was decommissioned a couple of years ago due to maintenance issues. A water cooled screw chiller was then installed to replace the ice storage system. This upgrade will see the new air cooled chiller installed in series with the existing water cooled chiller to achieve the required cooling capacity.” Casper explains.

“All our design decisions are driven by sustainability and maximising efficiencies of plant and equipment,” he adds. “This upgrade will result in the client achieving substantial electrical and maintenance cost savings on the HVAC installation, and the estimated total project payback period is less than 10 years.”

Boost For SA’s manufacturing sector

The South African manufacturing sector will receive a huge boost from July 2014 when more than 500 toolmakers, with an internationally accredited, government certified toolmaking qualification, become available to the sector. “The manufacturing and the supporting tool, die and mouldmaking industries are currently struggling with serious skills shortages,” says Ron MacLarty, the outgoing chairperson of the Toolmaking Association of South Africa (TASA) at its annual general meeting.

“213 apprentices are currently being trained as part of the TDM Powered Foundation Phase and Apprenticeship Programmes, and through the efforts of the National Tooling Initiative Programme (NTIP), a wholly owned TASA company, an additional 332 apprentices started with training in April 2013. This brings the total number of apprentices in Gauteng in 2013 to 545, and nationally to over 1200,” he reveals, adding that direct funding on the TDM Powered Skills Development Programme to date is R110-million.

“All the TDM Powered apprentices were placed with companies for training in 2012 and the feedback has been very positive. The apprentices are high potential candidates and year on year retention rates is in excess of 80%, which is well above the international standard,” says MacLarty.

In brief

Andrew Mentis has embarked on the local manufacture of a new European approved and crash tested modular guardrail system called EASYRAIL, under licence from Volkman & Rossbach a German company. This makes it the first guardrail of its type to be manufactured in South Africa for use on local highways and secondary roads.

The installation by Flexible Conveyor Systems of a FlexLink® Wedge conveyor, the first of its kind in sub-Saharan Africa, has increased production and realised significant savings within only two short months for private South African pharmaceutical company, Mirren (Pty) Limited, based in Gauteng.

ACTOM Air Pollution Control is more than halfway with the erection of the first of three bag houses in its current contract for the control of emissions from the new rotary dryer and two new kilns that form part of the Phase 2 smelter expansion project at Xstrata’s Lion Ferrochrome complex near Steelpoort in Mpuumalanga.

First National Battery has made a paradigm shift from the traditional lead-acid battery formation process (the first time charging of a battery) with the introduction of acid recirculation technology for the formation of truck batteries and traction batteries for forklifts and mining locomotives, as well as for the formation of solar and gel batteries. This green production process is now in use at two of its factories in South Africa.

Wear control specialist Filter Focus has recently designed and launched its proprietary Vacuum Dehydrator system with the main aim of combating the effects of emulsified, free and dissolved water in oil.

Proudly sponsored by Mitsubishi SA, Rhino Force’s red, black and white beaded bracelets have raised R4.6-million towards saving rhino’s, making them SA’s best-selling rhino accessory.

Atlas Copco, with the launch of responsive design for its websites, has moved a step further towards providing customers and other stakeholders with an optimal and efficient viewing experience on a wide range of computers and mobile technologies: from PCs to tablets and smartphones.

As part of celebrations to mark the Golden Jubilee of the Organisation of African Unity, which is now the African Union (AU) the New Partnership for Africa’s Development (NEPAD) Agency, in partnership with the Technical Centre for Agriculture and Rural Cooperation (CTA), is inviting entries for photos and essays on Youth, Women and Rural Agricultural Development.

www.ntipweb.co.za
Isigayo: the maize mill for South Africa’s SMEs

The Department of Trade and Industry (dti), in collaboration with the Foundation for African Business and Consumer Service (FABCOS), and Bühler South Africa, the food processing plant and equipment specialist, launched an innovative new agroprocessing mill called Isigayo in Johannesburg on Friday, 12 April, 2013. "MechTech" reports.

Wheat is the basic food staple for 3.5-billion people, while more than two billion depend primarily on rice and 900-million on corn. Furthermore, 500-billion cups of coffee are consumed and eight million tons of chocolate are produced every year – and here lies the core of Bühler’s business. The Swiss-based company, with a network of over 10 000 people spanning more than 70 countries specialises in processing equipment for all of the above industries and invests around 80-million Swiss francs per year on basic research and applied development.

Present in South Africa since January 1972, Bühler has acquired an intimate knowledge of its clients’ specific requirements. The strong local presence allows fast response to enquiries and short delivery times. Customers benefit from local manufacturing facilities producing at appropriate local prices and a large spare parts stock. Trained specialists are available to clients for after sales service throughout the life cycles of their production plants. If upgrades or green-field projects are being considered, Bühler offers customers assistance with feasibility calculations and financial solutions.

But customer needs vary greatly across sub-Saharan Africa. Bühler’s response to this challenge is to provide commercially optimised solutions in order to guarantee maximum customer benefit. Hence Isigayo, a two t/h mobile compact mill aimed at tackling the South African government’s mandate to develop the small-scale milling sector and improve food security in the southern African region, and the supplier’s solution to the need in South Africa to move the processing of raw maize product into rural areas.

"Although agricultural production of maize in South Africa was flourishing, processing was not answering the need for industrial development in rural and disadvantaged areas, particularly owing to the noticeable lack of small-scale milling provisions," says Bühler Group CEO Calvin Grieder. "This technology will create jobs, develop skills and provide affordable and improved nutrition through vitamin enrichment, as well as empower and generate income for entrepreneurs and existing small-scale millers," he adds.

According to Grieder, Isigayo represents a little revolution in milling. The word is of Zulu/Nguni origin (-gaya) and refers to the traditional process of grinding maize or beans using a base and grinding stone or a pestle and mortar. "Our aim is to replace traditional grinding processes with an efficient modern equivalent that is affordable for the rural market," he suggests.

Isigayo is a small, easy to transport mill for the small scale milling industry that will develop skills and help rural economic development. "Bühler’s strategy has not changed. We are known as a technology partner and supplier of state-of-the-art equipment, of highly efficient equipment and solutions for the food milling and processing industries. But Isigayo shows we are also ready and capable of offering affordable and portable solutions that are ideal for rural South Africa. This is not a change in policy, but an addition to our portfolio to better meet the needs of this market. And we are very proud of our excellent solution," he announces.

At the starting point of implementing this vision, was the signing an agreement for the purchase of 24 Isigayo plants between Bühler and FABCOS, the Foundation for African Business and Consumer Service, a membership-based organisation promoting the development of black business in South Africa. Speaking following the signing ceremony, FABCOS’ deputy president, Phillip Usiba, announced the establishment of a new company, Homegrown, which will ensure that Isigayo millers get a constant supply of grain and have a guaranteed buyer of their produce. "FABCOS’ strategy involves training new producers via its farm incubators – programmes that help launch new agricultural businesses through a combination of production and business education – that offer subsidised input costs; centralised land tenure and equipment leases to participants. We host and train new farmers as they produce food, share equipment, develop their markets, and learn from mentor farmers, agricultural professionals and each other. Then, once their businesses are viable, the new producers move off the incubator farm and find their own land to farm," Usiba explains. The addi-
The Isigayo mill

The maize milling process starts where dry, off-the-cob dry maize kernels are placed in a hopper. The kernels are then carried by a screw conveyor into a cleaning and conditioning bin, where foreign material such as husk, straw, dust, sand, stones, metal, and anything too big, too small or too light are removed, leaving only cleaned maize kernels. Water is also added to allow the husks to be peeled off more easily and to add some mass to the meal.

The cleaned and conditioned maize kernels then enter a degerminator where the skins are peeled off and the husks removed. A set of opposing mill rolls crack the kernels and the lighter skins and husks are sucked off, leaving the maize to drop into a hopper below.

The maize then passes through several further milling and sifting processes to achieve the grind consistency required. The combination of roller milling and sifting results in a higher quality product than alternative small scale milling processes, such as plate or hammer milling.

In the final stage of the process, ground maize is conveyed back down to ground level where it is bagged.

The Isigayo intervention by small businesses into the economy will improve competitiveness in this environment. It will help the maize-meal sector to be competitive and lead to poverty alleviation," he predicts.

The dti, the third party in the Isigayo collaboration was represented at the launch by acting deputy director-general for industrial policy, Garth Strachan, who said the new Isigayo maize milling machine will introduce new technology which will bring new entrants into the market including small, medium and micro enterprises (SMMEs).

"South Africa's foreign direct investment into manufacturing is robust and the R5,66-billion 12i Tax Incentive, designed to support new industrial projects as well as expansions or upgrades of existing industrial facilities, has supported large manufacturing investments worth R22,5-billion, a large proportion of which has been in the agroprocessing sector," he said.

He added that it was common knowledge that primary agriculture and agroprocessing, especially the milling sector, plays an important role in addressing poverty, transformation and rural economy.

The Isigayo is fitted with standard Bühler equipment, is pre-assembled in two containers and pre-engineered as a complete milling plant. There is very little infrastructure necessary and the mill is easily transportable and very easily installed, making it ideal for rural SME’s.

The combination of roller milling and sifting results in a higher quality product than alternative small scale milling processes, such as plate or hammer milling.

In the final stage of the process, ground maize is conveyed back down to ground level where it is bagged.
New nanofibre technology and extreme performance filters

Fluid technology and filtration specialist, Hytec Fluid Technology, is currently transforming its Mobile Division’s range to better suit the servicing and protection needs of high performance, heavy duty and off-road vehicles. MechTech talks to Sandor Bottyan, the company’s general manager, about the company’s filter kit offering and the introduction of the Baldwin range of air filters with ProTura® nanofibre technology.

As part of the Hytec Group of companies, Hytec Fluid Technology has its roots in the protection of hydraulic equipment, from filtration systems to accumulators, accessories, cartridges and coolers. Today, Hytec Fluid Technology is a specialised fluid services company that offers filtration solutions across the complete range of fluids for all plant and machine requirements: air filtration solutions; fuel and engine oil filters; hydraulic system protection; and a host of lubrication and contamination management sensors and systems “We are the only filtration company in South Africa to have our own in-house oil sampling and analysis laboratory, not that we offer independent oil analysis services, but to do trending in support of our filter offerings,” says Bottyan.

“Our diversified product range now includes: custom-built offline fuel de-watering and decontamination systems from the likes of HY-PRO; kidney loop oil filter trolleys that remove both water and particulate; online particle counters for snapshot oil analysis; industrial air filters, breathers and high pressure and high flow in-line filters; lubrication and fuel transfer pumps; oil cooling systems; accumulators; cartridge control valves, gauges and other hydraulic accessories; process filters for low viscosity cutting fluids, for example; electronic sensors and data recorders; and a diverse range of customised filter kits for the mobile aftermarket,” Bottyan notes.

To meet the new recertification requirements of the Pressure Equipment Regulation (PER), Hytec Fluid Technology is now offering a recertification service for hydraulic accumulators. “We are much more than a filter company,” he suggests. “We have a wealth of technical expertise that enables us to solve contamination problems and customise solutions to meet the requirements of any original equipment manufacturer (OEM) or end user,” he adds.

