MechChem AFRICA

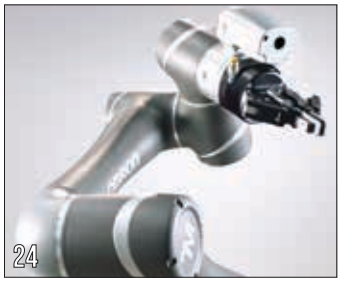
DEC 2019/JAN 2020

CROWN PUBLICATIONS

This month:

- Mechanical seals and the CAPI-TXS upgrade
- Decades of innovation driving electric motor efficiency
- LNG Hub to be established at Coega
- Steel Awards showcase steel innovation

CONTENTS



CROWN PUBLICATIONS

Published monthly by
Crown Publications (Pty) Ltd
Cnr Theunis and Sovereign Streets
Bedford Gardens 2007
PO Box 140, Bedfordview, 2008
Tel: +27 11 622 4770
e-mail: mechchemafrica@crown.co.za
www.mechchemafricamagazine.co.za

Editor: Peter Middleton
e-mail: peterm@crown.co.za
Assistant editor: Phila Mzamo
e-mail: philam@crown.co.za
Advertising: Brenda Karathanasis
e-mail: brendak@crown.co.za
Design: Darryl James
Publisher: Karen Grant
Deputy publisher: Wilhelm du Plessis
Circulation: Brenda Grossmann

Transparency You Can See
Average circulation
July-September 2019: 5 229

Printed by: Tandym Print, Cape Town

Front cover: Weir Minerals
Contact: Switchboard
+27 11 929-2600
Africa.minerals@mail.weir
www.global.weir/south-africa/

CESA
Publisher of the Year 2018
(Trade Publications)

PUMP SYSTEMS PIPES VALVES AND SEALS

POWER TRANSMISSION, BEARINGS, BUSHES AND SEALS

POWER ENERGY AND ENERGY MANAGEMENT

ENVIRONMENTAL MANAGEMENT, WASTE AND CLEANING TECHNOLOGIES

AUTOMATION, PROCESS CONTROL, INSTRUMENTATION AND CAE

INNOVATIVE ENGINEERING

REGULARS

Is climate ambition a factor in SA's energy plans?

Peter Middleton

COMMENT

It's December again and time for another UN Climate Change Conference, COP 25 in Chile. This annual environmental 'frenzy' began in 1992 at the Earth Summit in Rio de Janeiro, when 178 member countries of The United Nations Framework Convention on Climate Change (UNFCCC) entered into a treaty to 'stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'.

Some 28 years later, the World Meteorological Organisation (WMO) is reporting a new record high of heat-trapping greenhouse gases in the atmosphere, a trend that may mean "future generations will be confronted with increasingly severe impacts of climate change, including rising temperatures, more extreme weather, water stress, sea level rise and disruption to marine and land ecosystems".

Global average concentrations breached the 400 ppm benchmark in 2015 and had reached 407.8 ppm by 2018. At the time of the first UNFCCC treaty in 1992, the concentration was at 360 ppm and the aim of the member nations at that summit was to reduce and stabilise at 1990 levels, below 355 ppm.

How distant that target looks now.

Along with a 'surge' in concentrations of methane and nitrous oxide, the net effect since 1990 is 'a 43% increase in total radiative forcing – the warming effect on the climate', with CO_2 concentrations accounting for about 80% of the effect.

"There is no sign of a slowdown, let alone a decline … despite all the commitments under the Paris Agreement on Climate Change," said WMO Secretary-General Petteri Taalas.

In addition, the UN's Environment Programme (UNEP) Emissions Gap Report describes its findings as "bleak". Countries have "collectively failed to stop the growth in global GHG emissions, meaning that deeper and faster cuts are now required," we read in the executive summary.

Paying particular attention to the richest G20 countries responsible for 78% of all emissions, only the EU, the UK, Italy and France have committed to long-term net zero targets. South Africa is one of seven G20 members that "need to take more action to achieve their current promises". The others? Australia, Brazil, Canada, Japan, the Republic of Korea and the US. And of all of the 175 current signatories to the Paris Accord, only three, China, the EU and Mexico, are set to meet their emission reduction commitments via current environmental policies.

Bleak indeed! For over 28 years, the world has been procrastinating and, while every COP conference finds beacons of success, there seems little hope of a COP 25-inspired turnaround.

From a power perspective, South Africa has been procrastinating for nearly as long about which new-build power options to adopt and when. Nuclear has been on and off, the Medupi and Kusili new-build decisions came late and, in hindsight, now seem to have been on the overambitious edge. Also, in spite of the Department of Energy's widely acclaimed REIPPP programme, the role of renewables has never sat comfortably with ESKOM, which has long been a reluctant adopter.

With the recent promulgation into law of the Integrated Resource Plan (IRP) 2019 to replace IRP 2010, we see a small shift. We can finally say goodbye to the irrationally inflexible 'bulk-buy' of 9.6 GW of nuclear power. It has been replaced by up to 2.5 GW, no sooner than 2030 and implemented at a pace and scale based on affordability. Sense has returned, and sensible nuclear must surely have a long term future.

While coal will remain dominant in the energy mix, according to Gwede Mantashe talking at Africa Oil Week earlier this month: "new investments will be directed towards more efficient coal technologies, including underground coal gasification, and carbon capture and storage".

Renewables, now assigned the acronym VREs (variable renewable energies), are listed in the energy mix alongside coal as 'big' in terms of their planned contribution. VREs, most notably wind and PV solutions, are confirmed as least-cost new-build options in the future energy mix, while also generating the least CO_2 and consuming the least water. Sadly, however, current annual build limits on renewables have been retained, pending the finalisation of a 'just transition plan'.

