

→ **FESTO ... MORE THAN JUST ANOTHER  
AUTOMATION SUPPLIER**

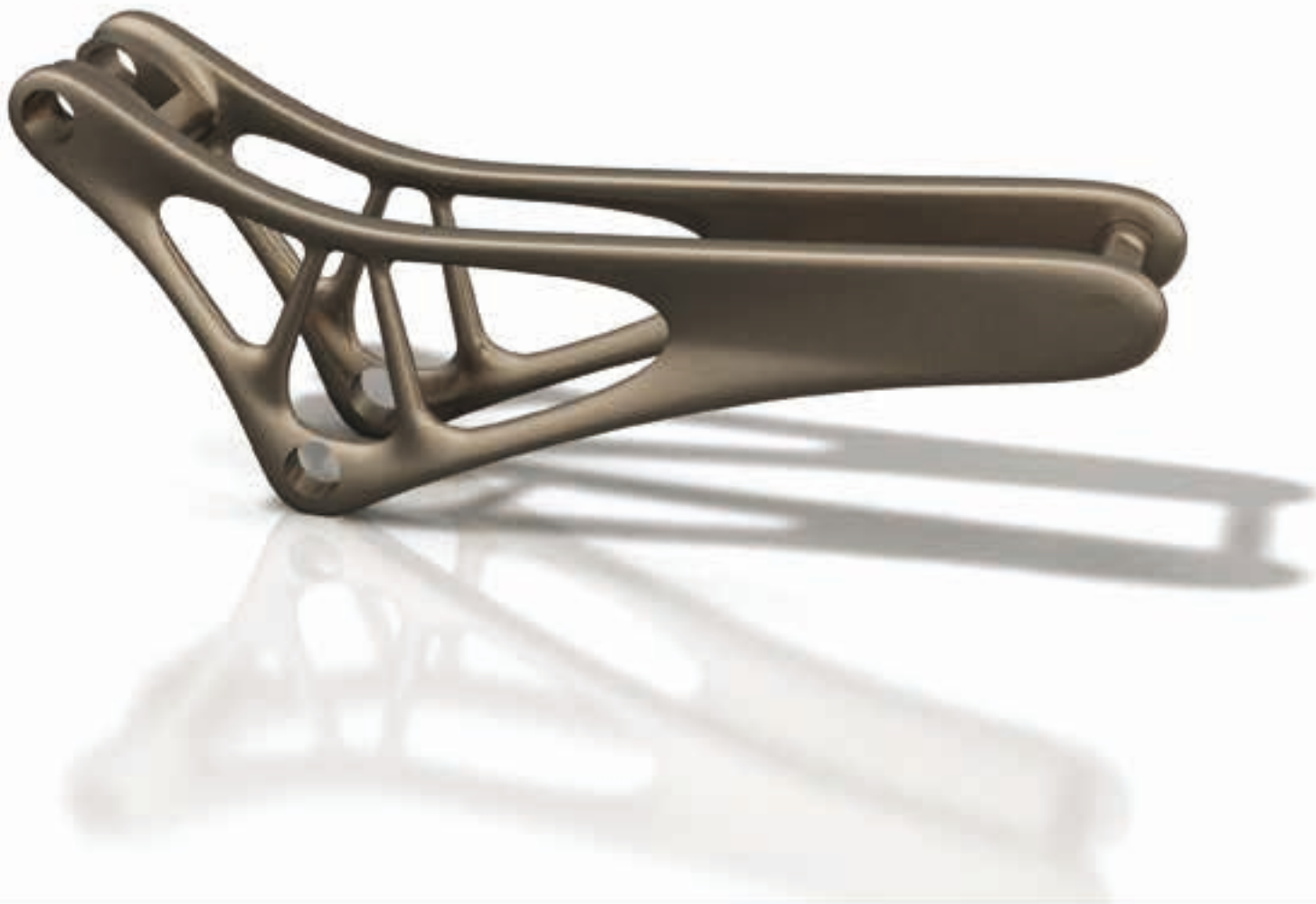
**MECHANICAL**

**CROWN  
PUBLICATIONS**

**THIS MONTH:**

- Track and trace for manufacturing efficiency
- The screen test – achieving maximum efficiency
- Chillers earns SABC R7.9-million in energy savings
- Achieving reliability through application engineering

# Design Faster, Smarter, and Lighter



**INSPIRE**  
solidThinking

Design lightweight **in**, instead of engineering mass **out**. Inspire helps design engineers create parts right the first time reducing costs, development time, material consumption, and product weight.

🔗 Request a free trial at [solidThinking.com/D3D](https://solidThinking.com/D3D)

An  Altair Company

www.crown.co.za

**Published monthly by  
Crown Publications cc**

Crown House  
Cnr Theunis and  
Sovereign Streets  
Bedford Gardens 2007  
PO Box 140  
Bedfordview 2008

**Tel:** +27 11 622 4770

**Fax:** +27 11 615 6108

**e-mail:** mechanical@crown.co.za  
www.mechanicaltechnologymaga-  
zine.co.za

**Editor:**

Peter Middleton

**e-mail:** peterm@crown.co.za

**Copy editor:**

Erika van Zyl

**Advertising:**

Norman Welthagen

**e-mail:** normanw@crown.co.za

**Design & layout:**

Darryl James

**Publisher:**

Karen Grant

**Deputy publisher:**

Wilhelm du Plessis

**Circulation:**

Karen Smith

**Reader enquiries:**

Radha Naidoo

The views expressed in this journal are not necessarily those of the publisher or the editor.



**Transparency You Can See**

Average circulation  
(January-March 2016)  
3 721

**Printed by:**  
Tandym Print – Cape Town

## Investing in maintenance: a survival priority



**A**s promised in May, Eskom has managed to get us through the winter without having to resort to load shedding. Energy availability has risen to close to its 80% mark, with unplanned and planned maintenance numbers not much higher than the 10% thresholds targeted by the utility before winter began.

Successes highlighted by group chief executive, Brian Molefe, in his July System Status Briefing include:

- A projected reduction of OCGT energy use from 1 801 GWh in Quarter 1 of 2016 to 16 GWh for Quarter 2, which amounts to a 98% decrease in energy from diesel generators and direct diesel costs reduced from R3.9-billion down to R86-million.
- An energy availability record of 81% for the month of June 2016, last achieved in July 2013.
- An overall availability increase from 66.3% in December 2015 to over 80% in July 2016.

Most significantly, Eskom claims that the improved performance of its plant is not due to lower demand – as many of us cynics have suggested. Available capacity is significantly higher, while demand is not significantly different from 2015. Available capacity for this year is greater than the peak demand for 2015 (34 481 kW) and 2016 (34 899 kW).

The energy crisis in South Africa has, undoubtedly, focused attention on the necessity and the value of maintenance, along with the dangers of unplanned breakdowns. In addition to the obvious production and substitution cost consequences, though, Eskom's brand perception has been close to destroyed. Even with performance on an upward trend for many months, the utility is still finding it hard to regain peoples' confidence, let alone their pride.

In the *'Mario on maintenance'* column this month, Mario Kuisis talks about the practical side of condition-based maintenance and outlines the four main pillars of condition monitoring: vibration analysis; oil analysis; infrared thermography; and ultrasound detection. "The aim of all the technologies is to permit in-service condition assessment whilst the plant is in normal production," Kuisis writes, through "trending the results of periodic condition assessments".

In a medium sized plant, Kuisis suggests, there is limited scope for continuous on-line monitoring simply due to economics. "Even though it is the ideal solution, it is typically confined to critical assets only." Included in his piece is a comprehensive table outlining which assets can benefit from the different condition monitoring technologies.

Says SKF's Sarel Froneman in our lead Proactive maintenance, lubrication and contamination management article this month: "With rotating machinery as the core focus, we develop maintenance solutions based on asset criticality, to most cost effectively maximise uptime and minimise failure risks and ownership costs." He cites a success at a coal mine in Limpopo – being developed to support Eskom coal-fired units in the area – where SKF IMx multi-log online condition monitoring units are being installed to protect the mine's critical assets. It is heartening to see investments in modern asset management systems and condition monitoring equipment being prioritised in new mining installations in South Africa.

Technology, in general, is increasingly reliable. If one compares a modern motorcar of any brand to its 25 year-old predecessor, reliability experiences and expectations are a generation apart. Vehicles have, for as long as I can remember, been fitted with overheating and oil-pressure warning systems. Today, though, cars are full of sensing, engine and condition management systems that can continually calculate fuel consumption, inform when a service is due, alert to an unclosed door or unfastened seatbelt and protect the vehicle against further damage should any hint of a sub-system failure be detected. Today's cars are possibly more expensive, but don't they have a longer life? Aren't the efficiencies much higher and the running costs lower?

As with any article on proactive maintenance, Kuisis addresses the question of how the investment money can be justified in "today's depressed business climate". He also cites the longer life, lower costs of ownership and the efficiency benefits associated with condition monitoring investments.

There are other spinoff advantages. Prioritising equipment and plant health can create confidence, drive improved performance and efficiency and cultivate a positive and responsible mindset across an organisation.

Ultimately, South African producers have to provide better quality at lower costs in order to compete on the global stage. Investments in modern maintenance strategies and systems could be a healthy starting point in achieving these imperatives.

Eskom's experience should remind us of the dangers of neglecting maintenance when times are tough. Its recent turnaround is directly due to maintenance being prioritised from the very top.

So as Mario Kuisis asks in his conclusion, "What are we waiting for?"

*Peter Middleton*



# TRIO®

# TRIO®

# RUGGED RELIABLE HARD WORKING

TP900

If you need a top performing cone crusher, no matter what the job, then the new Trio® TP Series Cone Crushers are for you. That's because these unique crushers are designed with a combination of head motion and crushing force to deliver application versatility and high productivity. Available from 200kw to 2,200kw of power with options for direct drive and variable speed operation, they are perfect for maximum size reduction at a high production rate.

**Get more from your mine with Trio®.**  
Visit [www.trio.weir](http://www.trio.weir) today.

**WEIR**

**TRIO®**

**Minerals**  
[www.minerals.weir](http://www.minerals.weir)



8



10



20



28

## ON THE COVER



### Technology for reduced costs and enhanced user competitiveness

Festo South Africa's Russell Schwulst talks to *MechTech* about how this global pneumatic and automation specialist is responding to the changing economic and production needs of its clients and how it has started to adopt Industry 4.0 technology principles in its own manufacturing processes to improve production efficiency and reduce end-product costs.

For more information contact:  
 Festo: Kershia Beharie  
 08600 FESTO (33786)  
 kershia.beharie@festo.com  
 www.festo.co.za

## FEATURES

### SPECIAL REPORT

#### 8 Africa a major growth node for design consultancy

Ranked as one of the best global consultancies in design, transportation and general building, AECOM has unveiled its 2020 Africa strategy to capitalise on growth opportunities on the continent.

### PROACTIVE MAINTENANCE, LUBRICATION AND CONTAMINATION MANAGEMENT

#### 10 Achieving reliability through applications engineering

*MechTech* talks to Sarel Froneman of SKF about the global group's redirection towards its core strength in bearings and the role of engineering services and customisations in resolving bearing reliability problems, optimising asset management and minimising the maintenance and ownership costs of rotating machinery.

#### 14 Mario on maintenance: Practical proactive maintenance

#### 17 Bulk fuel filtration essential for engine performance

#### 18 Driving down DMS maintenance costs

#### 19 Rapid mill motor repair for Rössing Uranium

### MATERIALS HANDLING AND MINERALS PROCESSING

#### 20 The screen test – achieving maximum efficiency

Corné Kleyn, product manager for screens at Weir Minerals Africa, explains how the efficiency of screens can be defined, measured and increased.

#### 22 Automated storage systems improve bottom line

#### 25 In-pit, semi-mobile crushing plants for increased efficiencies

#### 26 Chute systems reduce degradation, dust and noise in steel plants

### LOCAL MANUFACTURING AND BENEFICIATION

#### 28 Track and trace for manufacturing efficiency

David Stain of Zebra Technologies talks about modern trends in manufacturing and the solutions that allow plant operators to see what is happening in the enterprise in real time, helping them to make smarter and faster decisions.

#### 30 Towards best-practice manufacturing in SA

### HEATING, COOLING, VENTILATION AND AIR CONDITIONING

#### 32 Chillers earns SABC R7.9-million in energy savings

Four York chillers installed at the SABC in Auckland Park are bringing energy and running costs down by R7.9-million per annum, ensuring a return on this investment in two-and-a-half years.

#### 33 Back-channel cooling – a viable, sustainable and affordable solution

#### 35 Innovative fan prototype for vapour compressor

### INNOVATIVE ENGINEERING

#### 36 3D printing and the industrial potential of AM for metal components

This article from the RapidTech 2016 show and conference discusses the latest developments in 3D-printing and metal additive manufacturing technologies and the scope for and limitations of their use for industrial-scale production.

## REGULARS

#### 1 Comment

#### 4 On the cover: Technology for reduced costs and enhanced user competitiveness

#### 6 Industry forum

#### 38 Products and services

#### 40 Nota bene

# Technology for reduced costs and

Festo South Africa's Russell Schwulst (right) talks to *MechTech* about how this global pneumatic and automation specialist is responding to the changing economic and production needs of its clients and how it has started to adopt Industry 4.0 technology principles in its own manufacturing processes to improve production efficiency and reduce end-product costs.

“In the current economic climate, all over the world, there is a need for manufacturers to improve their competitiveness,” Schwulst begins. “While in the past, South African manufacturers could get by offering niche and customised products to local consumers, today, everyone has to become leaner and more competitive to survive,” he argues.

“Traditionally Festo's focus was on producing high quality products with extensive features, which of course in some cases carried a price premium,” he adds.

Festo has now shifted its focus to include a range of more affordable products for current markets, products that are more suited to mainstream manufacturing facilities and process plants. “We have introduced Festo's Star range of pneumatic, process automation and electronic components, with the fundamental aim of making our offering more accessible to local clients, in terms of price and availability,” Schwulst explains.

From its full range of over 32 000 basic components before customisations, Festo has identified the most flexible and widely used of these for inclusion in its Star range. “We have taken a streamlined set of typical production components and subjected them to a rigorous optimisation programme, to make them more cost effective to manufacture and to reduce costs and delivery times. We have also improved availability through common stocking of the Star range at every Festo outlet in the world.

“In the past, if we made a system for export to the USA, then the components used might not have been readily avail-

able there. But if using the Star range, all of the components under this umbrella are stocked in substantial quantities at every Festo branch,” Schwulst tells *MechTech*, adding “the idea is to make our components more affordable and more accessible, everywhere.”

As well as optimising Festo's production processes, the Star range also includes new product innovations. “We are an automation company, so we are utilising that expertise to better manufacture products to make them more affordable and competitive. We are also adopting design optimisation to redevelop products where we believe modern materials and design principles can be advantageous.

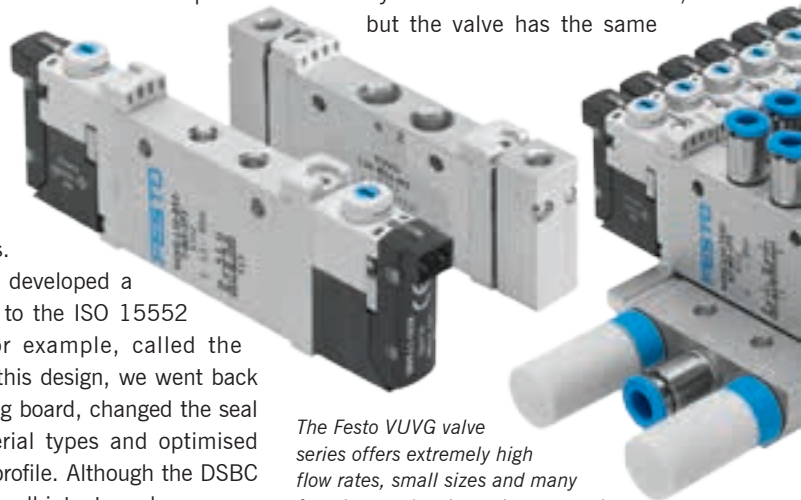
“We have developed a new cylinder to the ISO 15552 standard, for example, called the DSBC. With this design, we went back to the drawing board, changed the seal design, material types and optimised the cylinder profile. Although the DSBC cylinder is, for all intents and purposes, a replacement for our existing Festo cylinder, it is much more affordable.

“As an ISO-cylinder, it has universal sizes and fittings and is fully interchangeable with other brands. But ours is now super-competitive with respect to price without having lost any of its premium quality pedigree,” Schwulst informs *MechTech*.

In another example of finding innova-



tive ways to shave costs, he describes the introduction of a brand new range of solenoid valves. “We have now introduced a completely new VU valve series that comes in at about half the price of the current range. We have applied different manufacturing techniques in a brand new facility and used different materials, but the valve has the same



*The Festo VUVG valve series offers extremely high flow rates, small sizes and many functions and variants. Its patented cartridge principle and lightweight aluminium housing make these valves ideal for direct mounting on robot arms or cylinders.*

quality and robustness of our old valve ranges, albeit with more modern features.

“And while some of our customers still prefer the old valves that they have come to love and trust, they now have a choice of a more modern equivalent,” he notes.

Core to achieving better availability and lower costs for its Star range is the adoption of Industry 4.0 technology, in which Festo is a global pioneer. “We have established a new production facility in Scharnhausen, Germany, where we leverage modern Industry 4.0 manufacturing practices for competitive advantages. It is Industry 4.0 that allows us to optimise the production efficiency in terms of time and costs,” Schwulst says.



*Festo's new ISO 15552 standard DSBC cylinder has self-adjusting pneumatic end-position cushioning that adapts optimally to changes in loads and speed.*



# enhanced user competitiveness

The Scharnhausen Technology Plant is now the leading Festo factory for the production of valves, valve terminals and electronics. The plant is characterised by productive and energy-efficient processes, top-quality products and a customer-centric manufacturing focus.