Hytec Fluid Technology is split into three broad services: process filtration; hydraulic filtration; and mobile solutions. “Heavy machines like loaders and off-road tippers all need to be serviced every 250 hours or so, and filters are a key replacement component in order to validate the vehicle’s warranty,” Bottyan explains.

“The OEM specifies the filter requirements and we put together a complete filter package to suit each vehicle and each model. And we also include anything the customer might routinely require in a service kit to minimise servicing downtime. This is a key area for us. Off the back of our technical expertise and extensive filtration experience, we are aggressively expanding our market share for the mobile aftermarket,” he tells MechTech.

Citing the on-going relationship with the mobile crushing and screening specialist B&E International, part of the Raubex Group, Bottyan says that Hytec Fluid Technology’s mobile division now provides the service kits for the company’s entire fleet, which includes equipment from OEM’s such as Mercedes Benz, Volvo, Caterpillar, Liebherr and others. Our customised filter servicing kits for vehicles include air; fuel; hydraulic and coolant filters and we also supply dust collectors, bulk fuel filters and tank breathers for onsite installations. And while we are not the

Baldwin’s recently released Extreme Performance heavy-duty air filters for the mobile aftermarket use ProTura® Nanofiber to achieve higher initial efficiencies, greater holding capacities, lower flow restrictions, longer life and lower operating costs.
In summary, the use of these filters provides higher initial efficiency, greater contaminant holding capacity, longer service life, lower flow restriction, longer engine life, and lower total operating costs for the protected machine. “When an OEM builds an engine, it specifies the filter requirements and several suppliers can make filters to accurately comply with these. Baldwin’s philosophy is to meet or exceed the OEM filter’s performance,” says Bottyan. “Baldwin’s Extreme Performance filters with ProTura Nanofiber offer high filtration efficiency for demanding applications and environments, ultimately leading to lower total costs of ownership,” he advises.

As an aftermarket filter provider, one concern that Baldwin distributors sometimes have relates to warranties, and whether the use of an aftermarket filter will void the manufacturers warranty. “That is most assuredly not the case, and the company has written testimonials from several leading OEMs to this effect. The technology, expertise and quality standards of Baldwin filters has led to them being a substantial branded supplier to new-build OEMs,” Bottyan informs MechTech.

When asked about the typical costs of adopting Hytec Fluid Technology’s service kit offering, Bottyan points to one customer whose filter kit costs were significantly reduced. “And some of these machines were still being serviced under the OEM’s warranty, so the actual percentage saving was possibly as high as 25%,” he adds. “While we offer premium quality filters, we do not charge premium prices,” he assures.

“As a filtration specialist, we are able to offer 100% of a customer’s filtration needs, therefore we also include other premium brand filters in the kits. For hydraulic systems, for example, we offer the HY-PRO brand, which is technically better in that they are designed and tested according to Dynamic Filter Efficiency (DFE) principles. DFE ensures that both a filter’s capture and retention performances are quantified for cyclic and changing operating conditions,” Bottyan explains. DFE bridges the gap between laboratory data and the real world by inducing dynamic duty cycles and real-time performance measuring to predict the worst case fluid cleanliness of a filter. “Hydraulic filters designed and tested based on static conditions cannot claim a cleanliness rating as accurate, or a filter as efficient as the HY-PRO brand,” he claims.

“We are a one-stop filtration partner. HY-PRO vacuum dehydration units for oil decontamination optimise the balance between heat, vacuum and process design to rapidly remove free, emulsified and dissolved water and gas. Rather than simply supplying technically sound replacement elements, we have access to all of the best brands to fully support every conceivable need, and we have the technical expertise to custom design a solution should off-the-shelf units not prove satisfactory. We aim to become the total filtration solutions partner for an ever increasing number of vehicle fleet operators,” Bottyan concludes.
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Pump systems that reduce costs and improve productivity

In today’s competitive economic environment, plant operators across all industries are looking for ways to minimise costs while improving productivity. SKF Energy Monitoring Service – Pump Systems can help plant operators achieve those important and often elusive goals.

Industry assessments show that energy costs for pump systems can be cut by 20% or more simply by improving pump system efficiency. These reductions in energy use translate into lower operating costs. But the benefits of optimisation don’t end there. For example, shaft misalignment is responsible for up to 50% of all costs related to rotating machinery breakdowns. Accurately aligning shafts can prevent pump breakdowns and reduce unplanned downtime that results in a loss of production.

SKF Energy Monitoring Service – Pump Systems is a comprehensive energy management programme plant operators can use to carry out routine measurements and energy efficiency monitoring in pump systems. Implementing Energy Monitoring Service – Pump Systems in parallel with a condition monitoring programme can assist in determining when to rebuild or modify pumps to restore efficiency and reduce associated costs.

Since every pump system is unique, SKF Energy Monitoring Service – Pump Systems applies a flexible process that follows some key steps: a pump systems selection process for identifying which pumps systems to include in the monitoring programme; a database that includes details on the pumps included in the monitoring program; programming of route details into SKF @ptitude Inspector; setup and training of operations staff; programme hand-over and routine measurement; and interpreting of measurement results.

The SKF Microlog Inspector system has been specifically developed for ODR use, and combines software with portable hardware, enabling operations personnel to make their rounds and to collect machine condition, inspection and process data easily and efficiently in a palm-sized unit.

Energy Monitoring Service – Pump Systems integrates these leading measurement and maintenance technologies to further enhance the range and quality of support service it provides.

Reduce pump energy costs

By using SKF-trained plant staff to carry out routine measurements and monitor pump energy efficiency, you can determine when it is cost effective to repair a worn pump. This will free up valuable time and cost of specialists to concentrate on the most significant pump issues.

While routine monitoring itself will not capture all opportunities for improvement, understanding the status of your pump system efficiency is essential before making improvements. SKF’s Energy Monitoring Service – Pump Systems people can work in parallel with condition monitoring programmes as part of a comprehensive asset management system.

Benefits of the programme include: saving money, since improved pump systems’ energy efficiency translates directly into lower electricity costs; improve reliability, because operating any pump closer to its best efficiency point significantly improves its reliability; keeping the programme in-house means that there is no need to employ specialists to identify energy efficiency improvements in pump systems; through regular monitoring of selected pump systems improvements can be sustained; the programme can easily integrate with existing condition monitoring programmes; and plant operators and management staff become engaged in energy awareness and CO₂ reduction activities.
Total plant health and reliability solutions

WearCheck, the oil condition monitoring specialist, established its Reliability Solutions division in 2012, which quickly expanded following the purchase of ABB’s condition monitoring business. MechTech talks to Philip Schutte, the company’s reliability solutions manager, about a shifting maintenance focus in South Africa towards total plant health.

WearCheck is the leading oil condition monitoring company in Africa and the only one with ISO 9001 quality certification, ISO 14001 certification for environmental management and ISO 17025 accreditation for its laboratory-centric quality management programme. It has preferred supplier status from several original equipment manufacturers (OEMs) including Bell and Volvo Construction Equipment and, along with WearCheck’s global partners, is the laboratory of choice for a number of lubricant suppliers.

With the acquisition of the condition monitoring division of ABB in November, 2012, WearCheck became the only company in Africa – and one of only a handful globally – that can provide a complete condition monitoring service to the mining, power, pulp and paper, sugar, manufacturing and general industries. “The acquisition of the ABB division fits into our strategy of offering a complete industrial condition monitoring solution – which, on the oil side, also includes the analysis of heat transfer, turbine and transformer oils,” Schutte tells MechTech.

The former ABB division was responsible for most of the condition monitoring carried out by ABB in the fields of vibration analysis, infrared, laser alignment, shaft balancing and oil analysis, which WearCheck had been doing on behalf of ABB for a number of years. This business unit has been incorporated into WearCheck’s Reliability Solutions division, adding significantly to its capability in this field, and transforming WearCheck into a ‘one-stop shop’ for condition monitoring.

“Companies have always been doing time based maintenance, which is essentially preventative maintenance. If you look at the L10 life of a bearing, which is defined as the life that 90% of a large sample of identical bearings can be expected to reach, then a specific bearing might be expected to run for 1-million hours at 1 500 rpm. But it could still fail at 500 000 hours, or it might last significantly longer, to 1,5-million hours, for example,” Schutte explains.

If operating a plant according to preventative maintenance, the bearing will simply be changed as soon as it reaches its L10 life, regardless of its condition. “You take the risk of a breakdown failure should the bearing fail at 500 000 hours, and you lose out if the bearing is still good condition at 1-million hours,” he points out.

“By routinely monitoring the real condition of the bearing, you can detect the onset of an early failure and react to prevent a breakdown. Or, if no problems are detected at 1-million hours, you can safely leave the bearing running, because you know, via vibration monitoring and oil analysis, for example, that the bearing condition is still good,” he adds. “This is known as predictive maintenance.

“Then there is proactive maintenance, which is when you deliberately look for ways to extend the life of bearings or to prevent a component from failing prematurely. You might look at lubrication and the greasing intervals, for example, to optimise lubrication efficiency. You remove any problem that might reduce the bearing life: you correct misalignment; install better filtration to remove contaminants; or you might stiffen the mountings to avoid resonant frequencies, for example,” Schutte explains.

Wearcheck’s Johannesburg oil analysis laboratory. The company is the leading oil condition monitoring company in Africa and the only one with ISO 9001 quality certification, ISO 14001 certification for environmental management and ISO 17025 accreditation for its laboratory-centric quality management programme.

With respect to maintenance, there are generally two issues of general concern: plant availability and plant reliability – “and they are not the same thing,” Schutte continues. “In the taxi industry, for example, we can say that availability is high because there is one
samples. “If the machine is monitored, fine particles that accumulate in the oil can track this wear by counting the new, it might be 100% reliable. But it a graph. Initially, while the machine is expecting that can be summarised on every machine has a specific life condition monitoring methods, he says machines,” he adds.

The second indication of an impending failure will be the oil analysis results. “Normal wear appears as fine particles, but as soon as components begin to fail, larger ‘chunks’ begin to appear in the oil. In a gearbox, for example, you see natural wear as a number of parts per million of fine particulate. But as soon as you see larger particle sizes, you know that pieces are being knocked off teeth or off the ball bearings,” he explains. “Sometimes, from the composition of the particles, you can tell which component is going to fail, but it is vibration analysis that will tell you exactly which component is failing and where it is in the gearbox,” he explains.

Thermography, which uses the infrared (IR) spectrum to give an indication of a component’s surface temperature, can only detect defects later, once the machine problem has started to generate additional friction and heat. “And the last indications of an imminent failure are physical, ie, we can see, hear or feel the machine shaking, knocking or vibrating. You then know that a breakdown is about to happen or that the machine is nearing the end of its life,” Schutte informs MechTech.

And the approach applied to machines can also be used to proactively maintain the condition of oil. “Oil has two functions, it controls temperature and it lubricates. On a large turbine you might have 20 000 L of oil, so you want to keep the oil in good condition for as long as possible. “So you analyse the condition of the oil itself, its lubrication properties, viscosity, contamination levels, the total acid and total base numbers (TAN and TBN), for example, and instead of simply replacing the oil, you use better filtration and blend in additive packages to change the chemistry and get the oil back to its ideal condition. So the life of the oil is extended without any risk to the machine,” Schutte says.