We now know, based on global and local evidence, that clean renewable energies that pose the least risk to the environment are also cost effective. Why then are we continuing to restrict their deployment?

A CSIR analysis into IRP 2019 also points to the lack of long-term (post 2030) aspirations. Do we not want to become a net zero carbon emitter at some time in our future? Should we not be thinking now of a pathway towards a low/very low carbon economy, even if it is going to take 30 years?

We cannot afford to waste another 28 years before we react to what really is a current emergency. ❑

From mining to tailings management: Weir Minerals' Integrated Solutions

MechChem Africa talks to JD Singleton, process director for Weir Minerals Africa, about the company's five core Integrated Solutions offerings for: pit and underground mine dewatering; crushing and screening plants; mill circuits; mineral beneficiation plants; and tailings management.

The Weir Group PLC has been advancing the efficiency of pumps, valves, hydrocyclones, mill lining, crushers, screens and a host of interrelated equipment for nearly 150 years. "And our curiosity and determination to find efficient solutions remains as strong as ever," says JD Singleton of Weir Minerals Africa.

"Increasingly, we provide customers with total solutions that optimise their entire process, removing any bottlenecks and holistically maximising wear life and recovery efficiencies, while minimising downtime and ownership costs," he says.

From a minerals' perspective, Singleton says the company's Integrated Solutions offering can be categorised into five key areas: pit and underground mine dewatering; crushing and screening; the mill circuit; mineral beneficiation; and the management of tailings. "This general categorisation matches what we experience on customers' mines, where there are separate plant engineers and section managers for the mine, its crushing plant and the mill circuit while a single manager is often responsible for the beneficiation and tailings plants or the back end of the circuit."

Pit and underground mine dewatering

Dewatering, he says, is usually an essential first step before mining can begin. "While Weir Minerals has a whole spectrum of dewatering pumps, from clear water to high solids and slurry application across open-pit and underground projects, we find that engineered dewatering systems that include pumps, pipes, valves, controls and access platform or walkway solutions are always more effective than simply installing pumps.

"We design solutions using our Multiflo® or Warman® DWU pumps, which assist with high lift and high-volume dewatering. All solutions are application specific and designed to deal with multiple requirements: high volumes, heads, densities and accessibility. We may need walkways to get onto a pontoon in a pit, for example, and we are currently dealing with a client on an open cast coal mine that needs to anchor its pontoons against the sidewalls with suspended cables to ensure the system remains secure and in line with the fluctuating water levels.

"We manufacture pontoons that use Warman® DWU high-lift pumps that can deal with light slurries (specific gravities or SGs of up to 1.05), for example, into pressure heads of up to 130 m using a single stage centrifugal impeller. We also have our extensive Multiflo® MF range for higher head, higher volume applications.

"When pontoon access is impractical, diesel powered Multiflo dewatering systems with suitable priming additions can be mounted onto trailers and situated alongside the pit – and all of these solutions incorporate Isogate® valves and Linatex® hoses, combining best-in-class components to meet the applications' exact requirements and wear characteristics," he tells *MechChem Africa*.

Crushing and screening

Crushing and screening is the first processing stage for mineral ores once they have been extracted from the pit or lifted to the surface. "Our integrated crushing and screening solutions are centred around our Trio® and Enduron® brands, which can accommodate ore volumes from 40 to 1 500 t/hour. Solutions typically include the primary and secondary crushers, the interlinking feeders, the screens and all the conveyors required to move the materials to and from each crushing stage," Singleton says.

"We have just won an order from an iron ore mine for the supply of primary feeders and crushers, and secondary crushers – includ-

Understanding froth pumping technology offers significant filtration efficiency and throughput.

For dewatering, a diesel driven Warman DWU pump set on a trailer-mounted Multiflo unit can be used where access is impractical.

ing an Enduron® high pressure grinding roll crusher (HPGR) with HPGR product screens, which offers best-in-class wear life.

"Every sub-system used in this solution is from Weir Minerals and comes with our own process guarantees, so the client is dealing with us as single product supplier for everything needed to deliver suitably sized ore to the downstream processing circuit," he adds.

As well as being the OEM for all the crushing and screening plant equipment, Weir Minerals process engineers such solutions. "We included a washing section to remove clay material from the ore prior to sending it to the Enduron HPGR. This involved using our Warman slurry pumps and Enduron dewatering screens and highlights our ability to bring together our wet and dry circuit expertise to create highly optimised plant solutions," Singleton says.

Holistic mill circuit systems

The third category of Integrated Solutions is holistic mill circuit systems. "Before a mineral can be refined into its pure form, it has to be finely milled so the valuable mineral can be liberated from its ore. This has long been our bread and butter expertise," he continues.

"We have been manufacturing mill circuit pumps, mill liners, hydrocyclones, hoses, valves and rubber liners for as long as I can remember and we are very good at it. We understand classification and value circuits, wear aspects of hydrocyclones and feed pumps, the wear inside the mill and the various lining options."

For existing operations, for example, he says Weir Minerals has had significant success in applying computational fluid dynamics (CFD) to cyclone feed pump sump designs. "Excessive wear of hydrocyclone feed pumps can be caused by poor mixing in the sump. By optimising the flow and residence times in the sump, we have been able to double the life of the pump's wear components and extend the life of the sump and interconnecting hoses. "In addition, more laminar feed to the pump results in better feed to the hydrocyclones, which results in improved plant recovery performance – an excellent outcome from a not so obvious intervention," Singleton tells *MechChem Africa*.

On large mill pumps such as Warman® MCR®s, he says that Weir Minerals tries to match the changeout cycle times of the volute liners and throatbushes with the wear cycles of the mill. "When the mill has to shut down to replace the liners, the mill pump's wear parts can be replaced at the same time. This avoids having to shut down the plant between mill shutdowns," he explains.