Many of the aspects of Industry 4.0 are already a reality in the Technology Plant. For example, employees cooperate in safe interaction with a flexible robot, which takes over assembly tasks that are ergonomically disadvantageous. A holistic energy transparency system means that all energy consumption in the factory can be tracked for transparency and savings. And for service engineers, tablets and apps are used as principal working tools to detect and rectify machine faults as soon as possible and directly on-site.

Schwulst warns, though, that Industry 4.0 and the Internet of things (IoT) are still being developed. "There is a lot of hype about Industry 4.0 but Festo truly believes that this is the technology of the future. Festo is part of this initiative and sits on the board of directors as well as in the steering committee of a German government supported initiative to make Industry 4.0 a reality. But people need to realise that they will not be able to enjoy its advantages fully without first understanding the technology and transferring that knowledge to the employees operating these systems," he says.

In keeping with its history and traditions, training is at the starting point of Festo's preparation for Industry 4.0 implementation in South Africa. "In 2017, we will be bringing in Didactic equipment, and training courses have been prepared to enable us to introduce the fundamentals of Industry 4.0 to South African automation and process engineers," Schwulst reveals. "Industry 4.0 elements exist in industry already: I/Os and communication modules; decentralised controllers and web connectivity are being incorporated into many systems. Sub-systems of components are now able to communicate with each



*Festo is bringing in its CP Factory didactic equipment and training course to South Africa to introduce the fundamentals of Industry 4.0 to local automation and process engineers.*

other about their status, which allows any weakness to be intelligently overcome.

"By starting with training first, we can better establish the common platforms that will allow people to know what to purchase and when so that when the full power of Industry 4.0 arrives, we are able to implement it competently and to the competitive advantage of manufacturers," he argues.

"One of the most important deliverables of Industry 4.0 will be the freedom of supplier selection," Schwulst continues. "To meet the constantly shifting demands of today's markets means being able to adapt processes on-the-fly to achieve maximum production flexibility. Manufacturers must be able to ensure that their automation systems and devices can exchange information and communicate freely across multiple process levels, and cannot afford to be restricted by rigid and vendor specific platforms," he says.

"At Festo, we're pre-empting these evolutions and applying them to our training programmes so that we can advise and help customers with their own Industry 4.0 migrations and production specific scenarios," he adds.

Like the Festo's Star range, Industry 4.0 offers increased production efficiency, lower on-the-shelf costs and much leaner stocking levels with better product accessibility. "Modularity is also a key principle," Schwulst notes, "which offers unparalleled manufacturing flexibility while keeping costs low. In South Africa, we are going to have to adopt these

modern principles to have any chance of being globally competitive," he adds.

Accessibility has also required a change to Festo's distribution model. "To meet realities on the ground, where customers across South Africa as well as north of our borders need local access to product and support, we have established several different distribution channels. We have now signed up with RS Components, which offers secure online ordering and, depending on availability, same day dispatch and free delivery. We feel this is an ideal outlet for the Star range of standard and interchangeable automation system components.

"In addition, we have signed a distribution agreement with BMG, which not only has a vast branch network of its own but can offer local technical support. The whole idea is that we get close to customers, make our products readily available to them and ensure that, wherever they are, they have access to the necessary technical support. We have also added Hyflo to our distribution network and increased the number of re-sellers, who can carry stock but can't necessarily supply the support. Over the past two years, we have gone to over 200 distribution points," Schwulst estimates.

"Festo is a company that believes in change, innovation and creativity. We are continually adapting in response to market requirements, which are always changing. We believe that unless companies take this approach, they will not be able to remain on the right side of the sustainability line," he concludes. □

## World-class bottling plant unveiled in Mozambique

Coca-Cola Sabco Ltd recently announced the official opening of its world-class bottling facility in Matola Gare, near Maputo, Mozambique. This opening is part of the company's ongoing investment in world-class manufacturing capabilities on the African continent. The plant, built over three years at a cost of US\$130-million, is the largest green-field facility in Coca-Cola Sabco's history across its seven-country African regional market.

With fully computerised operations including energy, waste water recycling and building management systems, the firm is targeting Silver Leadership in Energy and Environmental Design (LEED) accreditation for these environmental stewardship initiatives. The plant's 300 ml glass bottling line – capable of bottling 48 000 bottles per hour – is

the largest bottling line in Sabco's regional footprint, which includes Ethiopia, Kenya, Mozambique, Namibia, South Africa, Tanzania and Uganda.

Mozambique's President, His Excellency Filipe Nyusi said at the inauguration of the plant: "Coca-Cola was one of the first global companies to invest in the country after our independence. Not even the devastating flood we experienced in 2000 could stop Coca-Cola. Its investment in job creation and the growth of skills in Mozambique is testament to the company's commitment to assisting us grow the economy of the country. We would like to congratulate Coca-Cola on the opening of this technologically advanced bottling plant."

Joining leaders from Sabco and President Nyusi in opening the new facility, Muhtar Kent, chairman and CEO of The Coca-Cola Company, said: "Coca-Cola has been investing in Africa for almost 90 years and is today present in every African country, with over

70 000 employees across 145 bottling and canning facilities. We have continued to increase investment in our business in Africa with US\$17-billion committed across our system for investments in distribution, infrastructure, manufacturing and marketing during this decade. We are proud to be one of the largest employers across Africa as well as Mozambique. Today's opening in Mozambique is the latest example of our continued commitment to refresh African consumers while at the same time, creating opportunities for enterprise and employment along our supply chain."

Initially, the Matola Gare plant will operate two lines, a glass bottling line capable of bottling 48 000, 300 ml glass bottles per hour (bph) or 14.3-million physical cases per year; and a plastic bottle (PET) line that can produce 24 000, two-litre bph or 28.6-million physical cases per year. The plant also has provision for a second glass bottling line of similar capacity.

[www.coca-colacompany.com](http://www.coca-colacompany.com)



The Matola Gare plant will operate a glass bottling line capable of producing 14.3-million cases per year; and a plastic bottle (PET) line that can produce 28.6-million cases per year.

## SMC to wow at this year's Electra Mining

Having officially opened its doors in South Africa earlier this year, worldwide leaders in pneumatics and industrial automation, SMC Pneumatics South Africa, will exhibit for the first time at Electra Mining Africa 2016 in Hall 6, Stand E5.

True to its customer-centric culture and innovative nature, having been voted on Forbes Magazine's most innovative company list for three consecutive years, SMC Pneumatics' highly trained staff complement will present a wide array of fully functional demonstration units.

The units showcased at this year's Electra Mining are a representative sample of the brand's broad range of over 12 000 basic products, matched to meet infinitely diverse requirements across almost every industry.

Offering service and training nationwide, machine builders and end-users can now benefit from increased levels of high quality technical support and the availability of customised products.

[www.smc-pneumatics.co.za](http://www.smc-pneumatics.co.za)

## Inspiring local pupils at the engineering outreach day

Altair South Africa recently hosted a group of 46 enthusiastic Grade 11 pupils from schools in the Stellenbosch area as part of its STEM (Science, Technology, Engineering & Maths) initiative to expose them to the opportunities available in the engineering field.

"The main criterion for attending the day was obviously an interest in studying engineering. This is the second year we have hosted the event and we were thrilled with the response – the number has doubled from last year," explains Gronum Smith, country manager of Altair SA.

The invitation was extended to all schools in the area including, Eerste Rivier Secondary School, Malibu High, Oval Engineering School, Paul Roos Gymnasium, Kayamandi High and Rhenish Girls High in Stellenbosch, La Rochelle in Paarl, De Kuilen in Kuils River and Parel Vallei and Hottentots Holland in Somerset West.

"We aimed to cover all the engineering disciplines with presentations, success stories as well as personal insights into our world," adds Gronum. Presentations

from Denel Spaceteq, the CHPC, Garmin (iKubu), Mix Telematics, Stellenbosch University, Sustnet, School of Engineering and EMSS Antennas were on the agenda.

All the pupils were open minded, interactive and extremely appreciative of the initiative. The common thread throughout the day by all the presenters was: work hard, be passionate, take risks, be entrepreneurial and realise that learning never ends.

The aim of the day was that the students left feeling inspired with the possibilities available to them in the future. One pupil's response epitomised this: "This conference inspired me be patriotic to South Africa and it would be a privilege to be an engineer in this country!"

[www.altair.co.za](http://www.altair.co.za)



Altair South Africa hosts a group of Grade 11 pupils from schools in the Stellenbosch area as part of its STEM initiative.



## 'The future starts now' at Electra Mining Africa 2016

Celebrating its 85<sup>th</sup> anniversary this year, Germany-based SEW-Eurodrive will unveil a range of new products at Electra Mining Africa 2016, which is to be held from 12-16 September at the Nasrec Expo Centre in Johannesburg.

SEW-Eurodrive MD Raymond Obermeyer highlights that the original equipment manufacturer (OEM) has had a presence at this flagship exhibition since the 1980s. "Electra Mining is the largest exhibition of its kind in Africa. Therefore as a market leader it is important for us to be there."

New products to be unveiled include the new DRN series of asynchronous motors, which complies with all the requirements for European energy-efficiency class IE3. The new motor range is fully downward compatible with all of SEW-Eurodrive's existing products.

Another new product is the X-Series agitator, based on a modular concept that incorporates many parts from the standard product platform. Features include an integrated extended bearing distance for moderate or heavy-duty applications, integrated drywell sealing and pressure lubrication, and a thermally optimised housing.

SEW-Eurodrive will also launch its Movitrac LTP-B Eco HVAC unit for mining, industrial and commercial applications. This comprises a total HVAC solution from fans to pumps and motors.

Citing Electra Mining Africa 2016 as a valuable platform to showcase the company's ongoing innovation and technological development, Obermeyer



SEW-Eurodrive will launch its new modular-concept, X-Series agitator at Electra Mining Africa 2016.

says: "We see this as an opportunity to welcome existing and potential new customers to our product range and our brand."

About the 'The Future Starts Now' campaign underpinning its presence at Electra Mining Africa 2016, Obermeyer stresses that innovation, tradition and customer focus are cornerstones of SEW-Eurodrive.

"That was the case when our company was founded 85 years ago, and it still holds true today. Thanks to a range of customer-orientated service modules, we offer our customers added value and measurable benefits. This is made possible by powerful drives, high quality standards and customised solutions," he concludes.

[www.sew.co.za](http://www.sew.co.za)

## SA designed equipment showcased in Russia

Johannesburg-based equipment specialist Osborn was one of the exhibitors at the recent Mining World Russia exhibition.

This three-day event was held at the Crocus Expo International Exhibition Centre in Krasnogorsk, in Russia's Moscow Oblast. Osborn marketing director Martin Botha reports that it attracted visitors from all over Russia and from former Soviet Republics that are now CIS (Commonwealth of Independent States) countries, including Azerbaijan, Ukraine and Kazakhstan, to which Osborn has previously exported equipment.

Osborn has supplied a double-toggle jaw crusher to Kazakhstan operation Kazchrome, one of the world's largest chrome exporters. The firm's most re-

cent export order to Azerbaijan was for one of Osborn's locally manufactured track-mounted primary jaw crushers, to be employed at an aggregate mine. A modular plant, designed and built in South Africa by Osborn, is currently operating in snowy Siberia, at the Alrosa iron ore facility.

"Despite the depressed economy, there are still opportunities to be had in Russia and the CIS countries, and we are actively marketing Osborn's range of high quality machines in the region. We have a pro-active agent representing us in Russia and believe that shows such as Mining World Russia offer a worthwhile platform to showcase our equipment," Botha concludes.

[www.osborn.co.za](http://www.osborn.co.za)

## In brief

At a ceremony held at Phokeng, North West Province, **AfriSam** and **New Business Consulting**, a 100% Bafokeng-owned, broad-based black economic empowerment company, signed a memorandum of understanding cementing a partnership aimed at facilitating enterprise development and creating job opportunities for the Royal Bafokeng Nation.

**Aveng Grinaker-LTA's Mechanical & Electrical (M&E)** business unit has recently been awarded several maintenance and shutdown contracts and electrical and instrumentation installation projects at Sasol. These include the mechanical shutdowns for the VCM, PVC, caustic and chlorine plants for Sasol's Sasolburg operations. The work comprises the supply, supervision, coordination and management of labour, personnel and equipment in order to render a comprehensive mechanical shutdown service at the Midlands site in Sasolburg.

**Big Lift Trucks (BLT)** has been appointed distributors in Africa for **MDS International**, global specialists in trommel screens and apron feeders. "BLT's carefully structured expansion programme encompasses a strategy to extend the company's range of materials handling equipment to meet exact market demand in Africa and the Indian Ocean Islands," says Ken Mouritzen, managing director, Big Lift Trucks.

Specialist crane and components manufacturer **Demag** was part of the team that completed a US\$750 000 cement manufacturing project at **Lafarge-Holcim Zimbabwe**. Demag supplied its state-of-the-art 8.0 t electric overhead travel crane, 200 m of crane rails with Gantrex pads, and new down shop power supply leads, via its regional distributor **O. Conolly**.

Industrial equipment specialist, the **Goscor Group**, has signed a key distribution deal to become the official dealer of Chinese multi-national **Sany Earthmoving Equipment** in South Africa. The Goscor Group will set up a new entity within the Group as **Goscor Earthmoving Equipment** to represent Sany.

Work has begun on the expansion of **Wacker Neuson's** light equipment production site in Reichertshofen, Germany. The company is investing around €10-million in a new R&D centre for light equipment between now and the beginning of 2017. Over the coming year, R&D, product management and materials management will also be relocating to Reichertshofen near to the production facility.

**Hatch** is launching a 'new era of positive change' campaign. "For Hatch, a big part of the 'new era' will be better ideas and better service for your businesses," says CEO John Bianchini. The company has a new visual identity and in South Africa, Hatch Goba will now be known as Hatch. The company has also officially inaugurated its new, state-of-the-art 'green' premises at Greenstone Hill in Johannesburg.

# Africa a major growth node for design consultancy

Ranked as one of the best global consultancies in design, transportation and general building, AECOM has unveiled its 2020 Africa strategy to capitalise on the continent's growth opportunities.

Addressing a media briefing to showcase the company's global and regional service offering and capabilities, newly-appointed chief executive for Africa, Carlos Poñe (right) says that, while AECOM had a presence in 150 countries, Africa remained a strategic objective.

"Going forward, Africa will remain a key focus. It is important to note that we have a global and a regional reach." Poñe notes that the continent fell into the Europe, India, Middle East and Africa 'super region'.

"This means we have a lot of international expertise and experience. For example, we have excellent engineering centres in Romania and Spain. Wherever we do not have local capabilities, we can certainly draw from our global centres."

AECOM has 1 200 employees in Africa, of which the majority are located in South Africa. Revenue from the continent currently stands at \$150-million, which Poñe says he aims to boost substantially. The company currently has a presence in 15 African countries with permanent offices in Ghana, Nigeria, Liberia, Senegal, Kenya, Uganda, Tanzania, Lesotho, Mozambique,

Botswana and South Africa, where its head office is located in Centurion. In addition, AECOM has project offices in Ethiopia, Guinea, Rwanda, the Democratic Republic of Congo, Gabon, Ivory Coast and Congo.

"We did not want to go into Africa with a shotgun approach. We have a strategy that defines our approach in terms of the business-to-business environment and GDP growth," Poñe reiterates.

Commenting on the challenge of conducting business in Africa, he says that AECOM's strategy is predicated on health, safety, ethics and integrity. "Being a company that sells expertise, our people are naturally at the top of our agenda.

"We cannot do the work we do without having the best people in the world." Poñe assures that AECOM's approach to Africa is based on being 100% compliant with the local laws and regulations, which he sees as a minimum requirement for conducting business.

Looking at the company's broader service offerings, Poñe elaborates that AECOM provides a blend of global reach, local knowledge, innovation and technical excellence in delivering solutions that



create, enhance and sustain the world's built, natural and social environments.

The Construction Services Group specialises in design, EPC contracting and financing, while AECOM Capital invests equity in projects that provide future opportunities and growth for the company. Both the Management Services Group and the End Market Group ensure sufficient integration and functionality between all the different divisions.

"In terms of architecture, we have been responsible for a number of iconic projects in Africa and around the world, from car dealerships to major buildings, hotels and airport towers. In terms of the latter, AECOM, in conjunction with Pininfarina, won an international design competition for the regional Air Traffic Control (ATC) tower and technical building at the Istanbul New Airport.

"If you look at the number of architects we have in the company, with 26 in South Africa alone, we could rank as one of the world's largest architecture firms," Poñe points out. In terms of design and planning, AECOM focuses on integrated project delivery.

"We have the capability to design and plan new cities and urban districts. For example, we carried out the master planning for the London 2012 Summer Olympics, the London 2020 Vision, and most recently for the Rio Olympics."

AECOM also carried out the master planning for Saadiyat Island in Abu Dhabi, an iconic residential and cultural development. In South Africa, AECOM was responsible for project and cost management and specialist consultancy for the Moses Mabhida Stadium in Durban and Greenpoint Stadium in Cape Town.

In terms of engineering services, Poñe highlights that AECOM has a highly



AECOM was responsible for the design monitoring the construction of the water transfer system that forms part of the Trans-Caledon Tunnel Authority's Mooi-Mgeni Transfer Scheme, which includes a 58 MW pump station to take water from Spring Grove Dam.





*AECOM is actively working with Growthpoint Properties on a range of solar rooftop projects and existing building performance ratings, where low-performance buildings are identified and corrective measures proposed. Depicted here is the 103 kWp solar PV project at 33 Bree Street in Johannesburg.*

experienced team based in South Africa that specialises in clinics and hospitals. “We are very strong in this niche sector, and our people are probably among the best in the world.”

Looking at programme management, Poñe cites the lead role that AECOM has assumed on the new Doha Port in Qatar, in addition to its ongoing involvement with the new dig-out port in Durban. “Globally and regionally, we have huge expertise when it comes to ports and harbours on a design, construction and project management basis.”

AECOM is also ranked as the num-

ber one company globally in terms of transportation, with construction and site supervision expertise ranging from railway systems to corridor studies. “I have little doubt that we are probably the number one in Africa when it comes to transportation,” Poñe claims.