WearCheck Reliability Services offers three levels of service. “At large plants we have people permanently on site, at several power stations, for example, and they have daily routes to monitor critical equipment and to collect oil samples. Typically, vibration and oil analysis of a machine is done every month, with thermography readings being done quarterly or bi-annually, depending on the machine’s mean time to failure (MTTF) statistics. At these plants, the idea is always to identify problems well in advance so that they can be rectified during a planned maintenance outage at a non-critical time,” Schutte says.

At the second service level, WearCheck specialists go to a plant on a monthly basis to capture the data. This is then analysed at the WearCheck laboratories and a comprehensive report is sent to clients. “The third option is for the plant maintenance personnel to collect their own oil samples and to use their own condition monitoring equipment to collect the data. But we have the analysis expertise and laboratories, so we will do the analysis, report back and recommend proactive action,” he notes.

“At the end of the day, no matter what equipment or methods you are using or how expensive, well-designed or critical the machine, you need people who can diagnose problems accurately so that they can be rectified properly. It is the expertise of our people that enables accurate diagnoses, and it is this accuracy that is at the heart of proactive maintenance,” Schutte believes. “With our oil expertise, along with the expanded condition monitoring abilities, we have now become a one-stop shop for any industry needing to improve plant health. We are now able to offer the most comprehensive range of reliability services available,” he concludes.
Innovative centrifugal bag filter

Filcon Filters will soon be introducing Sun Central’s all new design filter bag housing to the South African market.

Sun’s model HCTB, centrifugal bag filter (patent pending) features an in-housing centrifugal flow formation and a unique bag holder/dispenser assembly unit. This product is designed to achieve multiple performance advances, including:

- Improved in-housing liquid distribution.
- The elimination of the destructive hydrohammer effect on the bag bottom.
- Staged particle separation and retention.
- The holder/dispenser assembly acts as a bag installer ensuring correct bag installation.
- The destructive backwash effect is eliminated because the holder/dispenser assembly prevents the bag from being sucked up by system vacuum.
- Extended filter service life. The centrifugal flow ensures full and even utilization of the entire filter surface area.

Unlike the traditional inlet design, HCTB features a novel inlet pipe, which enters the housing at a tangent. As liquid enters the tangential inlet, swirl flow forms under centrifugal force. The liquid proceeds downward and enters the filter bag. As the flow channel narrows, the centrifugal flow rate accelerates.

**Swirl flow:** Unlike the traditional inlet design, HCTB features a novel inlet pipe, which enters the housing at a tangent. As liquid enters the tangential inlet, swirl flow forms under centrifugal force. The liquid proceeds downward and enters the filter bag. As the flow channel narrows, the centrifugal flow rate accelerates.

**Accelerated flow:** During the swirling process, coarser particles are thrown outward and captured on the sides of the bag media. Fine particles proceed downwards to the lower portion of the filter bag. The deflector shield effectively prevents these particles from rising and forces them into the filter media under the deflector.

**Deflected flow:** Since the bag bottom mainly captures fine particles, the potential destruction of the bottom is significantly reduced.

**Hydro-pressure release:** Excessive pressure developed at the bag bottom is released and channelled upward through the dispense pipe, effectively protecting bag bottom from bursting, one of the most common problems.

The HCTB is manufactured by ISO9001 certified Sun Central LLC, Wilwaukee, USA at their Shanghai factory. Filcon Filters are the appointed sub-Saharan distributors for Sun Central’s wide range of filtration products such as bag housings, cartridge housings, filter bags and filter cartridges.

Filcon Filters was established in 2000 and has branches in both Johannesburg and Cape Town. In addition to representing a number of international filtration manufacturers, Filcon Filters has a wide range of filtration products manufactured to its design in Johannesburg. The range includes the Dirt Gobbla (a centrifugal separator), back flushing automatic filters, in-line basket strainers, purge strainers, and bag and cartridge housings.

Filcon Filters prides itself on the number of years of filtration experience the technical members have, which enables the company to provide clear solutions to filtration needs and problems.
**Multotec’s Debswana maintenance contract**

The Multotec Group is making steady progress with the implementation of a maintenance contract awarded to the company that covers Debswana’s Jwaneng mine, OLM Process Plants, Orapa No 1 and No 2 plants, Letlhakane Mine treatment plant and Damtshaa mine. Once fully in place, this contract promises to mitigate production delays, reduce costs, decrease ferrosilicon losses and increase efficiency across the board.

“Diminishing skills, coupled with an increased focus on specialised products, have led to a definite trend in the mining industry towards maintenance contracts,” says Derrick Alston, managing director of Multotec Manufacturing. “It makes perfect financial and operational sense to optimise maintenance staff on a process plant and enable mine personnel to focus on the management of the mining operation.

“Multotec’s maintenance contract at Debswana is different from the norm, however, owing to the remoteness of its operations. Each of the plants must be overseen by maintenance crews with the necessary skills and expertise to conduct maintenance on a variety of equipment such as wear linings, screen panels, rubber scrubber liners, dense medium and hydrocyclones,” Alston adds.

The maintenance contract has been designed on a fixed cost basis with an additional cent per ton variable portion, dependent on the tonnages being processed. Multotec will maintain a stockholding of consumables on each site, eliminating the need for the mine to hold stock and resulting in an overall cost per ton reduction.

Multotec maintenance crews are now permanently deployed on each mine undertaking daily inspections of all equipment related to the contract. These daily checks are carried out in conjunction with the use of the Hawkeye monitoring program that allows the crews to accurately monitor the condition of equipment. For example, screen panel change-out can be predicted and dovetailed into pre-planned shutdowns to optimise the use of the process plant.

Hawkeye was developed in-house by Multotec to effectively monitor maintenance processes. It is a web-based application, accessible anywhere in the world, providing a simple interface for the user to access accurate and efficient records of maintenance activities. These entries are stored in a database and can be called up as required to identify actual equipment status.

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The evolving role of the project house and modular turnkey solutions

Trevor Anderson, of engineering and project management services company K’Enyuka says the role of project houses in the African mining industry has evolved from providing EPCM services towards a turnkey (TK) approach. He highlights the growing need in the medium to small mining sector for the supply of modular plants on a turnkey project basis.

The changing role of project houses in the African mining industry has come to the fore in a distinct manner over the past two decades; from a scenario where mining clients appointed several independent specialist consultants and suppliers for different project components to the current model in which project houses are appointed to manage major portions of a project, or the entire project from design to commissioning.

So says Trevor Anderson, of engineering and project management services company, K’Enyuka, who adds that the initial thrust of this trend embraced the EPCM (Engineering, Procurement and Construction Management) contract arrangement in which the EPCM contractor assumes responsibility for the correct and timely completion of a project.

“About 20 years ago, a mining company would source and manage multiple independent suppliers, but the more contemporary drift to EPCM offers these companies a spectrum of attractive benefits,” he says. “The client has one point of contact, while a single project manager controls project implementation. In most cases, project houses are able to tap into a broad range of in-house competencies and this translates into improved costing and time management, as well as efficient meshing of the various engineering disciplines. Well-established interdisciplinary communication, arising from long term in-house relationships, also contributes to the smooth progress of a project.

“Another major benefit is the sum of the expertise in a project house’s professional competencies pool. These professionals are all specialists in their particular discipline, across all commodities and their combined experience from past projects frequently leads to innovative approaches on the next project. After all, many of these engineers began their careers in an in-house project environment at some of the leading mining companies. Today, many of them have been absorbed into project houses where they work as part of a multi-disciplinary team.”

Anderson says the EPCM model rose to prominence in the industry from the early 1990s, until the global economic crisis of 2007 impacted the African mining market.

EPCM model has evolved

“I believe the African market is now demonstrating a clear move away from EPCM to turnkey (TK) projects,” he says. “This development has arisen out of the tighter controls being applied to clients’ budgets. With greater-than-ever emphasis on mitigating financial risk, the project model has had to evolve to accommodate a growing number of requests from clients, particularly in Africa, for design-and-build, as well as TK projects.

“These models differ from EPCM in that EPCM takes a reimbursable contract approach – effectively costed from month to month until project completion – and being subject to change. The other two models place more risk on the project house, with fixed costs for project execution agreed upon, provided that the scope remains the same over a known duration.

“With EPCM, project houses are fundamentally selling services, but TK projects require them to be able to cover all the costs of the project until handover. Beyond South Africa’s mining industry, risk-averse clients in other regions of the continent, where the mining environment is very volatile, are increasingly choosing a TK approach to make sure they receive a good return on investment. The more marginal projects in particular are focusing on maximum net present value.

“This escalating demand for TK
projects has required project houses to become more discerning about the projects they take on. A lot more engineering work is required up front in order to quote at the correct costing and there is also a relatively new expectation for project houses to bring outside investors to the table, so that projects can get off the ground as quickly as possible.”

Significantly, K’Enyuka has developed an innovative project financing model which could assist potential clients in attracting investment as well as with initial project financing, especially outside South African borders.

Global platform
Anderson adds that if the past 12 months are anything to go by, the number of new mining projects in South Africa is set to dwindle, with most new ventures being established in other parts of Africa via a TK approach.

“Today’s project houses operate on a global platform and to compete successfully in this international business environment we need to be excellent in all our disciplines,” he continues. “It’s all about establishing an unblemished track record. We need to be able to come up with, and deliver cost effective and innovative solutions and fully understand all the accompanying implications.

“K’Enyuka is ideally positioned to compete against Tier 1 global project houses for both local and international projects, while still being able to service mining companies with professionally designed and executed smaller projects. Technical expertise is a primary strength, drawing from a pool of relatively young engineers with fresh and innovative concepts, underpinned by the input of more longstanding professionals who have track records on major projects around the world.”

While the company has traditionally focused on South African projects, it is keen to expand its African footprint and has already identified heavy minerals and copper project opportunities on the continent.

Last year K’Enyuka announced a formal skills consolidation with all the linked enterprises associated with Read, Swatman & Voigt (RSV) (Pty) Ltd, to create the “RSV Group”. All enterprises linked to RSV, including K’Enyuka, are now able to draw from one another’s capabilities, building on a common high value brand. Established in 1991, RSV is one of the foremost consulting engineering and project management companies servicing the global mining and industrial sectors. Its growth strategy includes the creation of linked enterprises through which the company offers customers the benefit of combined proven experience across the full spectrum of mining, metallurgical, mineral processing, industrial plant and infrastructure design, installation and commissioning.

Kenyuka’s modular plants
Modular plants offer numerous benefits to both large and small scale operations, and are particularly sought after by junior miners and clients in Africa eager to generate cash flow quickly and effectively, maximising on the quicker access to product, which provides greater flexibility on limited life reserves, thus saving costs. They are ideal for applications where the lifespan of the mine is relatively short. Plant can easily be moved to a new site when the reserves are depleted.

Anderson describes some of the advantages of erecting modular plants.

“The structural design of the plant facilitates easy disassembly and reassembly on different sites. Fewer construction man hours are required and one does not need a highly skilled labour force on site since the plant is assembled off-site in a controlled environment where quality control is rigorously monitored.”

The off-site assembly, he explains, means alignment is easily checked and fewer fitting errors and reworking result thanks to the pre-fitting of components prior to delivery. Off-site erection also minimises laydown space, an important consideration for small or congested field sites. Schedules are shortened, allowing concurrent project processes to run unhindered. The wider benefit is a reduction to the client of the overall impact on his operation, especially when it is fully operative.