"This is done by optimising the pump-liner materials and the hydraulic efficiency to extend the life of the wear components. Understanding the mineralogy of the slurry and its effect on the lining material is critical in this regard," he adds.

This also applies to Weir Minerals' Cavex® hydrocyclones. "Our entire range of Cavex hydrocyclones has laminar spiral inlets that minimise turbulence and result in increased efficiency and component life. Instead of using chrome carbide or ceramic liners, we can use replaceable rubber inserts over a mild steel casing, which not only improves the wear life in high silica content material, but customers are able to easily swap out the inserts onsite, minimising maintenance downtime," he says.

For the grinding mills themselves, Singleton cites a success on a copper mill that involved using one of the company's proprietary Linatex® rubbers to replace the commonly used steel liners for the inlet chute. "This has doubled the chute life, again avoiding having to add a shutdown to replace them. In addition, careful selection of the correct grade of Linatex rubber lining for the trommel screen on the outlet side has improved the overall wear life balance of the whole plant," he tells *MechChem Africa*.

Once ore is milled, processing can begin to liberate high-value minerals. "We have done a lot of work on froth pumping: understanding the froth volume factors, froth generating factors and the sump geometry. We have found that froth is best discharged against the wall of the sump so that bubbles break down before reaching the suction inlet of the pump. To reduce turbulence, the resident time in the sump is also important. CFD analysis has proved very useful here, enabling us to optimise the flow through the hoses and valves and maximise froth pumping efficiency.

"We have froth pumping technology and expertise to make significant improvements in recovery efficiency for existing plants. These process plant optimisation solutions increase profitability through better recoveries, while also reducing costs: extending the life of pumps, valves and piping and reducing the number and duration of maintenance periods," Singleton notes.

Tailings management

Weir Minerals' tailings handling solutions have traditionally used various stages of Warman® AH and AHP high-pressure centrifugal pumps. From a systems perspective, however, the pipework must also be sized and lined correctly to suit the abrasive properties and density of the tailings slurry, and the number of pipe bends on the way to the deposition area, as well as in between the different pump stations, must be minimised.

Weir Minerals utilises its GEHO® range of positive displacement (piston) pumps for high specific gravity (SG of +60% solids) dewatered tailings that need to be transported against very high heads (above 300 m head or 30 bar up to 250 bar). "Using GEHO piston pumps enables dry-pumping of tailings, which minimises water and energy consumption. Again, these tailings circuits are built using careful combinations of pumps, valves, cyclones, hoses and pipelines. Many use our Cavex polyurethane-lined tailings hydrocyclones for dewatering the highly abrasive finely ground tailings," he says.

"For us, this Integrated Solutions approach is underpinned by a holistic understanding of a client's individual circuits and, because we understand our own equipment and have seen similar problems many times before, we can quickly generate tailored working solutions. This results in a quick return on investment for our clients," Singleton concludes. ❑

Weir Minerals' Linatex rubber lining delivers extended wear life, minimising plant downtime and can be installed on site.

The Cavex hydrocyclone has a laminar spiral inlet that reduces turbulence resulting in greater efficiency and reduced wear life.

Connecting chemical engineers in South Africa with an international community

SAIChE IChemE president David Lokhat summarises the new collaboration agreement between SAIChE and IChemE, which will link South African chemical engineers to the international chemical engineering community and provide access to the benefits associated with the larger global Institution.

In July 2014 SAIChE and IChemE signed a collaboration agreement to connect our two professional communities. The intention was to connect SAIChE members with an international chemical engineering community and provide access to the benefits associated with a larger Institution.

Since 2017 we have been working closely with IChemE's leadership to explore how our two organisations can best work together to deliver the sentiment of the 2014 agreement. Reshaping these collaborative arrangements has also provided SAIChE with the opportunity to address some aspects that have not met our expectations.

Since 2014 'SAIChE IChemE' has been the identity under which the collaboration has operated. However, this dual governed body has not provided sufficient recognition of each party's differences. Moving forward there will be an IChemE National Board in South Africa. This will sit alongside and work closely with SAIChE, with well-defined, separate but complementary remits.

The South African National Board will be part of the IChemE governance structure creating alignment between overall organisation objectives and activity in South Africa. The South African National Board will use and contribute towards learned society activities, benefit from IChemE staff support and peer-reviews via the IChemE Regions Committee, and have access to central funding.

IChemE will provide full membership services, which includes processing annual subscriptions and membership applications. This will improve operating efficiencies and enable members to make payments online via the MyIChemE member portal.

SAIChE will operate as an independent body and continue to fulfil its role as an Engineering Council South Africa Voluntary Association for chemical engineers and the profession. We will continue to be a voice for the profession in South Africa and will support continuing professional development activities independently – by assessing for and awarding ECSA CPD points. In addition, we will work with IChemE to create and encourage active local Member Groups.