In terms of the water sector, AECOM has been involved with various major acid mine drainage (AMD) projects in Gauteng. Other water infrastructure projects include the award-winning Spring Grove Dam. “We are working in Kenya and Ethiopia out of South Africa in this sector,” Poñe reveals.

The main competitive edge for AECOM is its capability to deliver total projects, all the way from design to complete handover. “What is important as far as the client is concerned is that we can handle the full complexity of a large project. This means that the client has a single point of contact and does not have to deal with a large number of different companies.”

Poñe adds that AECOM has identified the power sector as a major growth area in Africa, from transmission to distribution and even micro-grid systems. “We are working on several transmission systems in East Africa, and have just clinched projects in Lesotho and South Africa. This is an area where we foresee major growth, and we certainly have the capability to tap into this sector.”

While the mining industry remains constrained by the global slump in commodity prices, Poñe argues that mining projects in Africa in particular have a major need for enabling infrastructure in order for them to get off the ground. “This is another area where we can successfully deliver our expertise in EPC contracts.”

In the burgeoning area of environmental services, AECOM experts from Spain are involved in building up the capabilities of various local municipalities. “From ground engineering to air quality impact assessments to environmental health, we can conduct all these specialist studies in-house,” Poñe concludes. □



*AECOM undertook the engineering services for a recent expansion project by Toyota South Africa at its manufacturing facility near Durban, including the increased capacity press shop.*



# Achieving reliability through applications engineering



*MechTech* talks to Sarel Froneman (right) of SKF about the global group's redirection towards its core strength in bearings and the role of engineering services and customisations in resolving bearing reliability problems, optimising asset management and minimising the maintenance and ownership costs of rotating machinery.

“With the retirement of Tom Johnstone as president and CEO of SKF in December 2014, his successor, Arik Danielson has set up a new management team with a fresh and strong direction,” begins Froneman. Danielson worked for SKF between 1987 and 2005 and held a number of executive positions, including president of the group's Industrial Division.

“Danielson believes that, when it comes to bearings, SKF needs to return to being the undisputed Number 1 in the world. We are already considered by many to be the market and innovation leader with respect to bearings, but we now want this to be 100% undisputed,” Froneman tells *MechTech*.

“For the past nine years or so, we have been focusing on the services side, but we have sometimes forgotten that

bearings are the central core of all our offerings. So Danielson has asked us all to raise the profile of SKF bearings, regardless of whether we are involved with seals, lubrication solutions, condition monitoring, engineering services or mechatronics,” he explains.

Describing a local condition monitoring success, Froneman says that a coal mine in Limpopo has installed 78 condition monitoring systems – based around the SKF IMx multi-log online condition monitoring unit – which are being used to protect the mine's critical rotating equipment assets. “And this is only the initial installation phase. We expect over 100 systems to be onsite by the time the mine is fully operational,” he says.

“While the mine has standardised on this SKF-based system, several different OEMs are onsite, installing crushers, conveyors, etc, which may or may not

use SKF bearings. Each system can monitor vibration and temperature from up to 16 individual inputs. A gearbox, for example, might have five monitoring points from which we can pick up vibration and temperature data and analyse it to determine the state of health of the gearbox, its bearings and/or its lubricants,” Froneman adds.

“This project has a focus on bearings because rotating machinery is involved and we are confident that this will lead to ongoing bearing business. But this is not always the case. SKF IMx units have also recently been used in a much bigger project in the oil and gas industry to monitor valves and piping. In this case, the plant uses very few bearings and while it is a successful contract, several SKF engineers had to be on site installing a system that offered no long-term benefit to our specialist bearing products. Contracts such as these do not help us to become the undisputed Number 1 in bearings,” he argues.

## Application engineering and whole shaft solutions

From an application engineering point of view, SKF sees its offering as an integrated range of products designed to support the integrity of rotating machines, with bearings as the most critical components. While bearing selection is at the starting point, application engineering tends to deal with the more complex requirements, those that need a little engineering – upgrades, customisations or non-conventional applications.

“If a bearing load is excessive or a shaft diameter is too big for a standard bearing, we can do an investigation, a redesign and, in consultation with the client, develop a solution. If a mill, crusher or fan is 50 or 60 years old, for example, and the pinion or drive needs to be replaced, then we can do that. We have the industry knowledge to design



Specific services offered by the application engineering/solutions factory team include modifications to standard SKF products.



**Above and right:** Another highly specialised capability of SKF's application engineering team is spindle remanufacture, customisation or redesign for machine tools such as lathes and milling machines.



**Left:** Through SKF's bearing remanufacturing process, unused bearings that have reached their shelf life can be restored using SKF's basic level of remanufacturing service to 'as-new' at around 15% of the cost of a replacement.



**Below:** A new coal mine in Limpopo has installed 78 condition monitoring systems based around the SKF IMx multi-log online condition monitoring unit.



sell as many bearings as possible. It is more about building partnerships where companies are unwilling to buy anyone else's bearings, because SKF's optimised offering results in the best uptime and the lowest total costs of ownership. Long-term machine life is most important for us and this is summarised in the new SKF Group vision – a world of reliable rotation.

At the pinnacle of this approach is the SKF asset management service – “and we are currently involved in the biggest contract in our local history”.

“With rotating machinery as the core focus, we develop maintenance solutions based on asset criticality, to most cost effectively maximise uptime and minimise failure risks and ownership costs.

“At the start of implementing an asset management solution, we bring in the client's top management along with the buyer, production and maintenance manager and, together, we analyse the plant's operation philosophy. Based on the mandate received, we break production processes further down with the engineering and maintenance teams. What happens if a production line stands idle because of a pump breakdown? If it is critical, then we do what we can to prevent failures and/or to react to them in the fastest possible time.

“Ultimately, we classify every piece

and manufacture a custom-fit solution that will be as good or better than the original.

“In these cases, we strive not to simply copy the system we are replacing. We strive to put an optimised solution on the table that, while using as many standard components as possible, is engineered to better suit the real application requirements of the machine being refurbished.

“Having done a customised drive-train design for a mill, crusher or fan, we can also do the mechanical installation, shaft and/or geometric alignment, balancing, lubrication and condition monitoring. Then we stand alongside our customers to measure and monitor how the machine

actually responds and we make sure that the solution is successful. For all practical purposes, this is what our engineering offering is about. We have been calling this service ‘Solution Factory’, but this can be confusing to some customers and the name is likely to be changed in the near future,” Froneman reveals.

As the manager for the SKF Services and Solutions' team in Southern Africa, Froneman reminds *MechTech* that seals, lubrication, condition monitoring and asset management services all need to be underpinned by SKF's bearing offering. “Bearings are our Number 1 priority, but not in the sense that we want to





Industrial Solutions for the mining industry

## Wagon unloading stations.

With more than 100 years of experience our customers benefit from a unique know-how in the field of bulk materials handling. We offer complete wagon unloading stations from single discharge tipplers to quadruple car dumpers with fully automated side arm chargers. Get in touch with us: [info.tkmh@thyssenkrupp.com](mailto:info.tkmh@thyssenkrupp.com) [www.thyssenkrupp-industrial-solutions.co.za](http://www.thyssenkrupp-industrial-solutions.co.za)

engineering. tomorrow. together.



thyssenkrupp



of equipment that can affect production – valves, sensors, flanges, switches, bearings, pumps, fans, motors, etc – as critical, very important, important or not important. If a machine component is considered critical, then it needs, for example, a proactive maintenance strategy, with redundancy, so that unexpected downtime risks are eliminated,” Froneman explains, adding, “This system gives the maintenance manager a new way of implementing focused plant maintenance and a way for plant reliability and availability to be measured, tracked and improved.”

On the other side of SKF’s applications solutions are problem-solving services. “Typically a product fails prematurely, sometimes repeatedly, and we are called in to find out why. We would then do a root cause analysis and re-engineer, change the bearing or seal specifications, lubrication strategies, installation routines or maintenance procedures to prevent a repeat failure.

“Our field service teams might be tasked with regularly monitoring the machine – taking infrared images, ultrasound, vibration or temperature readings or even oil samples – to see how the solution performs under real conditions and how it is being treated in the field. And 90% of all this effort focuses on helping the bearings achieve the longest operating life possible,” Froneman reiterates.

Describing some of the specific services offered by the application engineering/solutions factory team, he says that all modifications to standard products – manufacturing of special sealing arrangements, bore-size changes on standard couplings, inspection or service opening modifications, even entrances for condition monitoring or lubrication systems – are all accommodated by his team.

“Bearing remanufacture is also a key activity. The protective coating on a new bearing left on a shelf, in its original factory packaging, will only last for three to five years depending on humidity and temperature fluctuations. Generally, we say that it then has to be scrapped. But a large spare bearing can be a substantial investment – anything from R100 000 to R800 000 – so nobody wants to be throwing it away,” he suggests.

Through SKF’s bearing remanufacturing process, unused bearings that have reached their shelf life can be restored using SKF’s basic level of remanufac-



**Above:** At the starting point of bearing remanufacture are the washdown stations.

**Right:** SKF’s super-precision bearings are an ideal choice for machine spindles.

turing service to ‘as-new’ at around 15% of the cost of a replacement. “And for a bearing that has been in operation, we can offer a full Level 4 remanufacturing service that could include the replacement of rolling elements and cage components, where necessary. And we can remanufacture the bearing for significantly less than a new replacement would cost,” Froneman points out.

As well as cost, Froneman cites lead times as a significant advantage of remanufacturing as opposed to replacing bearings. “Also, there is an environmental benefit. Reusing significant percentages of high-quality machined steel in a used bearing results in a carbon footprint reduction because less new steel has to be smelted and machined,” he explains.

Another highly specialised capability of SKF’s application engineering team is spindle remanufacture, customisation or redesign for machine tools such as lathes and milling machines. “Globally, SKF has 140 bearing factories so you can image how many spindles we are using to



manufacture our bearings. The capability we have developed remanufacturing our own spindles over the years is now part of the global offering and our largest spindle remanufacturing centre has 14 full time spindle technicians. In South Africa, we focus mostly on belt driven spindles and those with mechanical drives that are not electrically integrated. We can also do root cause failure analysis and customisations to better meet changing application needs – with super-precision bearings as the core focus, obviously,” Froneman concludes. □



# Practical proactive maintenance

Having devoted time in this series to the big picture of proactive maintenance and how it fits into asset management, Mario Kuisis gets down to the basics and summarises the four pillars of condition monitoring and how these fit together.

Let us look at the practical situation faced by the maintenance manager of a typical medium sized facility. It may be a hard or soft goods manufacturing or food and beverage processing factory; a small or medium sized municipal utility; a quarry or a small mine. Let us assume that reactive and preventive (usage based) maintenance have been properly considered and are employed. There may also be a formal asset management system in place but production downtime – due to unexpected plant failure – has become excessive.

The organisation is too small to warrant a dedicated reliability engineering team, but there is sufficient investment in production assets to merit the introduction of condition monitoring in support of a proactive maintenance system. Where do you start? What options are available? How do you avoid bad investments?

For this exercise, it is helpful to identify those technologies that find almost universal adoption because they are practical and can add value in typical environments. The discussion excludes visual inspection and basic temperature monitoring, which is incorporated by the

OEM. These are vitally important and it is assumed that they are already taken advantage of to the fullest extent possible.

Presently, there are four main pillars of condition monitoring that have merit in almost all situations such as these. In order of technical evolution for maintenance, these are considered to be:

- Vibration analysis.
- Oil analysis.
- Infrared thermography.
- Ultrasound detection.

These technologies complement each other, which means that they are used for different things and one cannot replace the other, except for some limited overlapping. Think of them as the basic tools in a toolbox – a screwdriver cannot replace a spanner, both are needed. Together they enable effective ‘on-line’ condition monitoring of a very wide range of mechanical and electrical plant and equipment.

The term ‘on-line’ is important. The aim of all of the technologies is to permit in-service condition assessment whilst the plant is in normal production. Condition monitoring is achieved through trending the results of periodic condition assessments using hand-held

instruments (except oil analysis, which is by sampling). In a medium sized plant, there is limited scope for continuous on-line monitoring simply due to economics. Even though it is the ideal solution, it is typically confined to critical assets.

## Vibration analysis

This involves measurement and analysis of mechanical vibration using an accelerometer. It is concerned with low frequencies (generally less than

1.0 kHz). Typically, a defect condition is indicated by vibration amplitude (displacement, velocity or acceleration) and diagnostics to identify the cause are usually performed by spectrum analysis. Application of vibration analysis is almost wholly confined to rotating equipment (pumps, fans, compressors, motors, generators, etc). It is best suited to speeds above 300 rpm and on equipment in continuous or near continuous operation.

Vibration analysers are available with varying sensor types and degrees of capability and complexity: from simple, low cost traffic light indicators to advanced instruments with automated fault detection and diagnostics. As always, it is necessary to balance cost with features and benefits, but as a minimum the vibration parameters that are measured must be reliably and accurately quantified so that discrimination, trending and diagnostics can be effective.

Defects are usually relatively advanced by the time they are detected with periodic vibration analysis. Choosing the right interval between assessments is therefore important. Training is essential in order to properly interpret measurements and perform diagnostics.

## Oil analysis

Asset condition may be indicated by debris, by-products, dissolved gases or contaminants in oil. Condition of the oil itself can also be determined. Applications include any asset employing lubricating oil or electrical equipment with insulating oil (such as oil-cooled transformers).

Most commonly, samples are drawn and sent to a laboratory for analysis. Continuous on-line monitoring is an option on critical assets and portable instruments for on-site test and analysis are available for large fleets or remote locations, but these are unlikely to be justifiable for the situation we are discussing. Most asset owners have oil samples taken and analysed by a lab specialising in this kind of service. Although many of the test methods may be the same or similar, the approach with lubricating oils is different to insulating oils.

With lubricating oils, the main focus is on:

- Analysis of contaminants.



- Analysis of debris from the wear components of machines.
  - Analysis of oil properties including those of the base oil and its additives.
- With insulating oils, the main focus is on:
- Analysis of dissolved gases that indicate the presence of a fault condition.
  - Analysis of the dielectric properties of the oil.
  - Analysis of contaminants.
  - Analysis of chemicals in the oil that are indicative of the ageing status of the winding insulation.

Regular analysis and trending of results are a reliable condition indicator, of both oil and asset condition.

### Infrared thermography

This method relies on the measurement of object surface temperature by detection and analysis of infrared emissions. It depends on line-of-sight. Defect conditions may be indicated by absolute temperature, comparison or thermal profile. Thermography was originally developed for military use but now has an extremely wide range of civilian applications: predictive maintenance, energy management, health and safety, security and many more. Where previously, infrared cameras were very high cost, they are now much more affordable.

The infrared emissivity of surfaces varies significantly, which directly affects the accuracy of measurements. Image resolution is very important for reliable defect detection and cameras designed for predictive maintenance have many features to facilitate data capture and interpretation.

Thermography is a versatile and effective condition monitoring technique for mechanical and electrical equipment as well as civil structures. While it should be considered a basic tool in every condition monitoring practitioner's toolbox, note that while it is seemingly simple and intuitive, this can be deceptive. Measurement inaccuracies can easily occur and misinterpretation of thermal profiles and patterns can lead to incorrect conclusions. Training is essential in order to fully and accurately 'read' the images and realise the benefits.

### Ultrasound detection

Friction, turbulence and electrical discharge all produce high levels of ultrasound, which is sound in the ultrasonic spectrum, i.e. frequencies above 20 kHz. This may be airborne, in solid structures

Mechanical plant	Infrared thermography	Oil analysis	Ultrasound detection	Vibration analysis
Anti-friction bearings (lubrication)	good	no	very good	no
Anti-friction bearings (wear)	no	no	very good	very good
Compressors	good	very good <sup>3</sup>	good	very good
Conveyor lines	good	no	very good	good
Couplings	no	no	very good	very good
Fans	no	no	good	very good
Gearboxes	good	very good <sup>3</sup>	very good	very good
Hydraulic systems	good	good	very good	no
Mills	good	very good <sup>3</sup>	very good	very good
Motors & generators	good	very good <sup>3</sup>	very good	very good
Pipe networks (pressurised air/gas, steam)	possible <sup>1, 2</sup>	no	very good	no
Pumps	good	very good <sup>3</sup>	very good	good
Steam traps	very good	no	very good	no
Tanks (liquid filled above ground)	good	no	very good	no
Tanks (liquid filled below ground)	no	no	very good	no
Thermal insulation, lagging	very good	no	no	no
Valves	good	no	very good	no
White metal bearings	good	very good	no	very good
Electrical plant				
Busduct	no	no	very good	no
Bushings	good	no	very good	no
Cable terminations	good <sup>2</sup>	no	very good	no
Generators	good	very good <sup>3</sup>	no	very good
Isolators	very good	no	very good	no
Motors	good	very good <sup>3</sup>	very good	very good
Switchgear & MCC's (LV)	very good	no	good	no
Switchgear (MV, HV)	no	no	very good	no
Transformers (dry types)	very good	no	very good	no
Transformers (oil cooled)	very good	very good	good	no
Transmission lines	very good	no	very good	no

Table 1: Applications of the four 'pillars' of condition monitoring, 1: Medium dependant; 2: If open line-of-sight, 3: If oil lubricated

or in liquids. The ultrasound spectrum contains an enormous amount of valuable information about equipment operation and condition. Detection, measurement and analysis of ultrasound allow for early identification of defects in mechanical and electrical equipment.

It is essential to use ultrasound detectors that are designed specifically for predictive maintenance. When accurate reproduction of the ultrasound in the audible spectrum is replayed through headphones, it permits ready location and identification of the ultrasound source and hence the defect. It may be thought of as the ultimate extension of the mechanic's screwdriver to the ear.

Ultrasound detection is the easiest to master and most intuitive of the technology options, but training is still recommended to gain all the possible benefits. It is a surprisingly versatile and effective condition monitoring technique for mechanical and electrical equipment. Ultrasound gives the earliest indication of onset of a defect condition in machinery where wear, due to relative motion of components, is a factor. It is not only

effective on rotating equipment such as anti-friction bearings, gearboxes, etc, but also slow speed, cyclical, linear motion and many stationary components.