The cost for engineering and construction is minimised and the plant can be transported to site in modular sections using regular road transportation or easily shipped, internationally, via regular containers.

Modular plants, Anderson claims, can be up and running within weeks if civil preparation and upfront planning have been conducted.

K’Enyuka’s modular plant treats a range of product, from -50 mm to +0,5 mm sized coal in the dense media cyclone and dense media drum respectively. These plants are offered on an EPCM or turnkey basis. K’Enyuka can design and construct all modular plant tie-ins including raw coal handling systems, fines beneficiation modules, dewatering systems and discard- and product-handling systems.

The modular plant is particularly suited to smaller operations and can accommodate from 50 tph to 200 tph per module, so two or more modules can be placed side by side if greater throughput is required.

All plant is tailor-made to customer’s specific requirements for different minerals sectors, and includes mobile crushing and screening modules, large and small coal washing and spirals modules.

“Where customers are unsure of the best solution, we offer expertise in up-front consultation, feasibility studies and test work prior to project initiation on full beneficiation solutions from run-of-mine to finished product. In effect, we enter into a partnership to ensure a win-win solution with the customer obtaining value for money and a plant tailored precisely to deliver the requisite finished product,” Anderson concludes.

K’Enyuka’s custom-built modular plants can cater for specific application requirements.
Reliability knowledge delivered by SKF

SKF offers a comprehensive programme that covers every aspect of machine reliability. Like any difficult skill, training is key to ensure you perform effectively.

Our SKF Reliability Maintenance Institute training courses are offered locally, regionally and alternatively a programme can be arranged at the customer’s site.

Various of SKF South Africa’s courses are now BINDT and merSETA accredited.

For the full RMI courses outline and itinerary for 2013, please go to www.skf.co.za.

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Enhancing mine safety with specialised technological solutions

Becker Mining South Africa plays a key role in ensuring optimum quality, performance and safety standards in the local mining sector.

Jo hann Smit, chief sales officer, Becker Mining South Africa, says the company’s commitment to providing a critical service to the mines and general industry encompasses the design and manufacture of products and systems, using the latest technology.

“A specialised consulting, training and support facility ensures optimum efficiency of a wide range of equipment and total safety for workers underground,” says Smit. “Mine safety is significantly enhanced by the implementation of one or a combination of Becker’s specialised multi-technological solutions.

“Becker steel arch support systems are designed for use in friable ground in tunnel applications, including haulages, incline shaft portals and special shafts. These mine support systems are critical for the safety of any mining or tunneling project and we expect sales growth to remain positive, as long as mines expand and new operations are opened.

“Becker Mining South Africa specialises in the manufacture of steel arch supports, but the company’s German and Polish subsidiaries also manufacture long wall coal mining shield support systems for European, Asian and North American coal mines. South Africa’s strata conditions are not suitable for long wall mining, which is why the company only manufactures steel arch supports.

“The Becker steel arch support system finds application in all types of mining due to the adaptability of the design which fits into any shape of excavation. This engineered structure is timeless because of the characteristics of the steel used and the mechanical properties derived from the shape of the elements of the roof support system. More and more applications for these well engineered and adaptable systems are being developed for customers who require long term stand-up support solutions for friable ground conditions.”

Local applications for these steel arch support systems include gold and platinum mines, as well as underground civil engineering projects such as the Gautrain. Becker’s roof support systems have also been exported recently into Australasian and African mines, with Zambia being a key user.

Becker Mining South Africa also provides specialised training to customers for the assembly and installation of steel arch support sets.

The company’s specialist manufacturing operation at the Chamdor factory in Krugersdorp is committed to the most stringent quality control procedures during production. These standards conform to the expectations and demands of the global mining industry, including ISO 9001:2008 specifications. Rigorous tests, which include the chemical and mechanical verification of materials, are performed throughout every production process.

This production line is capable of moving 250 t of TH profile a month. The factory is equipped with four bending presses, one of which is semi-automatic. All arch sets are pre-assembled and inspected prior to delivery.

The local operation benefits from Becker’s on-going research and development programme locally and in Germany. Close international ties guarantee the edge on product design, impeccable manufacturing standards, cost efficiency, safety and reliability of equipment.

Becker Mining South Africa extensive product portfolio, which complies with government mining regulations and mining house specifications, includes shaft safety components, underground and tunnel supports, transport systems and communication and collision avoidance systems. The range also encompasses pumps, electrical and electronics systems, mechanical equipment, as well as lifting and maintenance equipment.

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Adding maximum value to processing equipment

In line with a transition in the global mining industry away from mergers and acquisitions in favour of a focus on extracting wealth from existing assets, specialised equipment supplier, Multotec, is intensifying its process support activities throughout the mining industry. From self-driven trommel screens for a West African mineral sands project to TeePee screen panels for dewatering applications, the company is committed to adding maximum value to the processing equipment it supplies.

Multotec Group CEO, Thomas Holtz, says the company is committed to drawing on its in-depth application knowledge to add value to our customers’ assets by ensuring that their processes remain optimal. “These customers want to see predictable or consistent failure patterns, in order to plan their maintenance activities more effectively. It’s a given that plant equipment in the flow sheet will eventually wear out and fail, so it’s a case of managing the replacement of older equipment in the most effective way, both in terms of controlling costs and sustaining operational efficiencies while equipment is being changed out.”

He says what differentiates Multotec in the marketplace is the diverse equipment support package they offer. “We’re right there at an end user level, from plant commissioning and onwards into the day-to-day grind of running that plant 365 days a year for ten, 20 and 30 years at a time. We’re there for the lifetime of that plant and we make sure it remains as efficient as when it was first put together. Management and plant personnel move on and ore bodies change, and the efficiency of a plant will deteriorate over time without active collaboration between plant personnel and equipment suppliers.

“This is the space we’ve played in very successfully over many years and, in the current climate, this is exactly what our clients are looking for. They don’t want catalogue sales people – instead they need metallurgically knowledgeable people who are prepared to go into the plant, look at the application and see for themselves if cyclone cut-points are right, that the screens are functioning as they should, if the samplers are working effectively and the spirals are achieving accurate results. At this level it’s possible to recommend a design change that might improve the throughput or the grind.”

Holtz adds that one the primary metrics of a plant owner is the cost per ton. “It’s not about reducing the price of the products we sell you,” he stresses. “We’re not a low cost producer of product and, typically, this is not what gives you value for money. The value-add lies in having correctly specified products that work efficiently, fail predictably, are maintained sufficiently and that sustain the required efficiencies throughout their working life. The key is being able to reconfigure or improve the performance of a particular piece of equipment so that it works to specification in the context of the circuit.”

On the new products side, Multotec develops and supplies specialist process equipment into the gold, platinum, iron ore, diamond, base metal, mineral sand, coal and chrome sectors and the engineers working on these commodity-specific product lines include qualified metallurgists and former plant personnel. Holtz says these professionals understand client applications and have the knowledge and experience to specify or reconfigure a particular product for an application.

Trommels for mineral sands

“We have recently supplied two 52 ton self-driven trommel screens to a mineral sands project in West Africa, and will shortly be supervising erection and commissioning,” says Holtz.

The self-driven trommel screens have inside diameters of 3 365 mm and are 16 544 mm in length. Each unit is capable of handling 4 375 t/h of solid feed or 12 888 m³/h of pulp. The screens are mounted on support pedestals, plumber blocks and steel tyres on the feed end, with a plumber block supporting the discharge end coupled to a hydraulic drive.

On track to commence production this year, the mineral sands project is set to become one of the world’s largest producers of zircon and titanium dioxide products, coinciding with a period of unprecedented demand. It has a projected mine life of at least 20 years and...
is expected to produce on average about 85 kt of zircon and 575 kt of ilmenite per annum, as well as small amounts of rutile and leucoxene, when in full production, making it also the largest new mineral sands project currently under construction.

Multotec was originally awarded a contract to implement only up-front design, finite element analysis and engineering for these units, but subsequently received an order to manufacture and supply the self-driven trommel screens from the EPCM contractor for the floating (wet) concentrator, mineral separation plant and associated site infrastructure.

“The client required a primary screening machine to remove vegetation and tramp material from the beach sands,” Anthony Yell, Multotec project manager – screening, explains. “The high volumes made the self-cleaning capabilities of a self-driven trommel screen the most cost-effective option for the application, as has already been proved in a number of existing applications.

“Self-driven trommel screens of this size are unique in terms of the multi-disciplinary nature of their manufacture, involving large steel fabrication, rubber lining, stress relief, machining, casting of polyurethane panels and liners, assembly, hydraulic drives and electronics featuring Human Machine Interface. Test running is also a requirement, along with specialised logistics to transport these units to site – followed by supervision, erection and commissioning.

Multotec’s self-driven trommel screen designs use a direct hydraulic drive on the discharge end, which simplifies the drive and support mechanism. The hydraulic drive caters for variable speed as standard, making it possible to optimise the screening process to suit the application. Discharge of the oversize is accomplished through peripheral discharge ports, an approach that also simplifies the chute arrangement. The undersize is fed into a dewatering cyclone and then onto heavy mineral spirals and magnetic separation.

In manufacturing these two massive trommel screens, the Multotec team worked from February 2012 to the meet the non-negotiable deadline of November 2012, in order to transport the units by road to the Port of Durban before the annual holiday season roads embargo on abnormal loads was imposed.

**Newly engineered TeePee screen panel**

Following a significant investment in tooling by Multotec, the company has developed an injection moulded polyurethane screen panel that dramatically increases the open area and drainage. The new Multotec TeePee™ panel is already proving very popular in dewatering applications.

“We engineered this new screen panel with open area in mind and the resultant design provides a significant open area that, in some cases, has been shown to be double what was previously achieved with conventional Multotec Hi-Flow panels for the same aperture, and with double the drainage capability,” explains Yell.

“In dewatering applications, there is a significant improvement in drainage further reducing the moisture content of the oversized material.”

The Multotec TeePee screen panel has been designed as a standard modular panel of 305 by 305 mm with thicknesses of 30, 36 and 40 mm and compatible with standard fastening systems. The panel can be accommodated on any modular screening deck and Multotec is in the process of manufacturing a range of panels with slotted apertures from 0,3 mm up to 1,2 mm.

Yell says it provides an ideal solution on plants where existing dewatering screens are overloaded. “The TeePee is currently operating successfully in iron ore, coal, andalusite and diamond dewatering applications and we expect its scope to increase as new applications are tested,” he concludes.

**Staying relevant**

“Our strength is that we have the ability to conceive the design, make the prototype, evaluate it, test it and then install and operate it,” Holtz continues. “A tremendous amount of development goes into each application. Every plant is different, so a slight customisation on a certain screen or cyclone has to be compatible with the next stage. Therefore, while our products are not unique, they are customised to each application by commodity experts.

“For us to stay relevant in a globalised world, we must remain state-of-the-art in terms of the equipment we produce. This requires us to balance the two aspects of developing innovative new equipment, while ensuring its relevance in the flow sheet. This commercial and technical relevance underpins all our development activities as we work closely with our customers to extract top dollar from their existing investments,” Holtz concludes.