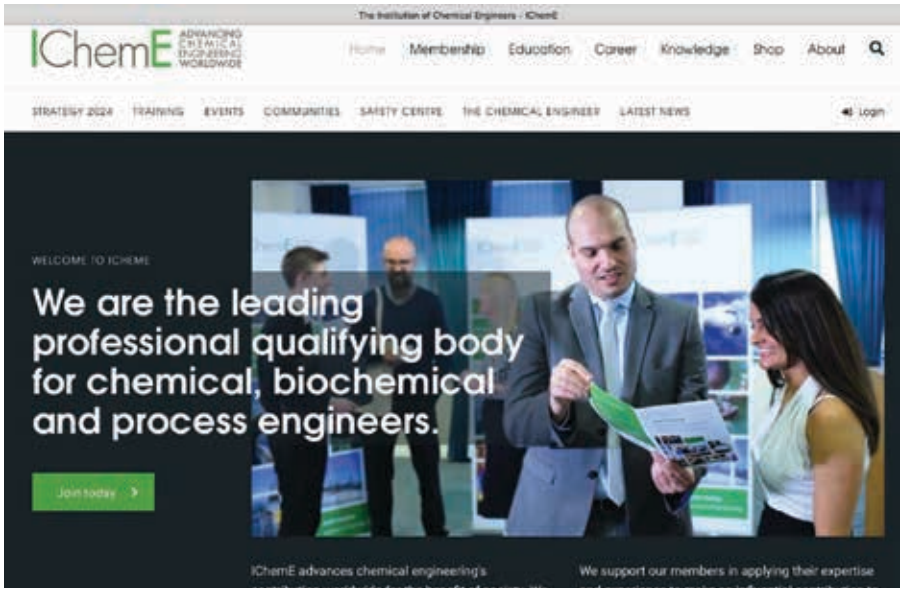
What is described above is, in part, a continuation of the provision that has been made available by IChemE over the past five years. To continue to benefit from this, it is fair and reasonable that operations in South Africa align with a global model that is scalable and sustainable, and that members in South Africa make the appropriate contribution in line with their peers in other countries.

The immediately noticeable changes will be largely administrative, but with members continuing to pay a single annual fee for both IChemE membership and SAIChE membership. Longer-term, IChemE's Strategy 2024 will deliver substantial added-value, which is being underpinned through significant financial investment. This provides access to a broad and diverse volunteer-base, and a staff team of approximately 100 people. Alone, SAIChE does not have the resources to deliver such an ambitious programme but by working with IChemE, we can share an exciting future.

Whilst the new collaborative arrangements respect each organisation's subtle but important differences, the outcome will be a move towards closer collaboration than ever before.

The below briefly outlines the new arrangements for SAIChE members:

- IChemE's standard membership offering is available to all members, globally.
- IChemE provides a full membership service to SAIChE, which includes maintaining its membership roll. All those who wish to be members of SAIChE will be required to hold membership of IChemE.
- Those who wish to be members of SAIChE should apply to join IChemE via the online membership application system.
- Existing SAIChE members are recorded on a SAIChE membership roll on the IChemE database. Being based outside of South Africa does not impact this.
- Those wishing to join or be removed from the SAIChE membership roll should contact saiche@icheme.org.
- The Gauteng, KwaZulu-Natal and Western Cape Members Groups' access to IChemE staff support will continue.
- An IChemE National Board is being created in South Africa to connect the membership in the country with IChemE's broader programme of activity. Governance of SAIChE will be separate but the two bodies



IChemE will be providing full membership services to SAIChE IChemE members, including processing annual subscriptions and membership applications, which will be efficiently handled via the online portal.

will work closely to deliver locally.

- SAIChE will continue to work with ECSA as a Voluntary Association to serve the profession in South Africa.

For more information on the revised arrangements please read the 'IChemE in South Africa: 2019 onwards' document via the link below.

www.icheme.org/media/12503/icheme-in-south-africa-2019-onwards.pdf

Parting ways, but with new horizons in sight

In the early 2000s the South African Institution of Chemical Engineers established a relationship with Crown Publications to provide curated content to the membership of the association through focused news and opinion in the *Chemical Technology* magazine.

Every month readers received, along with the other relevant industry information, updates on the activities of the Institution, member profiles as well as reviews on industrial operations or research that were of interest to the membership. The magazine ran the *Chemical Technology* research awards, and published shortlisted and winning papers from postgraduate students and industrial researchers. Over the years the magazine supported the work of the Institution by publicising workshops, seminars and other events that were organised by SAIChE.

In 2014 SAIChE entered into a collaboration agreement with IChemE, which saw the two organisations deliver a combined offering to members in South Africa. Under the new designation 'SAIChE IChemE', the Institution continued to play a pivotal role in the development of the profession, with the *Chemical Technology* magazine there to provide a platform for dissemination of information.

In 2017, *Chemical Technology* was combined with the sister publication *Mechanical Technology* to form *MechChem Africa*, with a broader readership and consolidated mandate. The new magazine has since been the home for SAIChE related content.

Major changes in the relationship between SAIChE and IChemE are underway, however, with closer collaboration expected as it transitions towards a National Board of IChemE in South Africa. As the institution looks to drive efficiency and more benefit from the communication channels that IChemE will make available, it will make more frequent use of web-based communications, email and IChemE publications. As such, the institution will be discontinuing its association with *MechChem Africa*, with effect from January 2020.

As SAIChE moves towards a new chapter in its history, it is poignant to recall the role that the magazine has played in it to date. The long record of the relationship will not be forgotten, and is in fact greatly appreciated.

David Lokhat

SAIChE IChemE

SAIChE IChemE Board members:

President:	D Lokhat
Past president:	C Sheridan
Honorary treasurer:	L van Dyk
Honorary secretary:	EM Obwaka
EXCO member:	M Hughes
EXCO member:	JJ Scholtz
Council member:	D van Vuuren
Council member:	M Chetty
Council member:	H Mazema
Council member:	K Naidoo
Council member:	P Cairns
Council member:	M Mabaso
Council member:	C Sandrock
Council member:	C Mausse
Member (co-opted):	NN Coni
Member (co-opted):	MD Heydenrych

Contact details

SAIChE
PO Box 2125, North Riding, 2162
South Africa
Tel: +27 11 704 5915
Fax: +27 86 672 9430
email: saiche@mweb.co.za
saiche@icheme.org
website: www.saiche.co.za

Mechanical seals and the CAPI-TXS upgrade

AESSEAL®, the global specialist in the design and manufacture of mechanical seals, bearing protectors and seal auxiliary support systems, has introduced an innovative shorter API pump sealing solution for legacy pumps in the oil and gas industry that need to upgrade to dual seal technology. Shane Chester, AESSEAL's MD in South Africa, explains.