Suitability for various applications is summarised in Table1. The relative merits of the technologies are necessarily simplified and take into account detection and diagnostic capabilities along with applicability.

At this stage you may be thinking that this sounds great, but where will the money come from, especially in today's depressed business climate? Remember that:

- The aim is to produce a nett reduction in asset costs of ownership.
- Costs are fully scalable according to the extent that you balance in-house and outsourced services.
- The number of assets chosen to include in the monitoring programme can help to reduce the investment.
- There are usually significant quick cash benefits to be had by including energy saving and efficiency measures.

So what's stopping you then? □





#### C85 series

- Conforms to ISO 6432 and CETOP RP52P
- Available in bore sizes 8mm through 25mm
- Unique rod packing design prevents dust entry
- Abrasion resistant packing and replaceable piston rod seals
- Exceptional service life

#### CP96 series

- Conforms to ISO 15552
- Up to 15% weight reduced
- Easy adjustment of the cushion valve for optimum control of cylinder speed and cycle time
- Improved mounting accuracy ensures a secure position during machine operation
- Maximum flexibility for auto-switch mounting
- Air cushioning and bumper cushioning for shortened cycle times
- Made to order options available

## ISO Cylinders now manufactured in-house at SMC Pneumatics!

Do you need an ISO cylinder but have non-standard requirements? SMC Pneumatics now manufactures ISO standard cylinders in-house and offers multiple variations to adapt to your specific application!

Our fully-functional in-house production situated in Midrand, Johannesburg ensures shorter turnaround times on specific items in series including CP96 and C85 cylinders.

SMC's light-weight cylinders provide a host of benefits such as maximum design flexibility, great accuracy and smooth operation offering optimum control of the speed and cycle time.

**Contact us for a free consultation or to experience our brand new showroom on +27 11 568 2407 or [sales@smcpneumatics.co.za](mailto:sales@smcpneumatics.co.za)**

*Remember to visit our  
SMC Pneumatics stand  
at Electra Mining 2016  
(Stand E5 / Hall 6)*

### #SMCRaisesTheBar

Join the conversation

 SMC Pneumatics (South Africa)

 SMC Pneumatics – South Africa



[www.smcpneumatics.co.za](http://www.smcpneumatics.co.za)

# Bulk fuel filtration essential for engine performance

The quality and cleanliness of fuel is a major factor that contributes to the performance of diesel engines and components. Contaminated fuel leads to higher maintenance costs and engine downtime, therefore good fuel filtration is vital for the performance of the engine.

**F**uel contaminants such as dirt, sediment and water can be introduced into fuel through channels such as the processing stages, transportation and when fuel is delivered to the point of use.

As a result, Cummins Filtration has designed a bulk fuel filtration system with an engineering company for a customer in Egypt. Cummins technical sales manager for Africa, Gerald Annandale, says the system will be installed on site so that cleaner fuel can be delivered from the main storage tank. "This bulk fuel filtration system has a filter with a micron ( $\mu\text{m}$ ) rating of 3, which means it will filter the contaminants of 3.0  $\mu\text{m}$  or larger. The filter's efficiency to remove contaminants, does however, depend on the quality of the fuel initially received," he explains.

Annandale says fuel injection system suppliers require that fuel should meet the ISO 12/9/6 cleanliness standard at the injection system, as contaminated fuel can cause components to wear prematurely. This translates into fewer than 40 particles of 4.0  $\mu\text{m}$  per ml of fuel (12); fewer than five 6.0  $\mu\text{m}$  particles (9) and an average of no more than 0.64 particles sized greater than 14  $\mu\text{m}$ .

"The bulk fuel filtration system will help to reduce contamination levels so that cleaner fuel can be obtained at the point of entry of the machine's tank (ISO 18/16/13), resulting in less maintenance and labour costs, which will lead to greater productivity," he continues. ISO 18/16/13 fuel contains between 1 300 and 2 500 particles of 4.0  $\mu\text{m}$  per ml.

## How the filtration system works

Fuel is pumped from the bulk fuel tank on the tank farm downstream into the bulk fuel filtration system. The fuel can either be recycled to the main tank, on a kidney loop basis, or delivered to the tank

of the mobile machine directly.

At this point, the cleanliness level of ISO 18/16/13 or better is achievable. The cleanliness level can be improved at this point by running the unit as a kidney loop system, to achieve ISO 16/14/12 cleanliness. Downstream of the vehicle's tank, there is a first and second stage on-board system that is designed to achieve the desired ISO 12/9/6 cleanliness level by using Fleetguard on-board NanoNet technology.

According to Nomfundo Maseko, Cummins' marketing communications coordinator, the Fleetguard range of products provide a solution for achieving cleaner fuel in conjunction with the bulk fuel filtration system. "The bulk fuel filtration system features a glass window that displays a rotating impellor, which starts to turn as soon as the filters restrict, and this indicates that it is time to change the filters."

Maseko adds that the pump on the unit is sized to give a flow rate of 300  $\ell$  per min, and the elements fitted are at

3.0  $\mu\text{m}$  absolute. "The unit is designed to handle up to 1 500  $\ell$  per min and the elements range from 3, 5, 6, 12 and 14  $\mu\text{m}$  (Beta 200). The suction side of the pump is protected by a 150  $\mu\text{m}$  'Y-type' strainer as well as an internal relief setting of 15 bar on the pump to protect the system. Furthermore, minmess sampling points verify the efficiency of the bulk fuel filtration system – there is one sampling point before going through the filter (from the bulk tank), and another sampling point after going through the filter system." □



Cummins Filtration has designed and installed a bulk fuel filtration system using its Fleetguard product range to take diesel fuel from the ISO 18/16/13 cleanliness level to the ISO 12/9/6 level required at the injectors of modern diesel engines.

## Stockpile dust suppression solution launched

**S**tockpile dust suppression has been dramatically simplified with the I-CAT retractable stockpile dust ring (R-SDR) system, which efficiently addresses dust issues at conveyor discharge points.

I-CAT technical manager, Morne van Wyk, explains that the R-SDR system creates a virtual curtain around material flow for outstanding particle containment. "Engineered to industrial strength and longevity, the R-SDR system surrounds the discharge flow on all sides, providing simple, focused dust management that is well suited to continuous duty applications, such as radial stackers."

The R-SDR system boasts a stainless

steel misting ring designed for mounting at the end of conveyor belts. A variable configuration allows nozzles to be added, removed or replaced with different types and sizes to suit specific applications.

Van Wyk continues: "Thanks to variable particle sizing (VPS) technology, it also features a number of customisable options. It is an intrinsically safe, mounted option, with a fully retractable and serviceable configuration for ease of access, installation and nozzle maintenance."

The PLC-controlled system consumes low amounts of water and a booster pump can be added to increase water flow and pressure. □



# Driving down DMS maintenance costs

Maintenance is a critical requirement for any minerals processing plant and Multotec has made it easier for mines to implement a proactive programme on dense medium separation (DMS) plants.

Over recent years, Multotec has launched a number of innovations that have not only extended the life of its cast iron DMS cyclones but also simplified onsite maintenance.

This is according to Richard Haydon, process manager, cyclones at Multotec Process Equipment, who points to the innovative design of the Multotec DMS cyclone Monocone, with its combined spigot and cone as a prime example.

Haydon says that often the cone and spigot in conventional cyclones wear at different rates, which can lead to a groove being formed between the cone and spigot as well as the creation of turbulence within the cyclone with a resultant loss of process efficiency.

The Multotec Monocone design has

eliminated the joint area, which is found in traditional two-piece cyclones by combining the two components into one.

“The most significant advantage of the new design is that we have completely eliminated the possibility of a groove forming between the cone and spigot,” Haydon says.

The design has been subjected to extended and detailed tests at one of Multotec’s customer sites where a cyclone fitted with a Monocone has outperformed a separate cone/spigot combination.

“The wear pattern on the Monocone combination was smoother than on the conventional cyclones. In addition, the conventional cyclones showed increased wear at the breakpoint where the cone and spigot connect. The Monocone also achieved improved separation efficiency at the DMS plant due to its smoother internal profile after prolonged operation,” Haydon says.

The Monocone is complemented by Multotec’s latest CL range of cast iron cyclones, which has a self-aligning joint between the spigot and

*Left: A Multotec DMS cyclone cone, constructed from an alternative alloy.*

*Below: Phillip Nxumalo and Tumi Segakweng, Multotec operations staff, with the new self-aligning cone and spigot.*



*Richard Haydon, process manager cyclones, Multotec Process Equipment.*

the cone. This eliminates the creation of an inward step during the assembly of cyclones on operational sites and in cramped conditions in a DMS plant.

Multotec will be phasing in the use of self-aligning joints on other cast iron components to achieve similar benefits in other areas of the cyclone, while the vortex finder has also been redesigned for accurate fitment straight into the cyclone.

In order to improve the life of high wear components in a cast cyclone, Multotec manufactures these from alternative alloys in place of conventional high chrome cast iron.

“Components, such as a vortex finder and a cone section, can be manufactured from alternative alloys. We are now able to retrofit these customised components in a high wear area on an existing cyclone,” Haydon says.

Visual inspections on the plant are not always possible but operational and maintenance personnel are now able to use Multotec’s ultrasonic testing equipment to assess the cyclone’s condition in areas where access to the DMS cyclone is limited.

“While never being able to fully replace important visual inspections that give an accurate account of the performance of the DMS cyclone, plant operators are now able to reduce the frequency of visual inspections and this technique can be used to strengthen existing proactive maintenance programmes,” Haydon says.

It is apparent that Multotec has responded to the demands of the existing mining landscape where maintenance is key to ensuring optimal performance in a challenging economic climate. □



# Rapid mill motor repair for Rössing Uranium

Marthinusen & Coutts, a division of Actom, recently repaired two large mill motors for leading uranium producer, Rössing Uranium in Namibia; a company celebrating 40 years of production this year.

**M**arthinusen & Coutts' field service team was requested by Rössing to inspect two brush mill motors on site. The team found that the starting cage winding on one of the motors had moved and rubbed against the stator winding, while an insulation test conducted on the second motor indicated that the stator winding was down to earth. This necessitated having both motors repaired at Marthinusen & Coutts' facility in Cleveland.

In view of the fact that no spare motor would be available to the mine in the event of a further breakdown while the two spare motors were being attended to by Marthinusen & Coutts in Johannesburg, the first of the two 1 586 kW, 3.3 kV, 187.5 rpm, brush motors to be repaired was treated with the greatest urgency to ensure that it was returned to the mine as quickly as possible.

"We therefore designated it as being 'a breakdown' and the repairs on it were carried out as soon as it was received at our plant in October last year. The repairs were completed within three months and the motor was returned to the mine early in January this year," Craig Megannon, Marthinusen & Coutts' general manager, says.

Repairs carried out on the two motors consisted of rewinding the stators with the use of a resin-rich winding system; overhaul of the rotors and complete replacement of the rotors' electronic diode and synchronising hub.

"Application of the resin-rich winding system for the stator rewinds necessitated having to manufacture special customised press boxes for curing the cells. A critical part of this was ensuring that the dimensions of the cells were 100% correct so that they could fit exactly into the core slots. A coil reset jig also had to be made to enable us to manufacture the coils to the correct shapes," Megannon says.

Repair of the second motor was completed at the end of March. In addition to the stator rewind with resin-rich windings, the rotor was overhauled and the quadrants on a damaged damper winding of the rotor were replaced. □



Alpheus Mtshali, from Marthinusen & Coutts, is pictured with the 1 586 kW 187.5 rpm, 3.3 kV, 278 A stator.



# SDT270

**The most advanced ultrasonic detector for your predictive maintenance programme**

**Leaps and bounds ahead**

- Unequaled precision in detection and measurements
- Vibration severity measurement
- Recording of time signal wave files
- Two channel inputs
- Included RPM sensor and laser pyrometer
- Integrated SQL database
- USB data transfer and IP address
- Intuitive management software
- Upgradeable platforms and applications kits.

**Numerous applications... to achieve major savings:**

- Leak detection on compressed air systems
- Steam trap testing
- Sealing vibration monitoring
- Acoustic bearing lubrication monitoring
- Pump cavitation detection
- Internal leak detection on valves
- Detection of electrical defects.
- Hatch cover tightness testing

For more information on the SDT270 and other great SDT products and their many applications contact  
**Martec on Tel: +27 (11) 326 2708**  
**Info1@martec.co.za**



Martec | A Pragma Group company  
[www.martec.co.za](http://www.martec.co.za)

**Reliability is *Everything*™**

1 Terrace Building, Eaton Terrace, New Redruth, Alberton



# The screen test – achieving maximum efficiency

Corné Kleyn, product manager for screens at Weir Minerals Africa, explains how the efficiency of screens can be defined, measured and increased.

**M**ining and aggregate processing equipment is used for a number of different reasons: from separation and washing to dewatering. However, regardless of the aggregate product's final application, be it construction material or road surfacing, the property a customer is most interested in is the average particle size.

Separating and sizing a wide range of particle sizes generated by crushing equipment is one of the most important functions after the milling process, and screens play a large part in the operation. The role played by screens is central to the quarrying process and Kleyn says there has been a trend towards increasingly large units being installed at bigger quarries as operators look to increase their output. However, he says that regardless of how big a screen may be and what volume of material is passing through it, it is vital that it operates efficiently.

## Defining efficiency

Efficiency is defined differently according to screen function. Screens fall into two main categories; separating screens – those that split the mixture into grades

according to particle size – and dewatering screens – those that remove water from the final mixture so it can be easily stored and transported.

The objective for separation screens is for the maximum number of particles that are small enough to pass through the apertures in the screen medium to do so. In contrast, the design of dewatering screens ensures that the majority of fine particles that could pass through the apertures are retained so that the screen does not change the composition of the mixture when the water is removed.

It is very difficult for any separating screen to be 100% efficient, as this would mean that every single particle in the mixture small enough to fit through the screen would find its way and pass through one of the apertures in the screen medium. In reality, this is never the case – some fine particles will always be retained.

The process that helps to ensure a separating screen operates efficiently is called stratification. This describes the ease with which smaller particles are able to fall between the gaps in larger particles in order to find their way towards the apertures in the medium at the base of the bed of material.



*Corné Kleyn, product manager screens at Weir Minerals Africa.*

If the correct level of stratification has been achieved, the depth of the bed will gradually decrease from the feed end to the discharge end, as finer particles are removed. Excessive bed depth at the discharge end of the screen is a sure sign of poor efficiency. The rule of thumb used by many quarries is that it should be no more than four times the size of apertures in the screen medium.

## Achieving efficiency

There are a number of ways to increase the efficiency of a separating screen. One option is to reduce throughput. However, Kleyn says that depending on output demands, this is not always a viable option.

Increasing the speed at which the screen vibrates can speed up stratification and reduce the depth of the bed, but there is a compromise to be made, as speeding up the oscillation will reduce the life of the bearings within the exciters, calling for increased maintenance. The amplitude of the vibration also needs careful consideration. While it can improve stratification, too much travel can cause finer material to bounce along the screen, reducing the probability of it finding its way through an aperture.

In general, separating out coarser particles calls for greater amplitude and lower frequencies, while finer particles require the opposite.

The size of the apertures in the screen medium is another important consideration. A proportion of fine particles will always be retained in the oversize output and therefore the appropriate slot size to deliver a mixture of a given specification might be slightly larger than the actual



*A Trio inclined vibrating screen installed in an aggregate application.*

separation grade required.

For dewatering screens, the challenge is less complicated. The high level of particle retention which is desirable for these screens is achieved by encouraging a much deeper bed of material on the screen, and this is done by ensuring a steep positive incline, with material held behind a discharge weir.

### Specifying the right screen

To ensure that the right screen is selected for any given application – one that will deliver required levels of efficiency at a high level of output – it is essential to understand the dynamics of the specific slurry in question. There is no one-size-fits-all solution.

Before a manufacturer supplies a screen that will meet production targets, they will need detailed information on production tonnage, the type of material, the shape and size of the particles, whether the feed is delivered in a slurry and, if so, what the concentration is.

Kleyn says that a good equipment manufacturer should be happy to visit customer sites and consult on which products would perform well in any given



An Enduron screen being installed in a quarrying application.

application. With a number of highly experienced engineers, Weir Minerals Africa is perfectly positioned to support and advise customers on site.

Weir Minerals Africa offers a wide range of robust screens, including

horizontal and banana screens, under its Enduron® brand and inclined and horizontal screens under its Trio® brand. Screens range up to 4.3 m wide and are built to cope with the demands of even the highest output quarries. □

## Weir Minerals launches Trio® TP cone crusher range

**W**eir Minerals has announced the global release of its Trio® Top Performance (TP) cone crusher range to the mining and construction aggregate market. Combining aggressive crushing action, high crushing force and high power, this new generation of top performing cone crushers takes the user to the next level of cone crushing.

“Throughout Weir Minerals, we strive to provide customers with the best possible equipment to meet their crushing needs, which is why we developed the Trio TP cone crusher range,” says Kurt O’Byrne, global product manager for crushing and screening at Weir Minerals. “The new TP cone crushers operate at a higher speed than their predecessors, which provides higher reduction with better shaped material.”

These compact, robust crushers are built with advanced cone crusher automation technology to ensure continuous high performance and application versatility. All Trio TP cone crushers feature a steep crushing chamber angle, a large crushing stroke and optimum speed to deliver a finer product through increased interparticle comminution.