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**The Multotec TeePee screen panel offers double the open area of conventional Multotec Hi-Flow screen panels with the same aperture size.**
MBE Coal and Minerals Technology’s BATA®c jig technology is gaining increasing recognition for delivering higher efficiencies, huge economic benefits, better product quality, better machine availability and higher throughput rates than other technologies. The system also has excellent separation accuracy, is relatively small in footprint and has a comparatively low capital cost. Every benefit the technology offers has been field proven through extensive and diverse test work.

Stratification by means of jigging is one of the oldest separation methods in the history of mineral and coal beneficiation and today this environmentally-friendly and cost efficient water-only technology is still considered among the most important sorting approach for beneficiation plants.

Since the first unit was introduced in 1964, more than 300 BATA© Jigging systems have been commissioned worldwide for coal preparation, processing of iron, tin and manganese ores and recovery of metal losses from alloy slags, 15 of them in southern Africa.

BATA©c jigs not only excel in their high separation efficiencies but also in terms of ease of operation, robust designs and minimised maintenance costs, making them the preferred technology for numerous beneficiation plants worldwide.

Jones® WHIMS
MBE’s robust Jones® Wet High Intensity Magnetic Separator (WHIMS) offers a high throughput capability coupled with simple maintenance and lower energy consumption and can operate at up to 13 000 gauss. The Jones is ideally suited to treating feebly magnetic minerals with a particle range from 20 microns up to 1,0 mm, while its compact design allows the system to be used in operations that call for a small footprint.

In actual operation the Jones WHIMS upgrades iron ores and other mineral raw materials. More than 180 Jones separators of different sizes have been supplied throughout the world, primarily separators of the type DP 317 designed for nominal capacity of 120 tph. Five different models for throughput rates from 200 tph to 400 kg/h (for laboratory and pilot tests) are available.

PERMOS MIMS
MBE’s PERMOS Medium-Intensity Magnetic Separator (MIMS) for dry and wet separation of ferromagnetic and paramagnetic ores and minerals, has a broad working range outside the drum that allows for dry and wet magnetic separation of coarse and fine ores and minerals, particularly high grade ores of medium and high susceptibility at high throughput rates.

The PERMOS operates at field intensities of 5 000 gauss on the drum surface and meets the demand for cost effective solutions for many applications which are outside the scope of traditional low-intensity permanent magnetic separators, that reach only a magnetic intensity of up to 2 000 gauss on the drum surface.

Pneuflot®
The company’s Pneuflot® technology is attracting worldwide attention as a flotation technology of the future. The flotation cell improves product quality and recovery, delivering lower capex and opex as well as significantly lower wear costs and higher efficiencies.

The biggest advantages of Pneuflot are its reduction in required footprint and ancillary equipment. The diminished process complexity also makes Pneuflot much easier to manage than conventional agitator cell circuits, while offering a genuinely economic solution not only for new plants, but also for existing plants and expansions.

Screens
MBE’s vibrating screens have been operating in the African mining industry for the past 40 years. With products for sizing, scalping, dewatering and media recovery, these screens feature an innovative side plate mounted drive, making them lighter than those utilising vibrator motors. The company also supplies screens with vibrator motors where required, while its resonance screens offer the benefit of low power consumption. Each screen is designed with sound mechanical features including vibration damping, side plates, cross members and the appropriate feed and discharge chutes. All types of screening.

BATA©c jig technology is gaining increasing recognition for delivering higher efficiencies, economic benefits, product quality, machine availability and throughput rates than other technologies.
MBE’s Pneuflot® technology is widely hailed as a flotation technology of the future. BATAc® jig technology has excellent separation accuracy, is relatively small in footprint and has a comparatively low capital cost. Surfaces can be accommodated.

In addition, maintenance of the screen is simplified with easy access to motors and drives. Power consumption is low as a result of the use of resonant motion. This ‘softer’ motion keeps wear and tear and therefore maintenance costs, down to a minimum. Equipment is supplied either as a one-off unit or as part of a comprehensive process engineering contractual package encompassing conceptualisation, design, manufacture, installation and support.

Feeders
MBE’s range of vibrating feeders, designed in Germany and manufactured locally, is available with feed capacities of 100 tph up to 3000 tph. These feeders are suitable for all applications where controllable discharge of bulk materials is required. Replaceable bolt-on wear liners are fitted to the feeder troughs to prolong feeder life. In addition to the low power consumption, RF Series resonance type feeders and twin vibratory motor type feeders are available.
The ‘proudly South African’ HVAC component manufacturer

Europair, a member of the First Tech Group of companies, has been a local manufacturer of air conditioning and air ventilation components and systems in South Africa for over 40 years. MechTech talks to Lee-Ann Drennan, the company’s general manager and Michael Muller, its regional sales manager for Gauteng, about the company’s commitment to the ‘proudly South African’ ethos.

Founded in 1968 by Barry Spanger, Europair has a long history of manufacturing and supplying essential HVAC components for commercial and industrial spaces across South Africa and into Africa. Specialising in air distribution, diffusion, handling and conditioning; and industry leading fire protection products, the company was one of the earlier acquisitions of the First Tech Group’s expansion programme. Together with the Group’s extensive product offering, Europair provides the following: damping systems; inlet and outlet air diffusers; air grills; fire protection systems; air volume controls; flexible ducting; insulation; and a host of other components used by building, electrical and HVAC contractors across southern and South Africa.

“We fit perfectly into the First Tech Group’s building and infrastructure supply portfolio, supplying HVAC contractors with the fittings and components they need to install air conditioning and ventilation systems. We do everything except the indoor and outdoor units and the chillers, which we feel is the domain of the HVAC contractor,” reveals Muller.

“We have always been a local manufacturer of these components,” continues Drennan. Out of its 6 000 m² facility in Spartan, Kempton Park, Europair manufactures and supplies custom-made components to several large building contractors, “usually on contracts that involve the installation of a building management system (BMS).”

The company also runs an air grill manufacturing facility in Cape Town for the Western and Eastern Cape and Namibia. Spartan houses Europair’s central warehouse for distribution to branches in Cape Town, Nelspruit, Port Elizabeth and to two agents, one in Namibia and one in Durban.

“Our philosophy is built on local manufacture to avoid having to import,” says Drennan. “Local manufacture (85%) means sustainability, which translates into keeping people employed. At least 50% of our labour has been here for 20 years or more, and key admin and senior management people have worked here for over 30 years. This demonstrates the value of promotion from within, and through training and development, we create sustainable jobs that enable us to keep our employees, rather than making people redundant at the first hint of economic trouble,” she adds.

The company’s commitment to long-term relationships is also mirrored through its imports: “We import some small household fans, for example, but this is via a 40 year import relationship. In today’s market, many people are trying to compete with imported substitutes, but we do not attempt to source cheaper product by importing, but rather by negotiating with local suppliers,” Drennan assures MechTech.

“Since 2010, competition from imports has been fierce,” she comments, “and we have had to be very active and aggressive to win tenders for available work. We have put product into contractor mockup rooms, for example, so that we can get specified at consultant level. But most importantly, we have continued to offer excellent service and a good basket of customised products. We take a ‘customer is king’ approach. By offering a basket, we offer convenience that mass-producing importers cannot
closed to optimise air flow and ensure dampers (OBDs) can be opened and be managed, but our Opposed Blade ventilation systems are usually linked by hand. Modern air conditioning and has cooled down or it can be reset by using an electric motor once the pin damper vanes can then be re-opened tor under the control of the BMS. “The damper vanes can then be re-opened against the springs, either manually using a quadrant handle or via a mo - again, allowing the damper to be reset if you under-order or you damage something and need replacement parts, then the lead times are extreme and, as soon as the volumes are not there, the price is no longer cheap,” she warns.

Niche products
Turning attention to the product offering, Muller lifts out Europair’s range of SABS-approved fire protection dampers, “Fire dampers are designed to isolate a fire as soon as it is detected. As soon as heat is detected, the dampers on the ventilation ducts close, shutting off the air flow to the burning space and throttling the spread of the fire,” he explains. “We manufacture a wide range of rectangular dampers, all made to suit the custom sizes of the inlet ducting,” he adds.

The simplest of these are bladed fire dampers with a fuseable link: The link holds a row of damper blades open against a loaded spring. The link is designed to snap as soon as it senses a temperature of 72°C, causing the blades to shut like a louvre blind.

After a fire, however, these dampers cannot be easily re-opened. They have to be removed from the ducting in order to replace the link. “But our McCabe link solves that problem,” Muller reveals. Europair’s Prefco McCabe Link fire dampers use an expanding pin instead of the fuseable link. The pin is designed to expand and pull out of its link at 72°C, allowing the damper to shut.

Return air grills have 45° curved blades angled to collect the rising hot air as efficiently as possible.

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Another key requirement for efficient ventilation and air conditioning is to keep the ducting, damping and flanges air tight to reduce losses. “When we profile our flanges on any of our dampers or grills, we inject a mastic sealant into the profile to guarantee that the flanged-joint remains completely air-tight and that no pressure losses occur at the joint,” Muller tells MechTech.

With the other First Tech companies, we essentially offer a complementary and comprehensive set of building and infrastructure component solutions and we strive towards healthy relationships,” says Drennan. “Our slogan says it all: ‘commitment is the difference’. We are committed to South African manufacturing and our employees; to our contractors and customers; and to all of the business relationships we have built up with suppliers and service providers over the years. All of our employees have the company’s interests at heart. And that really is what differentiates us,” she concludes. □
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**Versatile heat exchanger systems**

BMG’s focus on extending its heat exchanger business encompasses a new arrangement where SA Heat Exchange provides a manufacture, refurbishment and repair service for BMG to all industries, particularly the sugar sector.

Richard Strickland, divisional director, engineered products, BMG – Bearing Man Group says that, in conjunction with SA Heat Exchange, BMG now offers the supply and support of an extensive range of heat exchanger products.

“This range includes Transon modular shell and tube heat exchangers, Blockfin heavy duty extended fin heat exchangers and an ultrasonic cleaning and treatment service,” says Strickland. “Transon modular shell and tube heat exchangers, which have been used in the local sugar industry for over 35 years, are designed for sugar processing operations that include coolers, economisers and mash feed heaters, as well as calorifiers, after coolers and condensers.”

Transon systems, which are based on the latest heat transfer and process technology, are designed for the efficient and safe handling of hydraulic oil in large gearbox systems. These heat exchangers are used in a large sector of industry – not only as oil coolers, but also where fluid needs to be cooled, or even heated.

“This versatile heat exchanger system consists of modules that facilitate compact plant design and the efficient utilisation of space. The modular design, which comprises one or more shell and tube type standard units, enables installations to be extended to meet increased capacity requirements. Transon versatile heat exchanger systems now encompass the U3 series of oil coolers and the newly designed U5 series, available at short lead times,” explains Strickland.

Single and multi-module units can be arranged in horizontal or vertical configurations, depending on capacity and size requirements. Mounting stands are designed for simple, quick installation to match the related pipe work.

“This heat exchanger system is available in a wide range of steels and alloys, as well as corrosion and abrasion resistant materials. Standardised interchangeable components enable short lead times and early delivery of units and spares. Fluid separation is an important safety feature of this heat exchanger system. In the event of seal deterioration, an atmospheric gap ensures that fluid leaks externally, preventing internal mixing and cross-contamination of fluids.”