The traditional way of sealing legacy pumps was to use gland packing, which consists of braided rope-like material that is packed around the shaft in a 'stuffing box', with the packing forced into the gap between the shaft and the pump housing. Gland packing is still commonly used in many applications, including legacy oil and gas installations, but increasingly, pump users have replaced these with mechanical seals for the following reasons:

- The contact friction between the rotating shaft and the packing wears away the braided seal material over time, which leads to increased leakage until the packing is adjusted or replaced.
- The friction of the shaft means that the packing needs to be flushed with large volumes of water in order to keep it cool. This has become increasingly unacceptable.
- The packing needs to press against the shaft to reduce leakage, which means the pump needs more power to turn the shaft, making pumping more inefficient.
- The packing in contact with the shaft will eventually wear a groove into it, and shafts are costly to repair or replace.

Mechanical seals, on the other hand, are not only far more effective in preventing leakage between the shaft and the pump casing, they are also far safer. Particularly in the oil and gas industry, product leakage poses potentially catastrophic risks such as fire and explosions, along with expensive contamination and adverse health and environmental effects. In high risk applications such as process streams containing acute toxicity, aspiration hazards or flammable liquids, mechanical seals of increasing sophistication such as dual mechanical seals have to be used to minimise the potential dangers and costs of product leakage.

Mechanical seals generally contain three sealing points. The stationary part of the seal is fitted to the pump housing with a static seal, typically with an O-ring or gasket clamped between the two connecting components. Similarly, the rotary portion of the seal is sealed to the shaft, usually with an O-ring. This seal can also be regarded as static as it always rotates with the shaft.

AESSEAL's compact CAPI-TXS™ dual seal mechanical seal can be fitted to most API 610 5th, 6th and 7th edition pumps and non API 610 pumps – regardless of the OEM.

The mechanical seal itself is the interface between the static and rotary portions of the seal. One side is static, while the other rotates with the shaft. They are both resiliently mounted and spring loaded to accommodate any small shaft deflections, shaft movement due to bearing tolerances and out-of-perpendicular alignment due to manufacturing tolerances.

This primary seal is essentially a spring loaded vertical bearing consisting of two extremely flat faces, one fixed and one rotating, running against each other. The seal faces are pushed together using a combination of hydraulic force from the sealed fluid and spring force from the seal design. This forms a seal that prevents process fluids from leaking from the stationary areas inside the pump to the outside of the rotating shaft.

The surfaces of the seal faces are 'super-lapped' to a high degree of flatness, typically 2-3 helium light-bands or 0.8 µm.

If the seal faces rotated in contact with each other without some form of lubrication, however, they would wear and quickly fail due to face friction and heat generation. For this reason a fluid film of lubrication is required between the rotary and stationary seal faces. This film can either come from the process fluid being pumped or from an external seal-fluid circuit.

By maintaining a precise gap between the faces – large enough to allow small amounts of clean lubricating liquid in, but small enough to prevent contaminants from entering the gap between the seal faces – a perfect balance between protecting the seal and preventing leakage can be achieved. The gap is so tiny that particles that would otherwise damage the seal faces are unable to enter, while the amount of liquid that leaks through this space is so small that it vaporises on exit, typically at a rate of around half a teaspoon per day of pumping.

In summary mechanical seals offer:

- No visible leaking. Mechanical seals leak a tiny amount of vapour as the fluid film reaches the atmospheric side of the seal faces. If captured and condensed, this would approximate to ½ teaspoon a day at normal operating pressures and temperatures.
- Modern cartridge seal designs do not damage the pump shaft or sleeve in any way.
- Day to day maintenance is reduced as seals have inboard springs, which make them self-adjusting as the faces wear.
- These seals have very lightly loaded faces that consume less power than gland packing.
- Bearing contamination is reduced in normal operation as the lubricant is not affected by seal leakage and wash out.
- Plant equipment also suffers less from corrosion because the liquid product is contained in the pump.

- Less wasted product means more money saved. Even water is an expensive commodity and less clean-up of the area will be needed.

In addition, of course, there are the massively reduced safety risks associated with the better sealing performance of mechanical seals, which are further enhanced by the use of dual mechanical seals.

Dual mechanical seal upgrades for the oil and gas industry

Many of the developed world's refinery and petrochemical processing facilities were built over 30 years ago and the dependability of the legacy pumps being used, coupled with their high cost, often restrict their replacement. Many of these have been upgraded to use single mechanical seals, but these no longer meet current safety requirements. Upgrading to modern sealing devices that incorporate a double seal arrangement – such as the API 682 compliant dual mechanical sealing solution – has to be implemented to avoid wholescale pump replacements or upgrades.

The physical space required for many of today's API compliant dual mechanical seals does not lend itself to their installation on old pumps with small seal chambers (stuffing boxes). In addition, the cost and inconvenience of pump modification or replacement in order to accommodate traditional API 682 dual cartridge seal designs can be considerable.

AESSEAL's CAPI-TXS™ is an innovative solution. This dual cartridge mechanical seal has been designed specifically for legacy pumps found in abundance in the oil and gas industry. Using API 682-qualified componentry in a compact modern design has enabled the CAPI cartridge seal to fit almost all pumps without modification to the seal chamber. Key advantages include:

- The CAPI-TXS reduces life-cycle costs, upgrade costs and lead times.
- It enables users to extend the useful life of their older process pumps while simultaneously meeting 21st century safety and emissions requirements.
- The compact dual mechanical seal fits most legacy process pumps without the need to modify the pump casing, which significantly reduces upgrade costs.
- An upgrade using the CAPI-TXS also means the large capital costs associated with replacing the pump or fitting a 'back pull out' unit are completely avoided.
- Project execution can be both swift and efficient because a CAPI-TXS upgrade can be performed during the regular maintenance cycle. It is a simple matter of replacing the existing seal.