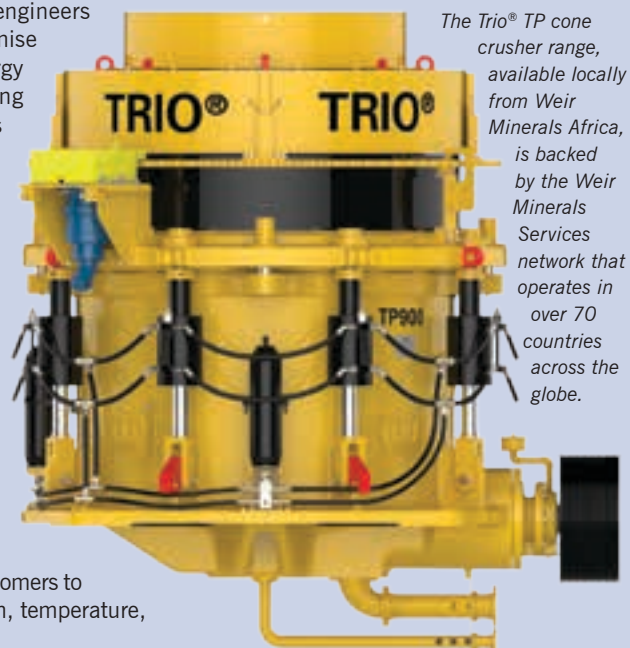
“Safety has always been the number one priority for Weir Minerals, which is why our Trio TP cone crusher range is designed

with self-protecting features to help achieve high levels of mechanical reliability under severe operating conditions, whilst ensuring the safety of the operator and equipment.

“Typically cone crushers are operated with high tension belt drives that are inefficient, require frequent maintenance and also become OH&S entanglement risk zones. Our engineers at Weir Minerals recognise the importance of energy efficiencies and reducing operating costs. With this in mind, they designed a reliable direct drive option for cone crushers. The direct drive system can be combined with a variable frequency drive (VFD) to further optimise crusher performance, resulting in significant energy savings.”

All Trio TP cone crushers are fully instrumented with advanced lubrication and hydraulic systems, allowing customers to monitor vibration, motion, temperature, flow and pressure.

“At Weir Minerals, our reputation for quality engineering and exceptional service is second-to-none. Combining decades of experience with innovative designs and the highest quality materials, we believe that our Trio TP cone crusher range leads the industry in terms of reliability, productivity, ease of operation and maintenance.” □



The Trio® TP cone crusher range, available locally from Weir Minerals Africa, is backed by the Weir Minerals Services network that operates in over 70 countries across the globe.



# Automated storage systems improve bottom-line

APC Storage Solutions SA, through its partnership with Mecalux, is a leading global specialist in the design and manufacture of storage and warehouse solutions. Managing director, Fred Albrecht (right) talks about the company's technology and success.



**A** new automated warehouse is being launched in South Africa every year, this in addition to APC Storage Solutions SA's consistent offering of the latest European trending warehouse and storage solutions to local companies, some of which have been developed specifically for the African market based on local input.

The 16-year partnership with Mecalux has seen the local company install an average of 10 000 t of storage systems per year. This equates to 150 000 t in more than 5 000 projects across South Africa and southern Africa, which has contributed to APC Storage Solutions SA's organic growth. Beginning with head office premises in Johannesburg and installing quality small solid angle shelving, the company has opened three additional branches in South Africa's main provinces that design, install and service comprehensive storage and automated storage solutions around the country. Additionally, APC Storage Solutions SA has done a large number of conventional racking and shelving projects as well as semi-automated and automated installa-

tions in southern Africa, and continues to service countries in this region.

As the first South African storage and warehouse solutions' company to import technologically advanced European racking and shelving, dating back to 2000, APC Storage Solutions SA has set the benchmark in warehouse and storage system quality in South Africa. "Mecalux's superior quality across its range and the current technology incorporated into its automated solutions gives customers a longer lasting warehouse solution that ultimately lowers the overall cost of storage ownership. This lower total cost of ownership effects savings across a company's entire supply chain, which in turn improves our customer's bottom-line over the long-term, albeit from a marginally higher upfront cost," says APC Storage Solutions SA managing director, Fred Albrecht.

## Shared IP and product development

Of significance to the relationship is the shared intellectual property between manufacturer and distributor. Subsequent

to each installation, APC Storage Solutions SA conducts an in-depth project analysis and provides recommendations to Mecalux's RD&I department, which annually spends about €6-million (about R110 million) on research, development and innovation. Feedback from APC Storage Solutions SA is used by Mecalux to tailor products for the African environment and associated logistical storage systems. Albrecht says that this dual development process is indicative of the collaborative partnership and the trust shared between the two companies.

"Our feedback has been incorporated into a number of storage solutions," Albrecht says. "One example was the suggestion to innovate and incorporate an electromagnetic system into our pallet shuttles, which attaches the shuttle to the forklift's forks, thereby facilitating an anti-fall protection system. The final product, the first of its kind, was rolled out on an international scale, which is testament to the innovation brought to market through our involvement." APC plays a significant role in improved automated product development with nine improvements in the pallet shuttles, including associated programmable logic controllers for the SA market due to local pallet types and loads.

Albrecht says that the Mecalux partnership grants additional value for customers through technological advances and a market offering that exceeds anything available locally.

He cites a turnkey project in the making of a 26 m high self-supporting warehouse in Lordsview, consisting of eight gangways/walkways developed by APC Storage Solutions SA and manufactured by Mecalux. "This will be a true landmark for generations to follow and, again, it's a first of its kind in the world."

## Business expansion

"Our dedicated approach as the South African partner and brand ambassadors



Mecalux develops automatic storage systems for boxes or trays integrating the shelves, machinery and warehouse management software into one single product.



The Mecalux Spinblock® horizontal rotary warehouse is an automated storage system based on the 'product-to-picker' principle.



Standardised conveyors make boxes and storage containers accessible for any warehouse or factory where there is a need to join different work stations.

of Mecalux, has positioned us as a significant Mecalux partner and we are considered as part of its core team," says Albrecht. "Since we began our partnership with Mecalux, they have increased their annual international turnover almost tenfold. It is gratifying that installations in South Africa and southern Africa, via APC Storage Solutions SA, are contributors to this growth." He adds that, on the other side of the coin, no other South African warehouse and storage solutions provider has been able to meet APC Storage Solu-

tions SA's product quality and diversity, or their geographic support to customers.

"Mecalux's resources combined with the deep-rooted relationship we have with them," Albrecht continues, "has enabled APC Storage Solutions SA to make the impossible possible when it comes to tailored, robust, efficient and cost-effective conventional, semi-automated and fully automated storage and warehouse solutions."

APC Storage Solutions SA distributes Mecalux's entire warehouse and storage

equipment range, retaining 5 000 m<sup>2</sup> of stock and 120 000 stock items – "more than local manufacturers collectively produce in a month," according to Albrecht. Sufficient spare parts for all equipment are retained, minimising any turnaround times and offering one of the most reliable and robust after sales and maintenance support structures in southern Africa.

All Mecalux equipment and automated solutions from APC Storage Solutions SA have a lifetime warranty and a 10-year guarantee. □

## Going Above and Beyond To Enhance Your Operational Efficiency.

Quality Components | Technical Expertise | Superior Service | PART OF THE PROCESS



BMG is Africa's leading distributor of engineering components and technical expertise. We carry an extensive range and stockholding of premium branded products to meet the needs of every industry sector across Southern Africa. It is this commitment that has driven BMG to become a powerful industry leader.

Part of every process. Part of yours.

For more information, contact your nearest BMG branch.

[www.bmgworld.net](http://www.bmgworld.net)

[facebook.com/bmgworld](https://facebook.com/bmgworld)

ISO 9001 Certified

BEE 3



BEARINGS • SEALS • POWER TRANSMISSION • DRIVES & MOTORS • MATERIALS HANDLING  
FASTENERS & TOOLS • HYDRAULICS • PNEUMATICS • FILTRATION • LUBRICATION • VALVES  
TECHNICAL RESOURCES • FIELD SERVICES





## Partner with the warehouse pioneers

We provide everything necessary to achieve warehouse efficiency in cost, operations and capacity. We consider product profile, warehouse flow – from arrival to despatch – and the dynamics of monthly, daily and hourly volumes to design a storage solution that is tailored to your needs.

Our product range, including everything from racking and shelving to warehouse automation and material handling equipment, provides the capability to achieve otherwise unimaginable efficiency.

**For a complete warehouse solution, contact us today!**

**APC**  
storage solutions SA

0861 61 61 61 • [www.apcstoragesolutions.co.za](http://www.apcstoragesolutions.co.za)

# In-pit, semi-mobile crushing plants for increased efficiencies

Thyssenkrupp's production-boosting mobile, semi-mobile and stationary crushing systems assist customers in optimising their comminution processes and increasing their equipment efficiencies.

**R**ising costs of labour, fuel and consumables and the trend to more stringent governmental regulations and taxation schemes related to greenhouse gases (CO<sub>2</sub> emissions) are the driving force behind mining companies around the world rethinking their conventional truck shovel mining methods.

Furthermore, mines and plants have to find ways to process large tonnages of low-grade ore at low costs and in an energy-efficient manner to overcome the many hurdles triggered by a sluggish global economy and low commodity prices, as well as the challenge of depleting higher-grade ore bodies. "Because these challenges are accelerating, low operational costs and equipment efficiency are at the top of most mines' and plants' priority lists, so we are focusing strongly on service and process optimisation for our customers," says Wilfred Barkhuizen, manager – minerals processing, power and energy, thyssenkrupp South Africa.

Barkhuizen points out that the design of efficient and cost-effective comminution systems requires "specific experience". He says this is where thyssenkrupp's competencies and capabilities take centre stage. The company encompasses more than 100 years of experience in its crushing technology, engineering and design. Continued investment in R&D and close customer cooperation spearhead innovative, state-of-the-art crushing plants that are energy efficient and economical to operate.

Semi-mobile crushing plants (SMCP) vary in design and capacity to offer different equipment solutions for diverse commodity applications, with output delivery ranging between 200 t/h to 12 000 t/h, depending on the requirement. There are currently about 257 thyssenkrupp SMCP installations in operation globally.

"We can supply a SMCP for most in-pit mineral mining applications, depending on the pit planning design," says thyssenkrupp minerals processing

product manager, Demetri Kokoroyanis.

Thyssenkrupp's cost-effective in-pit semi-mobile crushing solutions are well suited for coal and ore applications and can lead to significantly reduced operating and capital expenditure (opex and capex).

"In terms of opex savings, our in-pit crushing and conveying (IPCC) systems reduce the requirement for intermittent materials transport – using fewer trucks lowers diesel consumption, CO<sub>2</sub> emissions, fleet maintenance costs and labour," adds Kokoroyanis.

The plant's support on pontoons is designed to accommodate all static and dynamic loads and only requires a simple base to transfer the necessary ground pressure. In most cases, a bed of compacted gravel is all that is required to ensure a suitable foundation and, since the gravel bed is acting as a buffer, the plants are particularly suitable for mine sites affected by frequent seismic activity. As a result, costly civil work can be eliminated or substantial savings can be realised compared with common stationary crushing plants.

Another benefit is the ability of the SMCPs to be moved by transport crawlers

or self-propelled modular transporters. Usually, after being stationed in one place for a number of years, it can be moved into the mine closer to the actual excavation point to minimise truck haulage distances. Kokoroyanis adds that thyssenkrupp's specialist mine planning service offers advice to customers on how best to incorporate an IPCC system.

The fact that machinery is not overly complex and the main system can be connected to and controlled from the operation room, facilitates equipment monitoring by semi-skilled operators. The IPCC system has a feature that enables it to connect to a global service centre in Germany, which allows for constant system monitoring, 24/7.

The slowdown in large new projects has paved the way for an increase in upgrades and optimisation of existing plants. Kokoroyanis and Barkhuizen add that, despite the current state of the mining industry, neither sales nor interest in SMCPs and IPCCs has waned and that they have seen "a significant increase" in interest in some mining areas on the African continent.

Smaller thyssenkrupp installations for cement and aggregate plants are operational in Central and North Africa and the company is currently assisting the client of a large global minerals company in an existing Zambian copper operation to assemble and install five SMCPs. □



Thyssenkrupp's cost-effective in-pit semi-mobile crushing plants (SMCP) are well suited for coal and ore applications and can lead to significantly reduced operating and capital expenditure (opex and capex).



# Chute systems reduce degradation, dust and noise in steel plant

The recent installation of three Weba Chute Systems at the Isdemir Steel Plant in Turkey has significantly reduced noise levels as well as material degradation and dust levels. Alwin Nienaber, technical director of Weba Chute Systems, describes the installed solutions.

**N**ienaber says that the custom engineering of the transfer points addressed challenges previously experienced at the plant.

Describing the operation, he says that incoming material is transported from barges to the raw materials handling section of the plant using a series of conveyors. When the plant was assessed by Weba Chute Systems' engineers, it was confirmed that the existing transfer points were old and there was an urgent need to reduce the degradation of the material as the high levels of fines were impeding the performance of the furnaces. In addition to this, the unacceptable levels of dust and noise pollution had to be addressed.

Weba Chute Systems are custom engineered to meet the specific criteria of each transfer point, and factors such as belt speed, belt width, material size, shape and throughput are taken into account. "Use of a custom design allows for the control of direction, flow and velocity of a calculated volume and type of material. This minimises the impact of

the material, including belt presentation. This absolute control produces a significant reduction in material degradation as well as dust and noise," Nienaber says.

The three new Weba Chute Systems are being used to move sinter, coke and iron ore pellets through the plant, and the materials handling system has been engineered with a redundancy component to ensure optimum reliability and continuous operation.

The first transfer point is a conveyor-to-conveyor chute with a belt width of 1 600 mm and a material feed of 2.1 m/sec. It has been designed to handle a maximum lump size of 60 mm and 2 106 tph of sinter, 522 tph of coke or 1 496 tph of iron pellets.

The other two chutes are bifurcated chutes with integral sampling systems. The transfer points are being fed at a maximum rate of 700 m<sup>3</sup>/hr and receive material from and present material to a 1 200 mm wide belt travelling at 1.98 m/sec.

"Weba Chute Systems use a 'super-tube' effect with a cascade scenario,

where 95% of the material runs on material at the same time. The result is a controlled tumbling motion as opposed to material rushing down the chute," Nienaber explains. "Further, by engineering the internal angle of the transfer point to match the product with the belt speed, we can guarantee a marked reduction in product degradation."

Leveraging its extensive experience in custom engineered chute systems, Weba Chute Systems eliminated the conventional flopper door arrangement in the bifurcated chutes. This was replaced with a custom engineered articulating trolley section.

"This innovative solution further assists in reducing material degradation and dust levels, with the added benefit that the high wear traditionally associated with a flopper door mechanism has also been eliminated," Nienaber says.

The reduction in material degradation results in reduced fines, reduced dust and substantially reduced noise pollution. It also decreases wear, resulting in longer life for the transfer point wearing parts.

The wear rate of the chute lips has been monitored on an ongoing basis and, after 15 months of operation, these show relatively no wear. This reduction in wear translates into reduced maintenance costs with associated savings.

Such was the seriousness of the material degradation and noise pollution at Isdemir Steel Plant, that the customer and Weba Chute Systems conducted studies to determine the actual reduction in each.

The old chute systems recorded a breakage rate of 25% on the minus 5.0 mm sinter. The level of fines in the minus 5.0 mm sinter increased from 7.78% to 9.71% after passing through the old transfer points. This 25% increase in material degradation was considered a major problem for the furnaces, however high degradation rates were recorded with coke having 69% rating and iron pellets 43%.

Following the installation and successful commissioning of the Weba Chute Systems, the tests were repeated. Nienaber says that the custom engineered transfer points achieved a signifi-



Operating with Weba Chute Systems in the Isdemir plant has seen the noise level decrease by more than 10 dB to 83 dB, which allows a period of eight hours at this level of exposure.



**Above:** Weba Chute Systems are custom-engineered to meet the specific criteria of each transfer point, and factors such as belt speed, belt width, material size, shape and throughput are taken into account. **Right:** Weba Chute Systems at the Isdemir Steel Plant in Turkey replace the conventional flopper door arrangement in the bifurcated chutes with a custom-engineered articulating trolley section.

cant reduction in degradation with the sinter breakage rate dropping to 12.4%. This translates in to a 50% improvement.

The noise levels recorded with the previous chutes was 95 dB, and this had a detrimental effect on plant maintenance as the permitted exposure time for personnel at this extremely high noise level is between 30 minutes to an hour. This

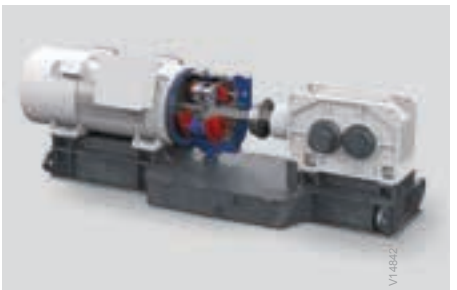
made equipment inspections difficult and thorough evaluation almost impossible.

Operating with the Weba Chute Systems in the plant has seen the noise level decrease by more than 10 dB to 83 dB, which allows a period of eight hours at this level of exposure.

"The intellectual property of our engineers remains the crux of our innovative

custom-engineered solutions, however we do believe in complementing our practical knowledge with discrete element modelling (DEM) simulation as a verification tool," Nienaber says.

"Our primary objective remains engineering a tailor-made best practice chute solution for each and every customer," he concludes. □



## Increase Your Productivity. Conveyor Drive Package Solutions

Voith offers highly reliable fluid couplings and integrated conveyor drive package solutions including peripheral hardware as well as control and supervision electronics:

- High availability of your belt conveyor
- Reliable operation under all conditions
- Optimised for each system

- Integrated design
- Precise control of the system
- Power range 125 – 4 000 kW

Tel: +27 11 418 4000  
info.vtza@voith.com  
www.voith.com

**VOITH**  
Engineered Reliability



# Track and trace for manufacturing efficiency

This article by David Stain, senior vertical marketing manager for manufacturing and retail at Zebra Technologies, the US-based enterprise asset intelligence specialist, talks about modern trends in manufacturing and the solutions that allow plant operators to see what is happening in the enterprise in real time, helping them to make smarter and faster decisions.

I spend a lot of time on our customers' manufacturing lines – from those run by OEMs through to their tier one and tier two partners and on to component suppliers. Despite differences between these companies, the managers who run their production lines talk of common issues: competition is sharper than ever; costs are under pressure; compliance and legislation are onerous; raw material prices are generally on the up; and there's a drive to accelerate production. Then there's the consumer: people's changing expectations have seen the gulf separating mass production to made-to-order customisation narrowing fast.