Strickland says the elastomeric mountings enable the tube bundle to float within the shell when subjected to fluctuating temperatures, thereby eliminating induced thermal shock loads.

“For high thermal efficiency, a unique patented shell pass baffle assembly ensures uni-directional flow at relatively high velocity, eliminating dead spots. Straight tubes enable unrestricted flow. During maintenance, individual tubes, or the complete tube bundle, can be removed and replaced in-situ, without disconnecting the related pipework. No special tools are required and seals are easily replaceable.”

SA Heat Exchange, which specialises in the manufacture of extended fin products for the sugar industry in South Africa and in Africa, utilises high speed fin manufacturing technology to provide the latest, robust industrial grade fin products.

The Blockfin range includes industrial heavy duty finned air blast heat exchangers and steam heated air driers, as well as coolers and heaters of oil, water, air and gas.

Fins, which are manufactured from aluminium, stainless steel and copper, are slid over the tube to provide a tight fin-tube joint for minimal thermal loss. Central to the integrity of this range is the quality of the tube to tube sheet welding process. Standard aluminium fins generally cannot withstand the cleaning operation of high pressure jets, but these fins are robust and are able to endure this cleaning process.

“Modular options are available to extend the existing capacity,” continues Strickland, who adds that these systems meet stringent ASME and TEMA construction code specifications.

Another critical service for the sugar sector is an ultrasonic cleaning process that ensures even the toughest heat exchanger components are thoroughly cleaned to an exacting finish. The company uses an ultrasound technique to clean and treat tube plates and tube bundles – there is no need for harsh chemicals or rodding. This system is also used to clean petrochemical inlet and candle filters internally and externally – it would not be possible to clean a filter’s microscopic pores perfectly without ultrasound.

*An air drier which has been manufactured for a sugar mill in Central Africa.*

*Twelve heat-exchangers have recently been manufactured for a local sugar mill. These heat exchangers have replaced the previous spiral finned tube type, using less tube rows, with higher off-coil temperatures and a lower pressure drop.*
Intensive processing solutions for concrete and sludge

Birkenmayer, in association with Eirich, offers a sophisticated range of precise concrete mixers with admixtures to optimise cement to gravel ratios, along with direct sludge drying systems that provides lower energy costs, better environmental practices and maximum operational efficiency. Dirk Heuer of Eirich and Birkenmayer’s Louis Eksteen explain.

Over the last decade, the concrete industry has slowly increased the complexity of its formulas in an effort to improve in-situ strength, viscosity and setting time, while reducing the cost of production with admixtures that optimise cement to gravel ratios. This has created a new market for cement mixers that produce more precise results.

Speaking at the 2013 Advances in Cement and Concrete Technology in Africa conference in Johannesburg, Dirk Heuer, manager building materials at the German company, Maschinenfabrik Gustav Eirich GmbH & Co KG, explained why the company’s world-renowned intensive mixers are gaining new relevance in the progressively high-tech concrete industry: “Using a unique mixing principle, Eirich mixers have proven to reduce cement requirements by up to 10% without affecting final concrete strength, by means of superior homogenisation. Other benefits are higher early strength of the concrete, which means precast products can be removed earlier. This drastically improves precast manufacturers’ productivity,” he explains.

“Eirich mixers offer significantly reduced batch times for high performance concrete. That means daily throughput can be maintained for much smaller mixers and, in turn, this reduces energy requirements. In fact, this helps to improve our customers’ profitability as well as the final quality of concrete. Proper homogenisation of concrete mixtures has also proven to reduce the need for super plasticisers by between 2% and 10%.”

Eirich has previously focused on its strengths within the specialised mixing markets, but the increased complexity of concrete manufacturing has seen Eirich’s applicability to the industry grow. “Concrete used to consist of just sand, gravel, water and cement. But nowadays, you’ve got sand, gravel, cement and water as well as expensive super plasticisers, admixtures, fibres and colorants that make it imperative to reduce batch wastage by taking a more scientific approach,” says Heuer.

“High value cement also has very small grain sizes, which increases the mixture’s tendency to agglomerate. To destroy these agglomerates, you need more shearing forces to be applied to the mixture. This is where our intensive mixing principle offers a major advantage,” he says.

Eirich, represented locally by its joint venture partner Birkenmayer, started manufacturing industrial mixers in 1903. The company later invented the world’s first planetary mixer in 1906 and in 1924 introduced the first rotating pan technology to the market and created the world’s first counterflow intensive mixer. The first rotor agitators were introduced in 1960, followed by inclined mixing pans in 1972.

“Today, we have a range of application-specific innovations such as hybrid mixing sequences, which allow variable speed mixing, various types of wear protection covers and fully automatic cleaning systems. We customise every mixer to match precisely the needs of our customers – starting at project consultation and the supply of mixers and ancillary equipment to aftersales services and support. This is why Eirich is very competitive in price and lead times compared to mass-produced mixers which need to be re-designed and customised to suite more specialised mixing applications,” says Heuer.

Eirich offers three wear protection systems for the concrete industry, which provide a maximum lifespan for mixers, depending on the concrete application. They can be equipped with steel protection for standard concrete mixtures, while for very fine mixtures with small gravel sizes, rubber linings are recommended. Eirich installs tungsten carbide plates for very abrasive mixtures, which can withstand many years’ of harsh usage.

Eirich is extending its product range by introducing a new one-litre lab machine, the EL1, which is ideal for research and development in universities for fine grain mixtures. Other product additions include the R16 industrial mixer which features a capacity of 600 to 900 litres. The R28 industrial mixer features a maximum capacity of 4 000 to 5 000 litres and the new R33 features a colossal capacity of 6 000 to 7 000 litres.
“These machines are suitable for all different types of concrete, including self-compacting concrete, ultra high performance concrete, facing concrete or fibre concretes. Eirich mixers are well known for their unique process advantages also in other industries, such as dry mortar, foundry moulding sands, metallurgical applications and many others,” says Heuer.

**The need for hi-tech direct sludge drying plants**

With the volume of sludge that needs to be dried likely to continue growing over the next few years, Birkenmayer also offers a sophisticated range of Eirich direct drying systems that provide lower energy costs, better environmental practices and maximum operational efficiency.

A number of recent trials have proven Eirich industrial mixers to be exceptionally efficient at drying municipal sewage sludge, industrial sludge and lacquer-containing sludge by using super-heated steam and exact process parameters such as temperature, pressure, speed and mixing time, among various others. Key to the range’s success is the mixers ability to accommodate vacuum drying, superheated steam drying, exceptional wear and abrasion resistance and the ability to operate in extreme operating conditions.

“Eirich mixers are capable of granulating, homogenising and heating within a single batch cycle, which simplifies process engineering and reduces setup costs as well as operational expenses,” says Birkenmayer’s business development manager, Louis Eksteen.

“Maintenance is minimal, and thanks to the purpose-developed intensive mixing principle, whereby maximum energy is directed into the mix using minimal energy input, results are predictable, highly repeatable and granulates are remarkably dense.”

**Direct drying of municipal sewage**

Sewage sludge is typically reduced to a solids content of approximately 20 to 35% with a centrifuge, belt filter or chamber filter, but Eirich machines that are configured to drying sewage sludge have demonstrated enormous cost benefits by reducing solids content by up to 95%, as it is significantly cheaper to dispose of smaller volumes.

Any vapours from the steam drying process can be condensed and returned to the sewage works for reprocessing, while the heat output is available for other uses such as energy generation and biological waste digestion.

**Industrial sludge**

A recent experiment reduced the moisture content of electrolysis sludges from 20% down to just 5%, making the residue suitable for sintering at high temperature without flaking. “The advanced homogenisation afforded by the mixer is the main condition that prevents flaking – a result of greater stability and compressive strength than, for example, pelleted granules made from a more powdery material,” explains Eksteen.

**Lacquer-containing sludge**

Eirich mixers are suitable for drying lacquer-containing sludge with a relatively high amount of solvent and a low amount of binding agent. Like many other types of sludge, lacquer-containing sludge is occasionally contaminated with significant foreign particles, such as plastic films, plastic pieces, and so on, but thanks to the high temperatures achieved within Eirich mixers, these impurities simply melt and blend homogenously into the sludge mixture.

“This means that batches with lower plastic levels are suitable for re-use within the lacquer industry, while high plastic levels render sludge suitable for landfill or incineration,” concludes Eksteen.

Birkenmayer and Eirich design, supply and commission industrial processing systems, including sludge direct drying systems.
When Size Matters

Bonfiglioli’s New Range of Large Power Bevel Helical and Parallel Shaft Reducers for Heavy Duty Applications

The HD series is the perfect choice for demanding industrial applications. The advanced design technologies are setting new standards for industrial gearboxes. High precision ground gears, closely spaced reduction ratios and a wide range of mounting options, guarantee excellent configurability for every application.
Energy efficient glass processing

An all new range of energy efficient glass tempering furnaces from one of the world’s foremost suppliers has finally arrived on South African shores to provide glass processors with broader options when choosing machinery.

While Cooltemper glass processing solutions are among the market leaders in Europe, the United States and several Eastern countries, they have not, until now, been sold or even represented on the African continent.

Stuart Fraser, managing director of FG Trading – a local glass equipment specialist that will distribute and support the machines – says this new range of tempering furnaces will now give local processors the capacity to temper glass – from extremely thin glass for applications such as solar systems to the latest spectrally-selective coated glasses used in the architectural environment.

“It is our on-going aim to bring the very best machines from across the globe to our local glass processors. Worldwide, the Cooltemper brand is synonymous with quality technologically advanced glass tempering equipment at a reasonable price – ideal for the local market,” he says.

“The local operation will uphold similar values as operations elsewhere around the world, with particular attention paid to providing the right technical solutions for the job. The company will provide on-going service and support of machines throughout the southern African region.”

Range highlights

Continuing research and development has kept Cooltemper at the cutting edge of tempering technology. The range of furnaces are, on average, 25% more efficient than existing units that are currently in operation in South Africa. Its solutions provide processors with a full range of options for any manufacturing requirement and further customised options are available as required. Top-sellers in the range include:

Jetstream: A top and bottom aspirated convection furnace that tempers all types of energy efficient glass from 2.8 to 25 mm thicknesses, producing top quality glass, with excellent visual and performance qualities, combined with high production cycles. Jetstream is ideal for architecture glass, automotive glass, optical and technical glass and solar glass.

Super Jetstream: A full convection furnace for all types of glass from 2.8 to 12 mm thicknesses. The balanced airflow circulation system ensures a uniform pattern of heat across the glass, giving fast production cycles, excellent visual appearance and the highest performance characteristics. It is ideal for all types of applications that focus on outstanding quality.

Firejet Plus: A low energy convection furnace for glass of all thicknesses. Ideal for high volume Low-E glass production.

Other production machines include chemical tempering, heat soak, double chamber furnace, continuous furnace, paint drying oven, glass scanner, IGIS insulated glass lines and glass washing machines.

Cooltemper tempering products are distributed and fully supported locally by FG Trading.

Making local manufacturing viable

Helping boost momentum for a South African manufacturing revival, this year’s AfriMold trade fair from 4 to 6 June at the NASREC Expo Centre in Johannesburg will showcase the latest trends and innovative solutions for the sector.