AESSEAL reinvests over 7% of its annual sales in R&D, and has done so for several decades. This has led to one of the most advanced ranges of sealing technology in the world. The company has long and established expertise in supplying the oil and gas industry with leading edge sealing solutions and has several thousand designs installed as retrofits to legacy pumps.

These upgrade solutions are cost effective, simple to fit, generally do not require modification to the pump and in many cases can be performed during the routine maintenance planning cycle. "Our CAPI range of API seals has been qualification tested to API 682, so customers can be confident that they are buying the very best," concludes Chester. ❑

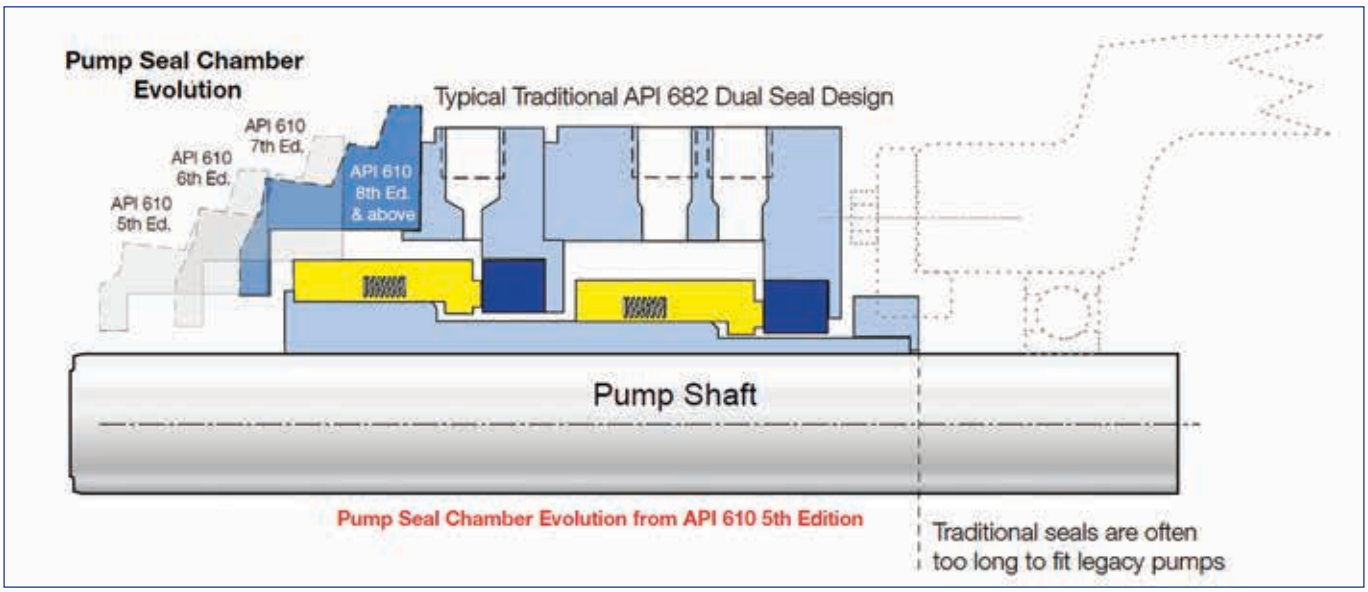
AESSEAL's family of CAPI-TXS™ API 682 dual mechanical seals, which are designed specifically to fit legacy pumps in the oil and gas industry.

Features and benefits of AESSEAL's CAPI-TXS™ API 682 dual mechanical seal

Compact – CAPI-TXS™ can be fitted to most API 610 5th, 6th and 7th edition pumps and non API 610 pumps – regardless of the OEM.

Increased reliability – Cartridge design uses API 682 qualified components. An integral bi-directional internal pumping ring circulates barrier/buffer fluid, reducing seal face temperatures and improving reliability.

Stationary seal design – The seal is designed with stationary flexible elements (springs) for improved tolerance to pump casing or gland plate distortion and misalignment due to pipe loads, thermal distortion, pressure distortion, etc. ❑



A diagram showing the evolution of the shorter API 682 dual seal chamber design from the API 610 5th edition to the latest 8th edition and above.

Industrial slurry valves for the harshest conditions

BMG's extensive range of industrial slurry valves, which has been designed to cope efficiently in harsh conditions, includes robust butterfly and knife gate valves, as well as diaphragm and pinch valves.

"BMG's range of industrial slurry valves – which all meet stringent quality and safety specifications – are highly efficient for the control and isolation of abrasive slurries in many industries, including power generation, chemical and petrochemical, cement handling, water treatment, mining, quarrying, pulp and paper," says Willie Lamprecht, national product manager for Valves, BMG. "Failure of a valve and subsequent leaking of corrosive media can have devastating effects on the safety of personnel and equipment, leading to premature system failure and costly downtime. It is critical that the correct valve is selected for every application, for maximum safety, ongoing operation of the plant, and minimum unscheduled maintenance," he adds.

Lamprecht says BMG's highly skilled team has a thorough understanding of the processes where valves are installed and supports every component with a dependable solutions service, to ensure optimum safety, efficiency and the extended service life of each system. "The selection of the correct industrial slurry valve is based on factors that include the size and shape of particles, pressure, temperatures and chemical content," he explains.

Polyurethane-lined knife gate valves are available in standard sizes between DN 50 and DN 600, with manual, pneumatic and electric actuation. These knife gate valves have a wafer pattern and are manufactured from cast and ductile iron, with stainless steel discs. They can withstand operating temperatures of between -20 and +80 ˚C as standard, with higher temperatures on request.

Polyurethane lined abrasion-resistant butterfly valves – in a wafer pattern or with a lugged design – are used for on-off and flow control of abrasive slurries. Butterfly valves are available from BMG in standard sizes between DN 50 and DN 400.