Personalisation is now a key trend: first in food (customised M&M<sup>®</sup>s any-

one?) and now with consumer goods, people want things made for them. Take the Vauxhall Adam – it has over a million variants, the Citroën DS3 offers three million combinations and the 2015 Dodge Viper and Viper SRT really can be 'one-of-a-kind' cars with a staggering 25-million possible configurations. Indeed, if building things wasn't already complex it's becoming more so.

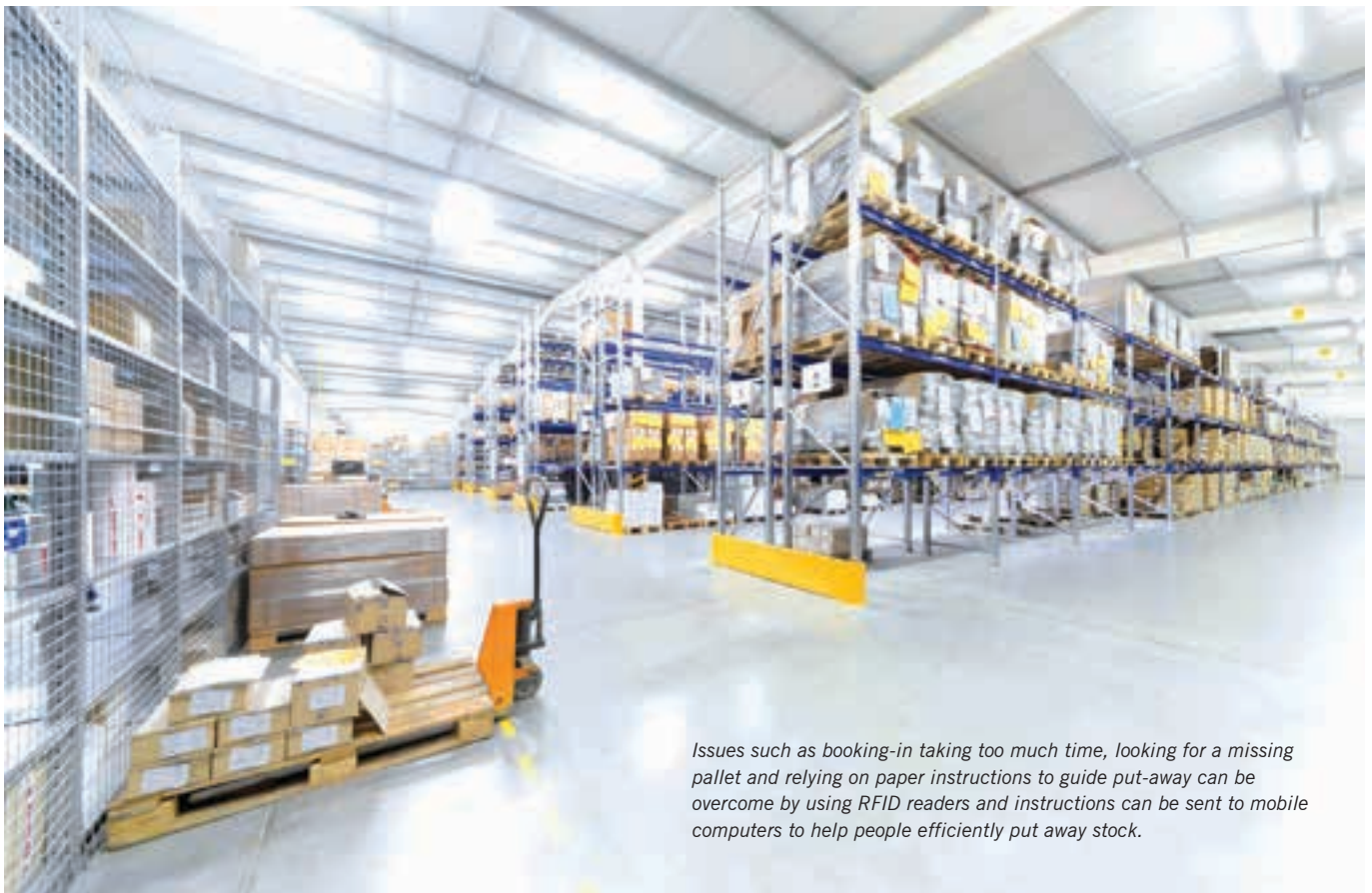
## The 'more' era

How do I sum up these challenges? In a word: 'more'. I see the need to produce more, more quickly, to achieve more cost and time savings, to find ways to manage more compliance, and, ultimately to be more efficient.



*Stages and gates situated throughout a manufacturing plant provide a continuous stream of performance data and therefore, visibility over the progress of the line.*

Just as we need to find new ways to work more effectively, the Internet of Things (IoT) promises to achieve it. IoT describes an environment where barcodes and smart sensors connected



*Issues such as booking-in taking too much time, looking for a missing pallet and relying on paper instructions to guide put-away can be overcome by using RFID readers and instructions can be sent to mobile computers to help people efficiently put away stock.*



to objects give those objects a 'digital voice'. It's a voice that allows them to connect and share data with one another – and the back office – over the Internet. Pretty much anything can have barcodes or sensors attached to them, from people to vehicles, to totes, to robots, to raw materials and much more. The technology has a key role to play in manufacturing especially with the use of 'stages and gates' throughout plants.

### Stages and gates: increasing visibility

Gartner, the American research and advisory firm providing information technology related insight, projects that 25-billion connected things will be in operation by 2025. With smart sensors and labels and tags attached to items the IoT promises to transform visibility over production lines.

There's a tendency for different cells and areas of plants to operate as silos. Stages and gates cross these divides.

A gate is a point for tracking, checking and auditing – for example, at goods-in to check a delivery manifest against arriving materials or components. The stage is the area between two gates. It follows that the more gates there are, the more visibility a facility has. One can automate the data processes at gates by using barcode and RFID labels and tags. The data on labels can be captured using handheld scanners, and, automated systems whereby fixed RFID readers track the location of items as they move

through. With the data from tags shared over WiFi networks with the back office and control systems, and the team's mobile devices, companies can keep a constant eye over the progress of the line.

A manufacturing plant, from goods in to onward shipment, can be split into nine stage and gate areas – all of which benefit from digital track and trace processes. One can't cover all of these here, but below are three areas in particular that can help drive efficiencies and performance gains.

- **Goods in:** Typical issues include booking-in taking too much time, looking for a missing pallet and relying on paper instructions to guide put-away. Even small delays in these areas cause congestion that can escalate to downtime. These issues can be overcome by the manual (using handheld devices) and automated scanning of goods (using fixed RFID readers) as they arrive. Also, instructions can be sent to mobile computers (with voice guidance) to help people efficiently put away stock.
- **Line side parts:** We still see a reluctance to move to 'just-in-time' stock handling (JIT). This is usually down to a lack of visibility over line-side stock. However, one can gain this visibility by scanning goods as they arrive on site, move to line side holding and as they are used by cells. The technology is central to establishing an eKanban platform where goods are delivered to – and used – at the moment they're needed. In turn, this will ensure quicker and slicker replenishment, it saves space by reducing inventory and it leads to smoother processes – all of which lower the cost of manufacturing.
- **Assembly:** Items can be tracked as they arrive at assembly points. Operators can also use handheld computers and scanners – together with label printers – to record quality data and label parts for tracking and auditing as they move down the line. In addition, operators can be linked to machines via their mobile computers – using human machine interfaces – and the data collected from their cells can be used to improve user training and shave further time from processes.

### Augment SOPs

Another core part of manufacturing that we believe can be significantly improved

is the Standard Operating Procedure (SOP). By replacing paper-based SOPs with digital versions on tablets and PCs – including video content – one can provide clear guidance for teams. In addition, working to SOPs will become more intuitive with voice software relaying step-by-step instructions to assembly teams.

And, in the not too distant future, augmented reality will further improve processes. For example, enhanced reality glasses can display data, images and video to provide all the information a cell worker needs – in front of their eyes – to follow exact procedures. With digital content, changes to SOPs are less cumbersome while intuitive guidance will drive new product introduction and process improvements.

### The power of visibility

A manufacturing line is a complex movement of parts, materials, people, machines and processes. All must move perfectly, to the second. Stages and gates situated throughout a manufacturing plant provide a continuous stream of performance data and therefore, visibility over the progress of the line, from goods-in to goods-out. This insight allows the progress of every order to be traced, complex interactions to be orchestrated, JIT principles implemented, issues rapidly identified, control maintained and, with the use of Big Data systems, areas where operating procedures could be refined can be identified.

As competition ratchets up and we adjust to the need for more agility and leaner operations, technology will help manufacturers respond. For example, smarter sensors, twinned with automated data capture systems at stages and gates will further enhance visibility across operations, while augmented reality will assist teams in embracing new SOPs that will enhance productivity.

Zebra helps enterprises to become as smart and connected as the world we live in. Real-time information – gleaned from visionary solutions including hardware, software and services – gives organisations the competitive edge they need to simplify operations, know more about their businesses and customers, and empower their mobile workers to succeed in today's data-centric world.

Zebra Technologies Africa operates out of Illovo in Sandton, South Africa under the management of Neil Gouveia. □



# Towards best-practice manufacturing in SA

Zest WEG Group in South Africa has recently introduced WEG's manufacturing planning and execution system into its South African operations as part of a global sustainability strategy. Along with an investment in best-practice production control programmes, the system will allow the Group's manufacturing facilities to accelerate production and meet shortened lead times.

It is never just about supplying products or technical support to the market. It is also about implementing best practice across all companies and, in particular, manufacturing operations. Louis Meiring, chief executive officer of the Zest WEG Group, says that it is this operating philosophy that has seen the Group's holding company, WEG Brazil, continue to invest in the local operation's manufacturing facilities.

Significantly, Zest WEG Group will be exhibiting its locally manufactured custom equipment at Electra Mining Africa 2016.

Meiring says that the most recent investment has been in best practice production control programmes that will allow the Zest WEG Group manufacturing operations to improve processes thereby accelerating production and meeting the shortened lead times that have become the norm in the market.

He explains that the decision to introduce WEG's manufacturing planning and execution system into the South African operations forms part of the global sustainability strategy. "It was always the intention to implement best practices at these facilities with the long term objective of enabling these manufacturing plants to produce product for the international market," he says. Eventually, WEG

will be able to manufacture at any of its centres worldwide.

"Zest WEG Group as an organisation is very excited about this step and particularly the very clear benefits that our customers will see," Meiring says. "It will make a massive contribution to the success of our local manufacturing facilities and put us into the international space."

Juliano Vargas, Zest WEG Group logistics and operations director, explains that the manufacturing planning and execution system being used is well proven at other WEG manufacturing facilities.

"The system facilitates full control of all our manufacturing operations, and, importantly, provides accurate cost and time control. Access to this level of information allows a high degree of certainty and creates an environment where customers can have complete confidence and comfort," Vargas says.

"Continuous improvement programmes have ensured that the system functions optimally and what is most important is that the system implemented at the South African manufacturing operations has been localised," he explains. "This means that South Africa was able to draw on the experience of all WEG facilities with the result that the system considers the exact Zest WEG Group operational conditions while still achieving



Transformers and ring main units on the production line at WTA Wadeville.

best practice criteria."

Zest WEG Group currently operates four separate manufacturing facilities, these being Shaw Controls, WEG Transformers Africa Wadeville, WEG Transformers Africa Heidelberg and Zest WEG Group Generator Sets Division.

Vargas says the system will enable greater and transparent communication with customers in terms of the status of each order. "Access to information is in real time and is so specific that at any point in time a customer can find out the exact stage of the product during the manufacturing process," he says.

This is most significant, especially given the dynamic nature of business at the moment, where manufacturing facilities often receive change notices or order amendments even once the production process has begun. Being dynamic, the system allows for the simulation of the change to be done and an accurate prediction made with respect to the impact in cost, time and order conclusion.

Commenting on the actual implementation, Vargas says that the planning



The Zest WEG Group Generator Sets Division facility in Cape Town.



Zest WEG Group's panel manufacturing facility in Cape Town.



stages started mid-2015 when the alignment between the Zest WEG Group and the WEG teams was initiated.

In November 2015, a team of skilled practitioners from WEG Brazil visited the South African facilities to assess these operations and establish the status compared to WEG global best practices

in manufacturing. This took place over a three-week period to ensure in-depth assessment of all four facilities.

Comparisons were done with WEG facilities in Colombia, Brazil and Mexico. These operations produce the same or similar products, which meant that the manufacturing processes are the same and similar. These facilities already complied with WEG best practices and Vargas says that some had done so for more than twenty years.

“The resultant gap analysis between the Zest WEG Group status and that of WEG’s best practices formed the foundation from which the implementation stage began,” Vargas adds.

The gap assessment was discussed in depth with WEG Brazil and the implementation plan was developed in conjunction with a local partner in South Africa. The implementation phase started in March this year and consisted of a couple of facets. A team of practitioners from Brazil that had already implemented

similar systems at other WEG facilities joined the local team and the system went live mid-June with the support of the full team.

Vargas pays tribute to the implementation team and all at Zest WEG Group manufacturing operations as he underscores the fact that on day one of going live it was possible for all facilities to operate normally.

“We cannot say it was effortless, but we can say that the implementation was thorough and customers have already started realising the benefits of the significant investment WEG has made in the four manufacturing operations,” Vargas says.

Meiring concludes by confirming that being responsive to the market has always been the cornerstone of Zest WEG Group’s success on the African continent. “It is this ability to adapt our business that we believe will enable us to become the supplier of choice to the market,” he predicts. □

## Relocation creates Africa’s largest plug and socket manufacturer

Component, equipment and system engineering specialist, Powermite’s range of electrical products are now manufactured locally by Ampco and Proof Engineering under one roof in a new state-of-the-art manufacturing facility. This combined operation enhances product and service delivery.

Ampco relocated to the manufacturing facility, which is on Johannesburg’s Westrand, in December 2013, and was joined in November of 2015 by Proof Engineering and Azolite. “Pooling talent and resources across both businesses has created the largest plug and socket manufacturer under one roof in Africa,” says Powermite’s marketing director, Donovan Marks. “The combined strengths and synergies of the two companies have lowered our cost base and improved efficiencies across the board. This move has also resulted in more streamlined processes and logistics, adding further value to our local manufacturing capabilities and ensuring rapid products and spares availability. In line with our customer-centric approach, we pass all these benefits on to our customers and end-users to assist them with optimal plant availability and production.”

The range of electrical products, hazardous lighting products and components from Proof Engineering and Ampco, part of Powermite, a Hudaco Group company, are used on mobile generators, pumps and welding machines, marine, industrial and general

engineering applications as well as on mining machinery operating in underground and opencast mines such as continuous miners, shuttle cars, pumps, tunnel borers and transformers. The ISO 9001:2008 compliant products carry SABS approval to IEC 60079 Part 1 and 2 and SANS 1489 – 2005, and to 60309 Part 1 and 2.

As a leading industrial plugs and sockets manufacturer for over 30 years, Ampco’s unique interlocking design prevents end-users from removing the plug under load, while the application of LM 6 reduces the possibility of corrosion and extends product life. Ampco’s range of CEE products are manufactured to SANS 60309 Part 1 and Part 2 standards.

Proof Engineering is a flame- and explosion-proof product specialist with over 45 years’ experience in the manufacture of world-class components, equipment and systems. Proof produces plugs and sockets as well as tunnel couplers and adaptors for underground and open cast applications and couplers for draglines. More recent additions include couplers and adaptors for overhead-line skids.

Proof Engineering set a benchmark when the company introduced its ProAlloy coupler manufactured from non-theft material, which consists of a combination of zinc, copper and aluminium. The coupler is 33% lighter than its brass counterpart and, most importantly, holds no resale value. □



Powermite, Ampco, Proof Engineering and Azolite products are now all manufactured out of a facility on Johannesburg’s Westrand, now the largest plug and socket manufacturer under one roof in Africa.



## Chillers earns SABC R7.9-million in energy savings

Four York chillers replaced the six 40-year-old chillers at the SABC in Auckland Park – bringing energy and running costs down by R7.9-million per annum, effectively ensuring a return on this investment in two-and-a-half years.

**T**he SABC in Auckland Park has replaced six 40-year-old chillers with four new York chillers from Johnson Controls. The R8.5-million investment in new chillers is part of a central plant upgrade project that delivers a more efficient cooling solution, offers improved controls and will provide the SABC with sufficient capacity to meet its growing needs. The time to return-on-investment: a little over two years for the total project – much of it in the form of significant savings in energy consumption that the new system delivers.

“The SABC’s Auckland Park premises extend over roughly 165 868 m<sup>2</sup> of lettable floor area and houses about 6 000 people on a daily basis. Our existing six chillers were 40 years old – they had been well maintained but had reached end-of-life. By making use of newer technology, centralising our plant equipment, and leveraging existing investments, we determined that we could improve environmental control across our facilities, increase our flexibility in terms of failover, gain significant energy savings and gear the broadcaster to meet future HVAC needs,” explains Bruce Phipson of the SABC.

Reliability, standby operations and efficiency were high on the SABC’s list of requirements. Aurecon was appointed

as consultants to do the design, while Airgro and Johnson Controls were appointed through a tender process to do the installations. Johnson Controls’ York chillers were selected to provide the best solution. Four chillers – two water-cooled and two air-cooled – were identified as suitable to meet the SABC’s core and standby needs.

### A new configuration for greater control and efficiency

The two York YK centrifugal water chillers take the complete complex load, replacing all six legacy chillers. The two air-cooled chillers will be placed on the SABC’s generator or standby grid for use in case of a power or water cut. One will be used as standby for the SABC’s radio block, and the other for the TV block.

“The two air-cooled chillers give the SABC greater flexibility, reducing its dependence on water, and reducing the complexity of ancillary equipment such as pumps and cooling tower fans,” explains Russell Hattingh, engineering manager at Johnson Controls Systems & Service. “We also expect that the SABC will see significant savings with the new design. A reduced number of chillers result in reduced ancillary loads (as there are fewer pumps), and controlling two



Russell Hattingh, engineering manager at Johnson Controls Systems & Service.

peak and off-peak periods.”