South Africa’s manufacturing sector faces stiff competition from offshore manufacturers, who appear to have the scale and capabilities to produce goods faster and cheaper. Even local innovators and business are offshoring their manufacturing.

Challenging this outlook, AfriMold, the 4th annual manufacturing trade fair and conference for the design, precision engineering & machining, automotive component, tooling, tool making, production and application development sectors, will address the critical issues around making local manufacturing viable and productive.

Taking a positive view on the technologies and strategies that can keep local innovation at home, invigorate South African manufacturing, and critically, help make it cost effective to produce goods locally, AfriMold will showcase the latest and the best solutions and outline strategies for growth. Offering solutions for every sector, AfriMold also enables vital business networking opportunities for small, medium and large players.

The AfriMold trade fair will be a hub of innovation, where local and international market leaders exhibit solutions for design, materials, simulation, visualisation, engineering, virtual reality, CAE, CAD and CAM, rapid prototyping and tooling, patternmaking and prototyping, precision machining, mould-making and tooling, tools, machine tools, quality assurance and automation, as well as processing and finishing.

For the full agenda, and to secure your space at the AfriMold conference, visit www.afrimold.co.za
DVM S for smart multi-zone air conditioning

On 8 April, 2013, Samsung Digital Air Solutions launched its new Digital Variable Multi (DVM S) variable refrigerant flow (VRF) air conditioning solution into the South African market. Peter Middleton reports.

Samsung Electronics’ latest generation smart VRF air conditioning system ‘represents a complete transformation from its predecessors. We’re truly proud of the versatility the new Samsung Digital Variable Multi provides for our consumers,” says Michael McKechnie, business leader for Digital Air Solutions at Samsung Electronics, South Africa. “Whether in home or commercial spaces, this air conditioning system will revolutionise consumers’ lifestyles with improved energy efficiency to save them money, and, with our first-ever system built exclusively with Samsung technology, demonstrate how we operate as a business.”

Previous generations of the company’s DVM system used a modulation technology called ‘Digital Scroll technology’ to achieve variable refrigerant flow. By separating the compressing scrolls, the compression cycle could be ‘loaded’ and ‘unloaded’, allowing the compressed refrigerant volume to be varied without changing the compressor motor speed. The scrolls separated in 15-second periodic cycles to obtain a time-averaged compressor capacity based on the ratio of loading and unloading times, allowing the compressor to achieve capacity modulation anywhere between 10% and 100% of full flow capacity.

The new Samsung DVM S, however, fully embraces the electronic approach and Dual Smart Inverter technology replaces Digital Scroll technology. Variable speed inverter drives are used to independently control and optimise the speed of two fixed scroll compressors in the central outdoor unit. And, unlike other air conditioning systems that use a mix of fixed and inverter compressors, Samsung’s DVM S contains only inverter compressors, which helps to improve the system’s overall efficiency.

The unit’s average European seasonal energy efficiency ratio (ESEER) rating is 4.0% higher than any similarly rated system. “In addition to the highest possible efficiency values, the DVM S also offers the world’s largest capacities: single units of 22 hp provide 61 kW of cooling each; and a four unit modular system offers a massive 88 hp, 244 kW, the world’s largest VRF system by a considerable distance,” says Robert Larkan, senior sales engineer, Digital Air Solutions at Samsung Electronics South Africa.

“This is third generation Samsung DVM technology,” he continues. “The DVM I used variable and fixed speed compressors in separate units. The second generation used one variable speed compressor and one fixed speed in a single unit, while the DVM S has two variable speed inverter-driven compressors in a single unit and both use vapour injection technology to maximise efficiency, resulting in savings for owners and tenants every month,” he says.

Digital vapour injection (DVI) involves adding cool, mid-range pressure refrigerant into the compression process, which increases refrigerant volume and flow rate, maximising the enthalpy difference. This improves cooling and heating performance and overall efficiency.

“Core technologies for the new DVM S are its smart compressor, smart inverter and smart protection,” says Larkan. On the compressor side, as well the use of DVI technology, the asymmetric scroll design reduces friction losses, resulting in enhanced volume and hence energy efficiency. The shaft and frame design have been made more robust and the oil supply has been optimised for high speed operation. Larger oil storage and lower net circulation per compressor also improve reliability.

The smart inverter achieves precise frequency control through its 0 to 280 Hz range in 0,01 Hz increments. “The micro-fine control solution offers much more accurate matching to the cooling or heating demand, which gives better comfort, along with improved energy efficiency,” Larkan suggests. It also enables a quick start function for faster heating or cooling on start up. The compressors are started simultaneously to share the initial load, which also results in improved compressor reliability.

On the smart protection side, adaptive sine wave technology in the DVM S with an intelligent filter reduces electromagnetic interference on the communication signal lines. “This means that it is no longer necessary to shield the wiring for the communication network, which can reduce wiring costs by as much as 35%,” Larkan claims.

To cool the inverters, Samsung has introduced a refrigerant cooling system, ie, chilled refrigerant is used to achieve much more effective cooling than traditional air cooling. “Resonance avoidance technology has also been incorporated to prevent frequencies from being transferred into the piping, inducing mechanical stress,” he adds.

The maximum piping length is extended to 220 m, with an increased height difference, allowing a single outdoor unit to be used to control in-
door units on several different floors. “DVM S level difference between indoor units has been increased to 50 m, which is three times longer than our competitors,” says Larkan.

Other improvements include:

- Dynamic current control for energy management allows the maximum current draw to be programmed to match the peak demand allowances and save energy. This feature prevents the excessive use of power and prevents the system from entering punitive tariff bands should demand be unusually high.
- Silent mode, which reduces night noise by 15 dB. “The maximum temperature load peaks at between 2:00 pm and 8:00 pm, but between 8:00 pm and 8:00 am, while it is cooler, silent mode kicks in to give both valuable cost savings and reduced energy use,” Larkan explains.
- When using the heat recovery option, hot water can be generated from the energy rejected while cooling the compressed refrigerant. This can be used for sanitary hot water at 50°C or at 80°C for commercial applications. Both options save money on heating.
- To assist installers, the new Samsung DVM S system is compatible with an S-Checker, which automatically provides operational test results, in pdf format, to ensure that the system is left fully operational and optimised on installation. Automatic inspection of the indoor units can be performed at any time and reports sent via wi-fi to a PC, tablet or smartphone, enabling them to be emailed to a plant or building manager.
- Also accommodated are remote system software updates. “There is no longer a need to plug in to the individual unit to upgrade them. All indoor and outdoor software updates can be sent to the relevant units via the Internet from the comfort of any office,” he reveals.

“The Samsung DVM S offers the largest capacity on the smallest footprint and is the global top performer with respect to energy efficiency, saving more money on operational costs than any comparative system on the market,” Larkan concludes.

The ZenManager app
To accompany the launch of the DVM S, Sibusiso Guzana, systems sales engineer, introduced the company’s new building management system, Samsung ZenManager. “ZenManager is an energy reducing, easy access monitoring and control system. It’s a complete estate management package with fantastic access via smartphones, tablets, laptops or PCs,” begins Guzana.

It is a software package that embeds, at its core, energy saving algorithms and options that allow better management of energy use in commercial buildings and its air conditioning, lighting, water heating, and other electrical systems with energy saving potential. “ZenManager is the first ever building and utilities management app. It allows managers to access and review data, to pinpoint exactly where energy is being used excessively and to react quickly to prevent unnecessary use,” he explains. Also included is a remote fault manager. Automatic error notifications are sent to managers as soon as faults are detected, enabling relevant people to be dispatched quickly to correct problems, reducing system downtime.

Real time access to facts about a building’s power consumption and the temperatures make for better tracking and operational analysis and better matching of energy consumption to real demand.

“Temperature limits can be set to cap the upper or lower limits of the air conditioning system to ensures that the air conditioners are only producing what is actually needed,” Guzana explains. “And the ability to manage the DVM S via a smartphone “revolutionises control systems as we know them,” he concludes.
New MI Range from Manitou

Manitou has recently introduced the MI range of internal combustion industrial forklifts that are designed to achieve simplicity, reliability and efficiency while maintaining Manitou’s trusted reputation of reliable machines with guaranteed services and support.

“Nowadays, customers expect more than just a machine. This is why we are offering a materials handling solution tailored to the constraints of our clients in terms of production and logistics. The redesign of the new forklift has made it an indispensable piece of equipment for many business operations,” says Lindsay Shankland, managing director of Manitou Southern Africa.

The MI forklift is a conventional unit, used within standard working conditions such as paved, tarred or smooth surfaces, that is ideally suited to a broad spectrum of industries such as warehousing, food and textile and manufacturing. The new MI forklift range, standard with side shift and solid tyres offers a very short turning radius for quick manoeuvring, making it ideal for tackling congested sites or warehouse aisles where high item rotation is important.

The 12 models of the MI range are available in both diesel and LPG variants with a high load capacity of up to 3 500 kg. The high performance 42,1 kW Yanmar diesel and 38 kW Nissan LPG engines have optimised related components that ensure a long life. Both engines come standard with high-level air intake, an air filter safety carriage and a vertical exhaust, making the forklifts well suited to indoor and outdoor applications.

Additionally, the MI range is equipped with Powershift transmissions with an inching function for jerk-free approach, and end-of-stroke braking functions for handling delicate loads. The range, alongside all Manitou forklifts, comes with constantly available service and support throughout South Africa as well as 95% parts availability.

Crown pallet trucks for ABI

Amalgamated Beverage Industries (ABI) has acquired 230 Crown ride-on and walk-behind powered pallet trucks from Goscor Lift Truck Company’s MPM as part of the overhaul of ABI’s warehousing and delivery system for mixed deliveries.

Forty rented units and 151 purchased units are already on site, and ABI is awaiting delivery of a further 39 units.

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Booyco Engineering 110 V dc ventilation units

Transnet Engineering has placed an order with Booyco Engineering for the supply of 110 V dc ventilation units for the four traction motors used on the new 10M commuter trains for cooling purposes. Booyco Engineering has designed these in collaboration with Transnet Engineering.

Helen Terblanche, customer service manager at Booyco Engineering, says units supplied through previous contracts have been operating in the field for a number of years with no traction motor cooling problems, and attributes this reliability to the 110 V dc power supply and the use of EC controlled fans, which are very dependable. The units are based on the latest EC fan technology that is compliant with international railway standards. Fan speeds can be programmed to the requirements of the customer and the system does full fault logging and can provide the train management system with information on the condition of the system.

“The order, which once again showcases our airflow and cooling system design capabilities, was challenging because we were working to meet shortened delivery deadlines,” says Terblanche. “We had to bring quite a few of the orders forward in order to assist Transnet Engineering with successful sales to the customer.”
SKF’s remote asset diagnostic services

Since launching the SKF cloud in November 2012, the global network of SKF Remote Diagnostic Centres has been connected, bringing together global IT solutions and making all application data accessible in a single cloud-based system. This collective data reflects a huge breadth of knowledge and experience in diagnosing and solving customer machinery maintenance issues in applications across all major industries worldwide. SKF Asset Diagnostic Services can now leverage and share this knowledge, and at any time of day, SKF service engineers – located in timezones around the world – can be available to provide support in response to problems.