Locally-manufactured KLEP BMG diaphragm valves – between DN 50 and DN 350, with manual or pneumatic actuation – are designed for abrasive slurry applications. These flanged diaphragm valves have a body pressure of PN 10 and can withstand temperatures between -10 and +80 °C.

Long-lasting rubber and jumbo rubber linings are suited for full-bore diaphragm valves with a high flow capacity and an efficient sealing capability, which shuts off any flow and prevents leakage. Full bore diaphragm valves also have a low pressure drop because there is almost nothing obstructing the flow of the fluid when the valve is fully opened. This creates little resistance to flow, which makes these valves suitable for fluids with abrasive particles.

Also in the range, are unlined diaphragm valves, which are suitable for water treatment and general industrial applications.

FPV pinch valves – featuring a design where the sleeve is pinched to close mechanically by means of hand-wheel or automatically via an actuator – are ideal for the control and isolation of abrasive slurries.

Open frame pinch valves are also available from BMG with a short and long frame design in sizes between DN 50 and DN 600. The body is made from mild steel, but stainless steel is also available for specific applications. These valves, with soft rubber sleeves, have manual, hydraulic and pneumatic actuation.

BMG's extensive range of components for fluid technology systems and general industrial applications encompasses valves, hydraulic hoses and fittings, accumulators, cylinders, heat exchangers, pneumatics, hydraulic motors and hydraulic plumbing, as well as pumps and reservoir accessories.

The company also offers a total process and lubrication management solution, to meet exact market requirements. ❑

Polyurethane-lined abrasion-resistant butterfly valves can be used for on-off and flow control of abrasive slurries.

A locally manufactured KLEP BMG diaphragm valve discharging an abrasive slurry. BMG industrial slurry valves are designed to cope efficiently in harsh conditions and include butterfly, knife gate, diaphragm and pinch valves.

Responsiveness to pit dewatering differentiates IPR

Responsiveness to pit dewatering requirements sets Integrated Pump Rental apart from its competitors. The team is able to assess an application and provide a pit dewatering solution with the correctly sized pump.

Responsiveness to pit dewatering needs has set Integrated Pump Rental apart from its competitors.

Pit dewatering remains a vital activity for opencast operations, as groundwater not only poses an operational challenge, but can become a safety hazard if not attended to appropriately.

Interestingly, it is not a simple case of one pump fits all dewatering application requirements, and it is advisable to deal with a reputable pump supplier to ensure that the most appropriate solution is selected.

Lee Vine, managing director of Integrated Pump Rental, explains that there is no such thing as a standard pit dewatering system, since each instance requires a site-specific solution.

"There are numerous options available in terms of the pump and ancillary equipment, as well as the choice between rental and outright purchase," he says. "The differentiator our team offers is the ability to assess a given application and provide a pit dewatering solution with the correctly sized pump."

Several factors can have an impact on the pump selection, including available power sources; volume of water to be pumped; and condition of the dirty water, including size and type of particles in the water.

"What makes pit dewatering applications complex is that, in many cases, the need to dewater a pit can be urgent, and customers are forced into making an incorrect pump selection or tying themselves to a contract that does not work in the long term," Vine says.

He adds that while the decision of whether to hire or purchase is an important commercial one, so too is the selection of the pump. "If the pump is incorrectly sized for the dewatering application, it will not perform as required. This, in turn, leads to further operational challenges including production losses and sometimes even the need to change the pump, which results in further costs."

One of the most important factors for consideration is the available energy source. If there is no access to power, options such as diesel-driven or pumps fitted with hydraulic power packs must be explored.

When selecting the pump, it is also important to understand the specifics of the water ingress conditions and whether these are a long-term issue or a short-term challenge. The scenario will dictate the pump size, its rated output and what ancillary equipment is required.

As an example Vine points to a recent dewatering application on a mine in Lesotho where a constant flow of water into the mine's pit area demanded that water be urgently and reliably pumped out.

Over time, the pit depth increased and the groundwater level was exacerbated by the winter snowfall. As a result, the total dynamic head for the duties of the installed dewatering pump installation changed, and the mine required an urgent solution.

Initially, a Sykes XH150 diesel driven pump was deployed, pumping 120 litres per second at 150 metre head. Subsequent to this, a second Sykes pump was dispatched to site to ensure the water remained at an acceptable level.

With the two Sykes pumps on site, the mine was assured of sufficient pumping capacity, should the groundwater level increase.

Commenting on the responsiveness exhibited by Integrated Pump Rental in this instance, Vine says this is not unusual. "While not standard across the industry, our teams are known for this, and the primary reason we can respond rapidly is our comprehensive fleets of pumps that are capable of handling varying dewatering applications."

He sketches a scenario where a call from the mine came in and, within 24 hours, the first Sykes pump was installed on site. "This is very significant when one considers that the mine is situated some 500 km from the company's front door and across the border into a neighbouring country.

"More often than not – and this was the case here – our teams have existing relationships with customers, which have been built up and maintained over time. Our repeat customers know they can rely on us," he says.

In addition to renting out Sykes diesel driven pump sets, Integrated Pump Rental is also responsible for the sale of the dewatering pumps across southern Africa. The robust units are designed for reliable performance under the harshest operating conditions.

Vine concludes by saying that operating in Africa requires a certain mindset and skill set, and most importantly suppliers need to be responsive to customer requests. "Many mines are situated in outlying areas and this calls for a customer focused approach, particularly when groundwater in a pit becomes an issue." ❑

Sykes diesel driven pump sets are ideal for pit dewatering.

KSB Pumps and SABS test powerful pump set

The SABS, in conjunction with KSB Pumps and Valves, has tested a massive V16 diesel motor, which produces 1 350 kW of raw power, one of the most impressive pump sets to be assembled on South African soil in recent times.