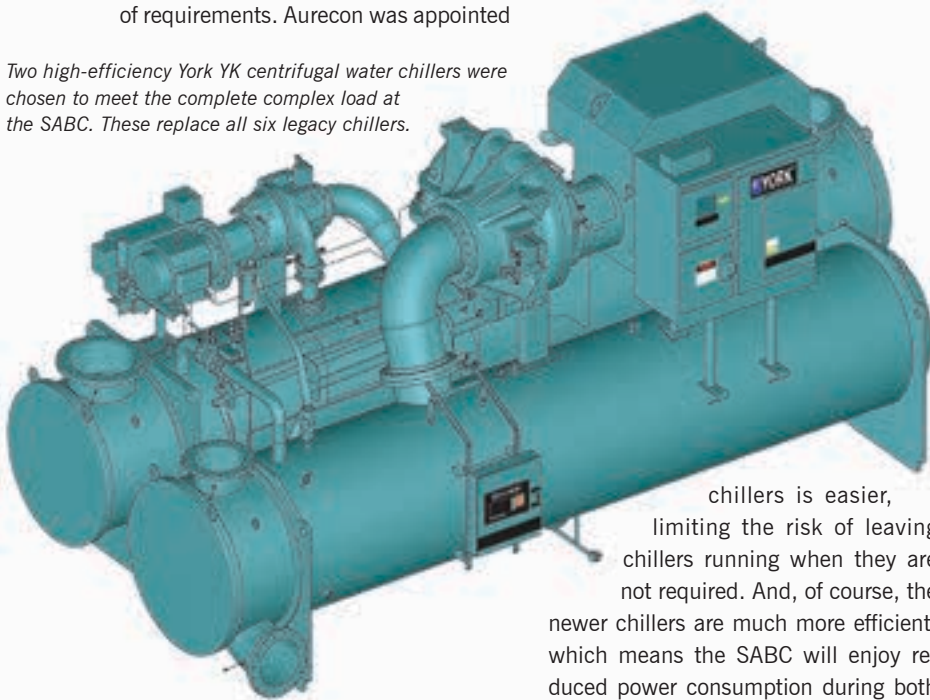
The total Auckland Park complex maximum demand has dropped from 8.45 MW per month to 7.66 MW. Average consumption per annum has dropped from 60.93 GWh to 54.49 GWh. “This brings energy and running costs down by R7.9-million per annum, effectively ensuring a return on this investment in two and a half years – and maintenance savings have not been factored into this calculation,” says Phipson.

With the addition of the Johnson Controls’ Central Plant Optimisation (CPO 10) application, further savings are expected. CPO 10 allows programming of complex chiller plant configurations and, at its core, has a chiller selector that determines which chillers best meet the building cooling load requirements and selects the combination of chillers that operates most efficiently. The SABC is also exploring the use of Johnson Controls’ building management system, which will allow it to effectively monitor and optimise its total utility spend.

The water-cooled chillers were commissioned in June 2015 and the air-cooled chillers in 2016.

“We are pleased with the performance of the system and the support provided by the Johnson Controls team. We are seeing quantifiable cost and efficiency improvements and have better localised control. The water-cooled chillers have also been put through their paces with good results. And we are not getting queries from staff – a strong indication that the environment is comfortable and the HVAC is working as it should,” concludes Phipson. □

Two high-efficiency York YK centrifugal water chillers were chosen to meet the complete complex load at the SABC. These replace all six legacy chillers.



chillers is easier, limiting the risk of leaving chillers running when they are not required. And, of course, the newer chillers are much more efficient, which means the SABC will enjoy reduced power consumption during both

# Back-channel cooling – a viable, sustainable and affordable solution

Interest in the multiple benefits of back-channel cooling and spin filter technology is growing locally and internationally – and RTS Africa Engineering is taking this technology further than anyone else.

**A**n electricity tariff increase of almost 10% announced at the beginning of March 2016 has put further pressure on the industrial sector and underscored the importance of energy efficiency in all aspects of company operations.

Variable speed drives (VSDs) have proved to be one of the most effective ways of reducing power consumption of motors, which reportedly account for about two-thirds of industrial electricity usage. Additional and significant reductions in consumption can be attained through ensuring that VSDs are installed with 'back-channel cooling', an innovative technological application that is being led in South Africa by RTS Africa Engineering.

Back-channel cooling offers a cost-effective way of ensuring that temperatures within VSDs do not reach levels that risk shortening the life of these devices. The drives are often located in motor control centres (MCCs) or similar enclosures that provide appropriate protection, but may become hot through the combined effects of ambient temperature and the heat generated by the VSDs' inverter technology.

Traditionally, site engineers have coped with this problem by installing large air conditioners that cool the air in MCCs. With back-channel cooling, however, ambient air from outside the control centre is channelled through a VSD, over the heat sink of the device, and then vented from the MCC.

"The critical point here is that the channelled air does not have to be cooled. The steady flow of air over the heat sink keeps the VSD at ambient temperature, which is normally quite acceptable; the drive does not actually need to be kept at a cooler temperature," explains Ian Fraser, managing director of RTS Africa Engineering.

"Up to 85% of the heat generated by VSDs can be dispersed through back-channel cooling,

cutting down on the need for air conditioning. This translates into savings that can prove astonishing. Air conditioners are energy-intensive, and can be unreliable in harsh environments," Fraser warns.

Air flow is driven by a fan and passed through inertial spin filters, which address another key challenge of MCC environments: the build-up of dust. The spin modules used by RTS Africa Engineering remove 98% of particles measuring 15  $\mu\text{m}$  or larger; while dust arrestance at 5.0  $\mu\text{m}$  is 80%.

As the modules make use of cyclone technology to capture dust (rather than filters that can become clogged) and are self-purging, they require little maintenance. This provides further savings to the user, who also benefits from the fact that the modules – manufactured from high-density polypropylene – are exceptionally durable. In certain instances, spin filters installed by RTS Africa Engineering have been operational for more than 20 years. This more than repays the initial cost of investment in the filters, which may be higher than that of competing products.

The simplicity and ingenuity of spin

filter technology have sometimes proved an obstacle to its acceptance. "In the beginning, nobody believed it would work. However, word gets around, and our track record now speaks for itself," Fraser adds.

RTS Africa Engineering has supplied spin filter technology to several key mines in South Africa and pan-Africa. The company is now seeing increasing interest in spin filters from other industrial sectors, and also from international enquiries. Currently, filters are being installed at a leading steel manufacturer where "dust-loading is a real challenge," says Fraser, adding that enquiries about the technology have come from as far as Australia and India – markets that, he believes, hold great possibilities.

"I believe we have taken this technology much further than anybody else has locally," says Fraser.

"Clients come to us with complex filtration and ventilation challenges, and we work hard to find viable, sustainable and affordable solutions. We purpose-build the technology because it's not a standard product but is custom-designed; and, if it's possible to engineer it, we will do it," Fraser concludes. □



*Back-channel cooling, along with RTS Africa's spin-filter technology, offer a cost-effective way of ensuring that temperatures within VSDs in motor control centres remain at safe levels.*



# Why should you pay more for quality?



## Improved performance with upgraded SKF Explorer spherical roller bearings

- Upgraded and optimized as part of the SKF EnCompass Field Performance Programme
- Improvements in steel composition, heat treatment, geometries, surface finishes, lubrication and seals
- Extended bearing life in the most demanding industrial applications - can last up to twice as long as previous bearings under contaminated or poor lubrication conditions.



Find out more at [www.skf.co.za](http://www.skf.co.za)

# Innovative fan prototype for vapour compressor

Local fans and ventilation specialist, MechCaL, has been appointed by AngloGold Ashanti to install a prototype of a ground breaking compressor at the Mponeng mine.

**A**s part of the vapour compressor, which is an integral part of the refrigeration plant at Mponeng, a new prototype fan is to be installed by South African specialist fan designer and manufacturer, MechCaL. The fan in question will form a flexible blade compressor that leverages the outstanding strength of high-end composite materials. The prototype has been in development since 2012.

Refrigeration plants are generally required in deep level mining where underground rock temperatures exceed legal limits and the air needs to be cooled down to create an acceptable working environment.

According to Michael Minges, director of operations at MechCaL, the use of carbon composites allows the product to be used in extreme operating conditions under high loads. The fan is also suited to applications in refrigeration and desalination plants.

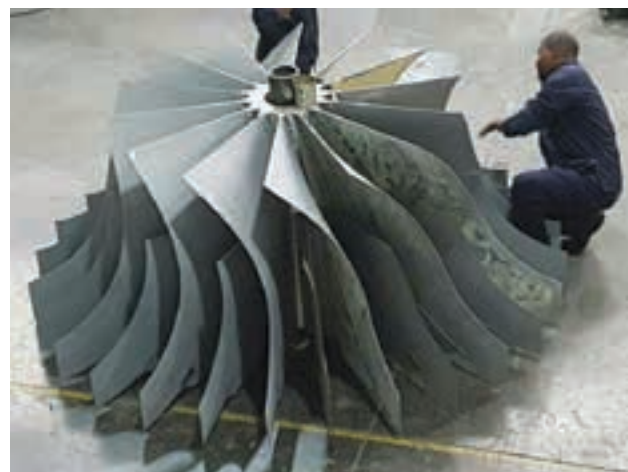
MechCaL has become well known for its innovative designs and unique use of technology to manufacture fans for the mining industry. Its patented designs are coupled with the use of lightweight composite materials to create fans that boast increased efficiency, operational and energy savings and lower mean time between failures.

"The use of composites in these systems is a niche application that has allowed us to re-engineer the vapour compressor and blades to enable them to withstand high loading, where each blade experiences loads of up to 70 t. This is mainly due to centrifugal forces associated with the fan's 2.4 m outer diameter spinning at 3 500 rpm. Some tricky design issues needed to be addressed with innovative and well-engineered solutions to address issues such as the blade tip speed crossing the sound barrier at 400 m/s at 120°C and reaching speeds of up to 440 m/s. It is also critical to ensure that, during normal operation, the natural nodes of the structure do not get excited, which

makes the stiffness design of the fan blade material layup of vital importance," says Minges.

Heinrich Jacobs, principal engineer at MechCaL, comments that the vapour compressor fan prototype represents MechCaL's innovation and technology driven offering through its unique design and materials usage capability. "This product is highly innovative by virtue of the merging of various metallic and non-metallic materials together to form a coherent item that is finely tuned to perform exceptionally in a narrow operational band," says Jacobs.

For MechCaL this project establishes a good base knowledge of highly centrifugally loaded composite structures for use in future development work and new products. Says Minges: "It establishes MechCaL as a supplier of these fans to the local market as well as to the international original OEM designer of this plant. Additionally, it strengthens our relationship with AngloGold Ashanti for the future supply of MechCaL products."



*MechCaL has developed a prototype fan for a blade refrigeration compressor that leverages the outstanding strength of high-end composite materials.*

Installation is set for August 2016.

MechCaL, established in 2002 to design and manufacture industrial fans, has developed proprietary software that allows for high efficiency designs to address the much-needed green economy to reduce CO<sub>2</sub> emissions by using less energy while providing the same performance. Working out of manufacturing facilities in Silverton, Pretoria, every fan is designed for a specific application by matching the required performance with optimised efficiency.

MechCaL has been awarded the prestigious Technology Top 100 award six times and has been a runner up four times. It has also won the Enabling Award from Frost and Sullivan. □

## MechCaL Honoured at MVSSA Awards

**M**echCaL was recognised at the recent Mining Ventilation Society of South Africa (MVSSA) awards ceremony in recognition of its contributions to industry knowledge and research.

Principal engineers, Michael Minges and Michael Schildhauer, received the Society prize for Best Paper of the Year for their paper titled 'Development of an Efficient Axial Flow Fan' – which was published in the Q4, Volume 68 of the MVSSA journal in 2015.

The paper examines the development of an efficient axial flow fan and describes the selection of the fan performance criteria in terms of static pressure versus flow rate. A brief overview is given of the aerodynamic procedure and some CFD results are presented. Mechanical design issues are also described in the paper, including stress analysis on the rotor as well as designs to improve the vibration levels of the rotor.

Finally, experimental test results are compared to CFD predictions and the targeted



*MechCaL principle engineers Michael Minges and Michael Schildhauer receive the MVSSA prize for Best Paper of the Year.*

duty curve. What their research found was that fan efficiency peaked at 80%. □



# 3D-printing and the industrial potential for metal additive manufacturing

RapidTech 2016, the international Additive Manufacturing 3D-printing show and conference, presented the latest developments in these technologies and the scope for and limitations of their use for industrial-scale production. Also, the new '3D Metal Printing' trade forum began to unravel the use of the technology for series manufacturing of metal parts.



As with all sessions at the Rapid.Tech conference, simultaneous interpretation between German and English was provided for presentations at the 3D Metal Printing trade forum.

Various applications in fields such as aviation and medical engineering illustrate that additive manufacturing (AM) processes offer completely new possibilities regarding product design, efficiency, speed and flexibility in the production of series parts. It is therefore hardly surprising that growing numbers of companies are investigating the industrial use of AM technologies.

However, standards in series production are significantly more rigorous than in prototyping. "IT integration in product life cycle management (PLM), continuous processes from concept to finished component and reproducibility are fundamental prerequisites for industrialisation," explains Helmut Zeyn, business development manager for AM at Siemens Industry Software.

Zeyn presented the keynote lecture on the first day of this year's Rapid.Tech in Erfurt, which highlighted innovative developments that enable manufacturers seeking to integrate AM processes into existing production lines to meet the requirements of modern series production

for process reliability, process monitoring, traceability and data exchange.

The different trade forums presentations followed the keynote address, beginning with the inaugural '3D Metal Printing' trade forum and an introductory

talk by Jannis Kranz of Materialise. The potential for producing metal components, including parts with hollow, lattice or protruding structures, was explored. Based on successful applications, Kranz demonstrated that it is no longer the limitations of manufacturing technology but rather component functionality that is driving the design of metal components. "Developers need to recognise the design freedoms and opportunities offered by AM technologies and make intelligent use of them," he advises.

Simon Höges of GKN Sinter Metals Engineering presented a paper on water atomisation as a cost-effective alternative to the more conventional gas atomisation of metal powders. He compared the microstructure and mechanical properties of components produced by laser melting of water-atomised 316L stainless steel powder with those produced from gas-atomised powder. His session showed that, when combined with the higher production speeds enabled by recent innovations, water atomisation significantly increases the range of possible applications for the series production of 3D-printed metal components.

The expanding range of metal powders on the market is also a key factor, as Matthias Gieseke of Laserzentrum



Oliver Kaczmarzik of Concept Laser examined how to increase productivity using a modular approach that combines several AM units; automated processes; the physical separation of the construction, pre-treatment and post-processing phases; and the integration of AM manufacturing machines to Industry 4.0 standards.

Hannover, highlighted when he discussed the use of selective laser melting (SLM) of the first magnesium powder, Elektron MAP 43, in lightweight designs. Gieseke outlined the results of a study calculating the particle sizes, processing parameters and structures required to produce specimen components with a density of over 99%.

Challenges and solution approaches of AM with metals in series production was dealt with by Oliver Kaczmarzik of Concept Laser. He examined a range of issues: how to increase productivity; a modular approach that combines several AM units; automated processes; the physical separation of the construction, pre-treatment and post-processing phases; and the integration of AM manufacturing machines to Industry 4.0 standards.

Both the medical technology and aviation sectors use electron beam melting (EBM) in the production of series parts. One of the firms meeting the resulting increase in demand for process and quality control solutions is the Swedish company Arcam; and Patrick Ohldin presented some of his company's innovative developments. These include a high-resolution camera and an X-ray sensor that are integrated into the company's quality systems. The camera takes images of the entire powder bed after melting so that quality controls can be performed for each layer of the process. The X-ray sensor is able to determine beam parameters such as position, focus and beam profile with exceptional accuracy.

Clemens Lieberwirth from the Department of Fluid Technology and Microfluidics at the University of Rostock presented a further exciting development: an extrusion-based additive process for producing high-density metal components known as Composite Extrusion Modelling (CEM). It consists of two phases: additive manufacturing of green parts from injection-moulded metal grains; followed by industrial sintering. CEM has demonstrated distinct advantages over powder-based processes in terms of material handling and cost-effectiveness.

The new trade forum was organised by Siemens' Yves Küsters, who has been working on SLM for almost ten years and was awarded his PhD for his thesis on 'Methodological Parameters for a Robust Blasting Process'. His work at Siemens includes developing SLM processes and materials, with a particular focus on high-temperature alloys.

Other trade forums included for the first time at the 13<sup>th</sup> Rapid.Tech were: Additive Contract Manufacturing; Electronic Engineering; and the Automotive Industry forum. The new conference forums and the well-established trade forums – Medical Technology; Dental Technology; Design;

## The selective laser melting (SLM) process

With selective laser melting (SLM) thin layers of atomised fine metal powder (50 to 150 µm) are evenly distributed using a coating mechanism onto a substrate plate, usually metal, that is attached to an indexing table that moves in the vertical (Z) axis. This takes place inside a chamber containing an inert gas, either argon or nitrogen with oxygen levels below 500 ppm.

Once each layer has been distributed, each 2D slice of the part geometry is fused by selectively melting the powder. This is accomplished with a high-power laser beam, usually an ytterbium fibre

laser. The laser beam is directed in the X and Y plane using two high frequency scanning mirrors.

The laser energy fully melts (fuses) the metal powder particles to form solid metal. The process is repeated layer after layer until the part is complete.

SLM machines rely on STL (stereolithography) files, a CAD file format created for 3D-printing systems that slices a CAD model into layers, allowing the part be built slice by slice from the bottom by fusing each 2D 'top slice' to the previously fused layers below. □

Aviation; Tools; and Science – and the User's Conference provided oppor-

tunities for industry professionals to discuss specific AM issues in depth. □

# High-quality, innovative fluid management solutions



Specialists in fluid management solutions, Hytec Fluid Technology offers cost-effective, customised filtration solutions with extensive facilities, technical expertise and excellent services.