“arly cloud solution allows us to monitor and diagnose not hundreds of thousands, but millions of machines. We already have half a million machines in the cloud. This shared knowledge helps us better serve our customers. In addition, the software and cloud-based services give our customers 24/7 access to an easy to understand diagnostics dashboard, regular reporting and our knowledge network. In this way we can help our customers to increase machine availability while decreasing maintenance costs,” says Erwin Weis, global manager – SKF Asset Diagnostic Services.

SKF Asset Diagnostic Services are particularly suitable for applications in wind, marine, mining, paper and metal industries, and all other major industries where condition monitoring is used. Part of this offer includes ‘software as a service’ (SaaS), which allows the customer to use the SKF cloud to host the data from their condition based maintenance programme.

Kobold’s differential pressure transmitter

Kobold Instrumentation, represented in South Africa by Instrotech – a Contest Group company – develops, manufactures and sells instruments for monitoring, measuring and regulating the physical quantities of flow rate, pressure, level and temperature.

An international state-owned oil and gas company, covering all aspects of the stream from exploration to production, refinery, depots, pump stations, and ultimately the retail outlet, recently went to the market for offers to revamp and refit a field instrumentation and control project.

The refit included the replacement of not only the defective/faulty field instruments, but also the main control system. Most of the instruments installed at the site were dp flow meter types, both senior orifice and pitot tube – and almost all of these were defective and needed to be replaced for the site to operate safely and normally. With the launch of the long-awaited PAD dP transmitter, and in-depth discussions with the oil company, the new Kobold differential pressure transmitter (PAD) was specified. By showing the client a complete picture and competitive overall pricing model, Kobold managed to seal the deal.

HPE Africa introduces McCloskey International range

High Power Equipment (HPE) Africa has expanded its comprehensive product offering to the local market after being officially named in January 2013 as the sole Southern African distributor for Canada-based McCloskey International, a global leader in the manufacture of crushing, screening and recycling equipment. HPE Africa will stock and distribute the entire range of McCloskey International equipment, which is divided into four main products groups that include: stock piling conveyors, crushers, trommel screens – aimed at the organic and recycling markets – and vibrating screens for the aggregate market.

“The McCloskey International range of equipment augments HPE Africa’s current offering to all of its existing markets. As the sole distributor of the McCloskey International brand in Southern Africa, HPE Africa has committed itself to being a fully stocked dealer, and will be furnished to provide the support that is required to properly maintain the McCloskey International range of equipment and its customer relationships.

HPE Africa will stock and distribute the entire range of McCloskey International equipment: stock piling conveyors, crushers (eg, the jaw crusher above), trommel and vibrating screens.

Furnace flame monitoring system

Durag’s D-UG 660/D-LE 603 flame monitoring system, distributed in South Africa by OEN Enterprises, is ideal for monitoring all kinds of furnaces, even under difficult conditions. Typical applications include power stations, chemical industries, refineries, cement plants and waste incinerators. The combination of the D-UG 660 Control Unit and D-LE 603 Flame Sensor offers detailed information and adjustment options. It is recommended for use in furnace plants with several burners that have significant demands on selectivity at high sensitivity levels.

At fuel change or to compensate for strong movements of the flame, a secondary flame sensor connected in parallel can take over flame monitoring, which makes the D-UG 660 universally suitable for use in plants of varying fuel types and/or load conditions.

The design of the D-UG 660/D-LE 603 is fail safe with a dual channel microprocessor system to ensure safe operation of the flame monitor and built in periodic self checking.
Matterform’s Photon: a home 3D scanner

Drew Cox and Adam Brandejs, two Canadian inventors from Toronto have developed a home 3D scanner called Photon and launched it via a 35 day crowdfunding campaign on Idiegogo. With an initial target of C$81 000 (Canadian), just over C$471 000 was raised by the campaign, based on a launch price of just $599, R5 400, less than the cost of a tablet.

The Photon allows anyone to turn physical object into a digital 3D model on their computer, then print the file using a 3D printer or use it in 3D designs or animations. “The Photon 3D scanner works by firing dual laser lines at an object as it is rotated through 360°, taking pictures with an HD camera and using software to create a digital 3D model in as little as three minutes. Once the file is created, it can be modified, reproduced on a 3D printer to create copies of the original object, used in animations or 3D designs, or saved to keep a digital archive. At the current price, this is the first 3D scanner that is affordable for the home consumer market,” says Drew Cox of Matterform, the invention company.

And it is designed for simple home use rather than for professional designers. “Unfold it, plug it in, place an object on the scan bed and press go! It’s that simple,” says Cox. “We understand that 3D modelling software can be harder to learn than one might think, and we want to help change that. The power of 3D printing comes in the ability to make personalised items, not simply printing off what other people have created. We really want to give people the tools to see their creativity come to life,” he adds.

Why Indiegogo and crowdfunding? “In order to keep the cost down, we need to make these in volume. Your pledge helps us create these at the lowest possible price. The future of this scanner is in your hands,” says Cox.

The Matterform 3D scanner can scan objects up to 190 mm × 190 mm × 250 mm, yet it’s lightweight, portable, and compact, making it easy to integrate into ones workspace. The associated software was designed from the ground up, and works seamlessly with the hardware. Free to use and download, the software is available for PC, Mac and Linux. “Whether you’ve used 3D software before or if you’re just getting into it now, you’ll find our software was designed to be as easy as possible. We know you want to spend your time creating things and being creative, not calibrating, tweaking hardware or figuring out yet another tool,” Cox advises. Currently the resolution of the scanner on a 100 mm figurine is 0,43 mm with 0,5° scans each with ±0,2 mm accuracy. “We’re quite excited about the current results, and are working everyday to continue improving the resolution,” adds Cox.

Unlike software-based solutions, the Matterform 3D scanner gives dimensional data; making 3D scans far more useful. “We’re aiming to make the 3D files compatible with all major CAD packages, 3D modelling software and 3D printers. Currently, models produced from the scanner can be saved as .STL, .OBJ and point cloud .PLY formats, making it easy to integrate scans within existing systems, such as 3DS max, Maya, Solidworks, Cinema 4d, Google SketchUp, Rhino and True Space.

www.matterform.net

Africa Rail 2013

Africa Rail is a unique exhibition and conference designed to assist rail operators, emerging and well-established heavy haul end-users, investors and government to optimise their investment into railway infrastructure. It is about understanding what it takes to run proficient freight and passenger rail services, maximising intra-African trade and working together to improve operational efficiency and profitability of African private and public sector owed railways.

The 2013 event sets out to enable participants to: maximise the potential for intra-African trade; improve operational efficiency; improve your supply chain logistics; drive investment into African railway infrastructure; use profitable railway concessions to generate revenue; overcome skills shortages; and to inform about railway infrastructure and procurement projects.

The conference takes place from 24 to 27 June, with the exhibition from 25 to 26 June, both at the Sandton Convention Centre, Johannesburg, South Africa. www.terrapinn.com/africarail

Industry diary

June

Afrimold 4th annual manufacturing trade fair and conference
4-6 June: NASREC Exhibition Centre, Johannesburg.
Details: Leigh Angelo or Stephanie Conradie; +2711 869 9153
leigh@tradeprojects.co.za or stephanie@tradeprojects.co.za

OSH EXPO Africa 2013
18-20 June 2013
Gallagher Convention Centre, Midrand
Details: Marlene Bosch, +27 11 835 1565
marleneb@specialised.com
www.oshexpoafrica.com

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the 16th annual transport and infrastructure show

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40 Mechanical Technology — May 2013
The Engineering Drawing Guide authored by Mr. Joelson has formed the basis for the first year drawing module at UKZN for many years. It is laid out in a logical and structured format. It is easy to read, understand, and follows a format that builds understanding in engineering drawing. This Guide is highly recommended for tertiary education students that want a complete guide to modern day engineering drawing methods, principles, and practices.

Prof Glen Bright; James Fulton Professor in Mechanical Engineering; Academic Leader Discipline of Mechanical Engineering (UKZN); PhD, MSc, BSc, MBA.

This book is the culmination of many years of teaching, and first-hand experience with the engineering drawing course which the author lectured at UKZN for 21 years. It provides a state-of-the-art textbook on the subject, including CAD, with several examples, exercises, and explanations. It is recommended to all students who are studying the subject and to professional engineers who use drawing in their work.

Prof Sarp Adali: Sugar Mills Professor of Engineering Design; Fellow of the University of Karshu-Natal; Fellow of the South African Royal Society; Fellow of American Society of Mechanical Engineers.

“The Engineering Drawing Guide is prescribed for students undertaking the capstone project for the Bachelor Degree in Mechanical Engineering Technology at the Durban University of Technology. The outcomes of the course require that students use best practice to produce engineering outputs that conform to established standards. As such, the Engineering Drawing Guide provides very useful guidance in aiding students to produce professional engineering drawings according to the latest ISO code of practice. Besides providing information related to drawing outputs, the guide also contains other engineering data that will ensure that the book serves as a valuable reference in professional practice”

Dr David Jonson: PhD, Associate Professor, Department of Mechanical Engineering, Durban University of Technology (DUT)

“Crisp and to the point. Although the author uses a different software package for his presentation of this book I, as a user of Solid Works, have found it very useful as a guide that I could flick through to recover a ‘standard or convention’. I would recommend the Engineering Drawing Guide as a preparatory reading for students starting a course on technical drawing but also as a refresher and for older engineers who, from time to time, need to rekindle ‘ancient memories’”

Prof Graham D J Smith: PrEng (SA)

FOR FURTHER INFORMATION:

The ENGINEERING DRAWING GUIDE for Students and Professional Engineers: From experience, working in the industrial sector as a toolmaker and draughtsman, and in education as a lecturer in mechanical drawing and design, it became apparent to the author, Sydney Joelson, that a book with foundational information, providing the basics to understand drawing concepts, the visualization thereof, and the correct form of communication to comply with the ‘ISO Mechanical Engineering Drawing Code of Practice’, was necessary to be addressed. Consequently, a book for up and coming engineers has been compiled, covering these characteristics, which is now available to use in most technical drawing applications.

In engineering alone, poor communication costs industry millions per year and is therefore the main task and emphasis dealt with in the ‘Guide’ - good communication and accurate drawings, teaching fundamental techniques, methods, and skills. It can be used as a reference to recover forgotten drawing standards and conventions and is also suitable for schools, colleges, universities, and industry. A section on engineering drawing with practical applications in real design situations is included, making the book more complete, forming a basis for more advanced study in mechanical engineering design.

Ultimately, as knowledge and skills in engineering drawing improve, computer aided design and drafting is inevitable, regardless of the software package used. Computer technology has developed to such an extent that CAD, both 2D and 3D, is now used in most, if not all, companies and educational institutions, but it is still of utmost importance to comply with the International Organization for Standardization (ISO). However, it takes a skilled draftsperson to manage the CADD system. The “Engineering Drawing Guide” makes this transition from freehand sketches/drawing board to computer aided drafting effortless.
QUALITY AND PERFORMANCE IN ONE

EML electric motors have established a reputation within the local agricultural and HVAC sectors as quality, affordable motors suitable for driving pumps, fans, conveyors, complete irrigation systems and ancillary equipment. Manufactured to ISO quality standards, these electric motors carry SABS certification and offer reliable performance. An off the shelf stockholding with 24 hour technical support ensure customers have total peace of mind.