Our comprehensive product range includes accumulators; compact hydraulics; process, mobile and hydraulic filtration; cooling systems; and oil services, as well as decontamination and exclusive fluid maintenance equipment.

We are distributors of leading international brands such as Bosch Rexroth, Baldwin, Fleetguard, Hy-Pro, Stauff, ASA Hydraulik, Olaer, Settima and Bühler.

**The TOTAL filtration and fluid control specialists.**






**HYTEC**  
**FLUID TECHNOLOGY**  
*A Joint Venture with Bosch Rexroth*

Hytec Fluid Technology  
Tel: +27 (0) 11 976 7300  
Web: www.hytecgroupp.co.za  
E-mail: info@hft.co.za

**50<sup>th</sup>**  
ANNIVERSARY  
1966 - 2016  
HYTEC GROUP

**Rexroth**  
Bosch Group

A Member of the Hytec Group of Companies





## Affordable off-the-shelf sheet metal products



World Power Products has been a 100% South African-owned specialist fabricator of high-precision sheet metal products for over 50 years and boasts extensive design, fabrication and finishing facilities at its Johannesburg South headquarters.

High-precision, custom-designed sheet metal products account for 70% of production with the balance focused on standard off-the-shelf mild steel and stainless steel cabinets, enclosures, storage systems, locks and hinges as well as perforated sheets manufactured for local and international electrical, electronic, telecommunications and IT equipment industries.

World Power Products managing director, Jan Görtzen assures that no standard product is a 'knock-off'. "All our products are manufactured from original, innovative and unique in-house designs that are highly adaptable to offer customers and end-users maximum versatility. The fact that our 'home-grown' products are available from an on-demand store presents customers and end-users with numerous advantages. For instance, immediate availability means no lead times and little downtime because you can, literally, get it now. Furthermore, buying direct from the manufacturer holds a distinct price advantage."

A long heritage resides in the company's off-the shelf product line-up with

the PB series of modular industrial cabinets and enclosures setting the industry standard. The basic cabinet module consists of 2.0 mm mild steel profiles welded together by means of flanges to form a rigid unit. Available with ingress protection ratings of IP 54, IP 55 and IP 65 and in a vast range of sizes, these cabinets are ideally suited for a wide range of electrical, electronic and telecommunications applications.

The three world-class quality industrial enclosure ranges from World Power Products include the PB 3000 wall-mounted enclosure for housing 19-inch equipment, electronic modules and data link modems; the stainless steel Dolphin series, an ideal enclosure solution for smaller electric, hydraulic and

pneumatic applications; and the Perano series manufactured in mild steel for large applications.

Alongside improved productivity, World Power Products' compact, modular, space-saving storage systems can extend the service life of expensive tools and equipment. The range includes rack storage units, draw storage cabinets, two-door cabinets, mobile cabinets, tool trolleys and work benches.

World Power Products also manufactures off-the-shelf perforated sheets for screening, filtration and separation in the minerals, mining, water effluent treatment, catering, petroleum, beverage, bottling plants and agricultural industries. Standard high quality perforation sieves for the catering industry are also available. [www.wpp.co.za](http://www.wpp.co.za)

## New compact high vacuum system launched

In an effort to provide technology that improves productivity and reduces maintenance and downtime, Oerlikon Leybold Vacuum has added the Turbolab to its product portfolio. The Turbolab is a compact, fully assembled and ready-to-operate high vacuum system for application in laboratories, spectroscopy and microbalances as well as sputtering and evaporating systems.

John Russell, business development manager at Integrated Pump Technology, the distributor of Oerlikon Leybold Vacuum products within southern Africa, says



the system, which has just been launched, is available in either tabletop or mobile cart variants.

The tabletop variant has a new diaphragm backing pump for industry proven Turbovac i Turbomolecular pumps, which attain ultimate pressures of between  $10^{-7}$  to  $10^{-10}$  mbar and pumping speeds for  $N_2$  of 65 l/s to 430 l/s, depending on the model selected.

Turbolab can be tailor made to individual customer needs with a choice of up to six connected accessories that include purge gas or venting valves, cooling units, heater collars and vacuum measurement devices, all connected through built-in communication ports.

The system has been designed to simplify data analysis tasks. A plug-and-play approach allows the user to connect a computer to the Turbolab via a standard LAN interface. The built-in web server allows users to access all critical parameters and conditions and draw reports from data stored in internal memory," explains Russell.

"Integrated Pump Technology provides an end-to-end product solution for Oerlikon Leybold Vacuum products from high level product and technical support to ready availability of parts and servicing of fore-vacuum pumps," Russell concludes. [www.pump-technology.com](http://www.pump-technology.com)

## Industrial plant maintenance products now available from RS

RS Components (RS), the global distributor for engineers, has announced a range of plant maintenance products and solutions designed to help companies with planned and emergency maintenance requirements at manufacturing or processing facilities.

Key product areas for plant maintenance include tools, consumables, chemicals, cables and cable management, test and measurement, HVAC systems, lighting and a range of automation and control products including sensors and machine guarding.

It is essential that production-line systems be continuously maintained, as having an early indication of when a unit is operating outside of normal parameters can help avoid equipment failure and reduce downtime. RS

offers solutions designed for production line maintenance, covering areas such as process control using sensors, relays and beacons, plus a large range of products for predictive maintenance.

Important for predicting failure is the integration of sensors into existing systems or equipment, such as the SKF CMSS 200 vibration sensor, which can be placed on machinery to measure vibration above a pre-set limit and trigger an alarm condition.

RS also offers a large range of key RS Pro products targeting plant maintenance applications, including heavy-duty cabinets and tool modules, lead-acid batteries, LED lamps, extension reels, cable ties and fastener kits.

[za.rs-online.com](http://za.rs-online.com)

## Quick and easy laser shaft alignment

It's estimated that more than one-third of all bearing failures – and up to half the cost of downtime – is caused by a few microns of shaft misalignment in rotating machines. Such tiny misalignments – either angular or offset – can introduce vibration, wear and failure in bearings and seals. It affects just about every type of machine, from motors and gearboxes to pumps and couplings.

Ensuring accurate shaft alignment will help to overcome this – and engineers are increasingly choosing to replace traditional methods such as straight edges and dial indicators with more accurate laser alignment systems.

Laser systems boast several advantages over traditional shaft alignment methods, including higher accuracy and greater ease of use. In general, they are intuitive to use – especially when used in conjunction with an app – and produce results that require no calculations.

An example is the SKF shaft alignment tool TKSA 11, which incorporates a special app that guides a technician through the stages needed to correct imbalance. It indicates what shims are needed to correct vertical alignment, and which movements are needed to make horizontal alignment corrections. A live view helps to achieve accurate positioning quickly. Results can be shared for reference keeping or operator-driven reliability programmes. Variants of the system – for harsh environments, or with enhanced measurement and reporting –



*The SKF Shaft Alignment Tool is a quick easy solution for overcoming shaft misalignment problems.*

are also available.

If upgrading to a laser alignment system, it is tempting to look to the top of the range at a model that has wide functionality. But while laser systems are more expensive than traditional systems, they are available from entry level to high end.

Before purchasing a system, buyers should identify the exact applications where it is to be used and draw up a list of requirements. Buying an expensive system that can handle virtually every eventuality is likely to prove a costly mistake, because technicians must be skilled in using it. A typical alignment task involves a horizontally placed electric motor with a pump or fan, joined using a single coupling. This needs to be done quickly and easily, with minimal set-up time. A well-chosen laser alignment system will be able to satisfy these needs.

[www.skf.co.za](http://www.skf.co.za)

## Hot-water and wet-services contracting

Magnet Energy's hot water and wet-services contracting division offers customised turnkey solutions to ensure energy efficiency in industrial, commercial and domestic sectors.

"Services include the design, supply, installation and commissioning of centralised hot water systems, which



*Two 40 kW industrial heat pumps installed by Magnet Energy.*

are built to the highest quality, reliability and safety standards," says Magnet's divisional manager, Brett Jones. "These energy efficient systems are suitable for use in many environments, including hospitals, hotels, universities, hostels, prisons and municipalities."

This division also supplies domestic cold-water storage tanks and water booster pumps for domestic water supply.

Electrical control panels for these systems, which are designed and built in-house, incorporate variable-speed drives for optimum control efficiency.

Magnet's heat pump servicing and maintenance team offers a 24-hour support facility throughout the country, to ensure efficient operation and extended service life of every system.

[www.magnetgroup.co.za](http://www.magnetgroup.co.za)

## Ultra-Lok tools to be featured at Electra Mining 2016

Says Banding & ID Solutions Africa director, Terry O'Kelly: "Electra Mining is the ideal platform for us to consolidate existing business, while generating new business leads."

The company's feature product for Electra Mining is the Bosch UL4000-C Ultra-Lok application tool, which is ideal for hose clamping, having been designed to replace band and buckle systems in high volume applications. Combined with the Ultra-Lok band and buckle system, the UL4000-C delivers a finished product that is stronger than crimped or swaged industrial hose assemblies.

Banding & ID Solutions Africa business manager, Rosa Remendos, says that this makes clamping three to five times faster than conventional banding tools when tensioning a band clamp. "The UL4000-C is one of the most powerful portable band clamp installation tools on the market. It is powered by advanced lithium-ion battery technology, which holds its charge for longer with consistent peak performance throughout the life of the battery."

Cable theft is another major issue in South Africa. Estimates put losses at between R5-billion and R7-billion a year, with serious implications for the economy, reliability of electricity supply and security. Cable theft can cause power outages that could last for days, with the theft of copper cable constituting more than 90% of these crimes. Furthermore, the emergency replacement of stolen cables takes precedence over essential maintenance, preventing infrastructure from being upgraded.

The security of any traditional cable installation can be improved by applying an Ultra-Lok clamp for every 150 mm of cable. "The cost of replacing the stolen cables and resultant downtime are high, as cable theft affects production and costs. The Ultra-Lok clamp is a robust clamping solution, with a tamper-proof design. It is easy to install, and can drastically decrease cable theft in the industry," Remendos predicts.

In addition to the new product line, Remendos points out that the company will also host various interactive demonstrations on its more well-established Band-It application tools, together with a range of cable ties and stainless steel buckles and straps.

The company will be exhibiting at Stand 6B01 in Hall 6 at the Electra Mining event.

[www.banding.co.za](http://www.banding.co.za)



*The Bosch UL4000-C Ultra-Lok Application tool, which will be demonstrated at Electra Mining Africa by Banding & ID Solutions Africa.*



# Enhanced Flygt 2000 dewatering pumps

**X**ylem Water Solutions South Africa is ready to debut enhancements to its market-leading Flygt 2000 drainage pump range at Electra Mining Africa this year. The new and improved Flygt pumps will offer customers an even more reliable and robust selection of large and mid-sized drainage pumps engineered for the most challenging dewatering conditions and applications. Xylem will showcase these enhanced



drainage pumps engineered for the most challenging dewatering conditions and applications. Xylem will showcase these enhanced

*Xylem's Flygt 2400 stainless steel pump is Flygt's first stainless steel-only pump in the 2400 series. In the mining sector, it offers a durable, super-high head pumping solution for transporting chemically aggressive mine water.*

drainage pumps on Stand G10 in Hall 6 at the Nasrec expo taking place from 12 to 16 September.

Xylem's new 25 kW Flygt 2190 mid-sized submersible dewatering pump is built to handle tough, abrasives-laden liquids. The Flygt 2190 pump is available with two impeller options: the signature closed impeller with 'Dura-Spin' safeguards against wear by sweeping abrasive particles away from the impeller neck, while the semi-open impeller increases uptime by preventing fibrous solids from obstructing the pump.

The pump's conical trim sleeve, a quick and easy to use impeller-adjustment feature, restores clearances to near-original condition, boosting pump performance, while robust cable entry ensures safe, continuous operation. The new and improved Flygt 2201SH shares the same proven technology as its robust and reliable sibling the Flygt 2190, in addition to providing customers with a super-high head alternative with its two-stage hydraulics.

Xylem's Flygt 2400 stainless steel pump, the first stainless steel-only pump in the Flygt 2400 series, provides customers in the mining sector with a durable, super-high head pump suitable for transporting chemically-aggressive mine water. Target ores such as gold, silver and copper are often rich in sulphide which, when exposed to water and air during the mining process, reacts to form sulphuric acid. The Flygt 2400 stainless steel drainage pump is designed to provide excellent wear-resistance for reliable and efficient dewatering in this demanding dewatering environment.

Kristoffer Kratz, product and application manager of Xylem's dewatering business said, "Xylem's Flygt 2000 range offers customers a comprehensive suite of exceptionally robust pumps built for long life. These new and enhanced wear-resistant pumps are engineered to handle the most challenging liquids as well as being suitable for dry running and snoring operation. These highly efficient, low maintenance pumps are ideal for large and smaller scale jobs that require reliable, flexible dewatering solutions."

Other top-of-the-line products and services being featured at the show include those from all of Xylem's global pump brands: Godwin; Flygt; Sanitaire;

Leopold; Wedeco and Lowara.

A team of experts will also be on hand throughout the week of Electra Mining Africa to discuss product specifics and to guide visitors towards the best possible solutions for individual requirements.

"We are looking forward to this year's show," says Lorraine Smart, marketing manager for Xylem Water Solutions South Africa. "The team has been hard at work putting together the best product and service selection for Electra Mining and we look forward to interacting with visitors in this vibrant setting."

With cutting-edge displays and an extensive portfolio of world-class products and experts – Xylem Water Solutions South Africa is eager to share the experience of its brand-excellence to visitors at Electra Mining this year.

[www.xyleminc.com/za](http://www.xyleminc.com/za)

## Industry diary

### October 2016

#### WasteCon 2016: The Changing Face of Waste Management

17-21 October  
Emperors Palace, Johannesburg.  
Winet Fourie  
[winet@reputationmatters.co.za](mailto:winet@reputationmatters.co.za)  
[www.wastecon.co.za](http://www.wastecon.co.za)

#### WearCheck Training: Oil Analysis 1 & 2

18-19 Oct, Gauteng  
Ashley Mayer: +27 11 392 6322  
[training@wearcheck.co.za](mailto:training@wearcheck.co.za)

#### Welding Coordination: ISO 3834 and ISO 14731

19 Oct, Johannesburg  
SAIW: Laetitia Dormehl  
+27 11 298 2111  
[laetitia.dormehl@saiw.co.za](mailto:laetitia.dormehl@saiw.co.za)

## Index to advertisers

Altair .....	IFC
APC Storage Solutions .....	24
BMG .....	23
Crown.....	IBC
Festo .....	OFC, OBC
Hytec Fluid Technology.....	37
Martec .....	19
SKF .....	34
SMC Pneumatics.....	16
Thyssenkrupp .....	12
Voith .....	27
Weir Minerals .....	2

## Maintenance and asset management planning

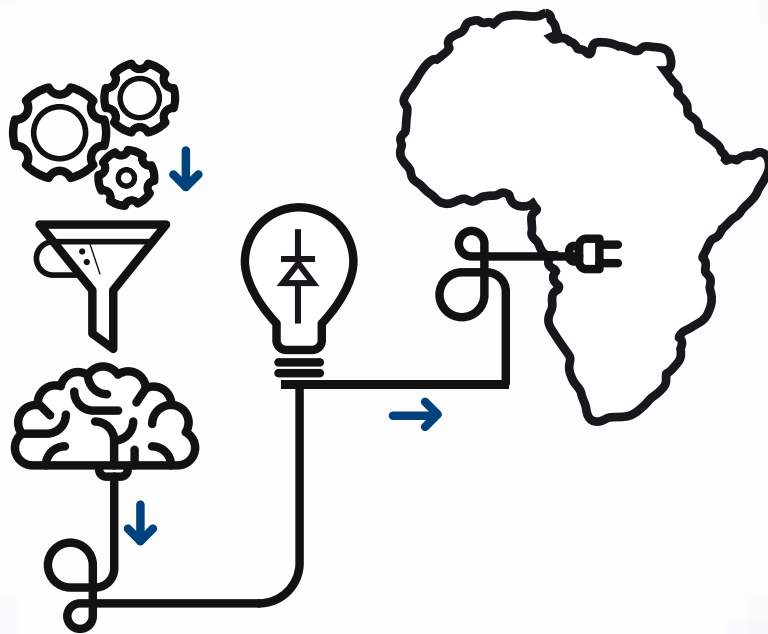
14-16 September 2016: Birchwood Hotel, Johannesburg

Hosted by The Hill Institute at the Birchwood Hotel in Johannesburg, this workshop and seminar on maintenance and asset management will deal with principles of effective maintenance planning, as well as proven techniques for the development of an effective maintenance plan, the planning and control of maintenance work, shutdown management, and management reporting and analysis.

The results and benefits from implementing a world-class maintenance operation should yield a significant improvement in plant profit, as well as many intangible benefits such as enhanced customer satisfaction, employee pride and vendor relations.

The course has been accredited and registered with the Southern African Asset Management Association/ECSA for CPD points on completion of this training.

# CROWN PUBLICATIONS



## Informing industry across Africa

African Fusion, Capital Equipment News, Construction World, Chemical Technology, Electricity + Control, Housing in SA, Lighting in Design, Mechanical Technology, Modern Mining, Modern Quarrying, Sparks Electrical News

[www.crown.co.za](http://www.crown.co.za)



Visit us at  
Electra mining,  
stand A9 in Hall 5  
between  
12-16 September  
2016

**FESTO**

## Flying high above the rest at Electra Mining 2016!

Festo will be exhibiting at Electra Mining 2016. We are also a proud sponsor for the show.



A key focus area for Festo is the mining industry. We will have an extensive range of pneumatic, electric and process automation products and solutions on offer as well some of our latest training equipment. At the forefront of our impressive offering will be the cutting edge, AirPenguin, which spans over 3,7m long!  
Don't miss out!

Visit Festo at Stand A9 in Hall 5 at the Electra Mining event to see this incredible invention!

Tel: 08600 FESTO (33786)  
Email: [sales@za.festo.com](mailto:sales@za.festo.com)  
Branches nationwide.  
[www.festo.co.za](http://www.festo.co.za)