Because of the critical nature of an application required to suppress toxic gases in an emergency, engineers took the unusual step of pre-testing the complete pump set to ensure the unit performed exactly as required. In this instance, even KSB's own world-class testing facilities in Germiston were deemed too small to deal with the size and power of the set, which required the use of the SABS' larger facilities in Pretoria.

KSB contract manager, Geoff Havenga, explained the set – comprising heavyweight KSB RDLO 400-935 A pump, V16 Quad-Turbo Mitsubishi motor and David Brown-manufactured gearbox – was part of Sasol's Natref Hydrofluoric Acid Cloud Mitigation project and was required to rapidly produce spray water to 'knock down' any gas cloud that might form in an emergency spill. As a result, the pump set needed to be ultra-reliable and ready to spark into action in an instant to pump approximately 770 litres of water per second at a head pressure of 13 Bar.

"The test was unusual in that components are usually tested individually and again on commissioning. This time, however, the units were tested separately, the pump in Germany pre its delivery to South Africa, the diesel engine by Mitsubishi in France and the gearbox by David Brown in Benoni. Owing to the nature of the project, further tests were required of the entire unit including capacity, head, power, efficiency and net positive suction of the pump to ensure further conformity with specifications," said KSB's test field manager, Norman Taylor.

"KSB usually performs these tests on its own equipment, but this time the size of the motor was a limiting factor and required us to use the SABS facility. Here, testing was done under the supervision of the customer, KSB and SABS personnel. The process ran for four hours before successfully meeting all specifications and requirements.

"These kinds of string tests are done to ensure the entire unit works correctly, taking into account the diesel motor is required to produce 1 015 kW of power to handle the required absorb-power necessary to produce the 2 800 m^3 of water needed per hour. You can only imagine the forces at play when you consider this power is generated at 1 500 rpm and reduced through a reduction gearbox to 1 000, which is the optimum range of the KSB RDLO 400-935 A pump," adds Taylor.

The KSB Pumps and Valves team lowers the diesel engine into position on installed baseplate for alignment with gearbox and pump.

Trusted type

Havenga continues, "With the unit weighing in at 32 tons, it is impressive that we have facilities in South Africa where our customers can witness the performance of the equipment they have purchased; in this instance by Worley Consulting Engineers on behalf of Sasol.

"The pump is operated in high volume applications in raw and potable water industries and is capable of reliably pumping high volumes on a continual basis. Well known for its reliable operation, it was deemed as ideal for this critical operation," Havenga concludes. ❑

Building relationships with Chinese EPCs

Chinese engineering, procurement and construction (EPC) companies are responsible for about 64% of all power projects currently underway in Africa and are looking to collaborate with the best in Africa for equipment and services.

KSB Shanghai recently facilitated a high-level meeting between role players and KSB's own operation in Africa – KSB Pumps and Valves –with one of the most prominent EPCs in Africa, Power China East.

The meeting was held at PowerChina's offices in Fourways and chaired by SEPCO III's (a subsidiary of PowerChina) business development manager, Li Zhilei. It was attended by PowerChina East and Southern Africa representative, Chen Si, KSB Shanghai export manager, Liangxi Huang, KSB Shanghai director of business development, Helen Ding, and KSB Pumps and Valves regional project manager, Frikkie Botma.

Botma says the meeting was a great success and created a platform to discuss business opportunities with Chinese contractors where previously language and cultural barriers prevented penetration into that market demography.

"The opportunity to meet with Chinese EPCs has created the possibility of future business and created a platform to build strong customer relationships. We anticipate that entry barriers will be lowered, making future contact with the clients a mutually beneficial experience. We want our new clients to place KSB first on their contact list for assistance, and to be their preferred pump supplier for all future projects," he says. ❑

Sasol award for ACTOM Turbo Machines

Petrochemical giant Sasol has recognised ACTOM Turbo Machines with one of its top 2019 awards for exceptional service in repair, refurbishment and ongoing maintenance.

Grace Nndwammbi, Sasol's senior vice-president: supply chain, presented ACTOM Turbo Machines' managing director Chris Bezuidenhout with the award in the *Top Performing Service Supplier: Large Enterprises* category at Sasol's head office in Sandton.

Bezuidenhout commended ACTOM Turbo Machines' maintenance and refurbishment teams on the achievement, and said the company was honoured to have received the award.

"It signifies recognition of the highest order, which we greatly value and cherish," he said. "It marks an important milestone for us in our ongoing drive to provide the best possible service to industry."

A division of ACTOM (Pty) Ltd, ACTOM Turbo Machines is the only large non-OEM business in its service category to win the award to date. Since its inception six years ago, it has become the largest non-OEM turbo-machinery and high-speed rotating equipment service provider in sub-Saharan Africa.

From left: Leon Greeff, Sasol's senior manager, oxygen electrical & instrumentation; Anton Hamman congratulates Chris Bezuidenhout on receiving the prestigious Sasol award; Mervyn Naidoo, ACTOM's Group CEO, and Nicholas Mokgosi, Sasol's senior manager E,C & I sourcing, category management.

The Integrated energy and chemical company is OEM-reliant in terms of service backup and parts supply, according to Anton Hamman, Sasol's principal specialist for sourcing mechanical equipment. Nonetheless, ACTOM Turbo Machines has proved itself in service provision for turbo machines, where critical and complex skills are required.

"We view turbo machines as the heart of our operations, so it is absolutely essential that the service provider has all the critical skills needed to ensure the equipment is maintained to OEM specification," Hamman says. "If you use a non-OEM company for this work, you must be certain they have the required skills and competencies to perform this work to the correct standard every time, and understand the associated risks."

Safety awareness was a critical aspect of the service. The 36 MW machines in Sasol's oxygen plant, for instance, are large and very heavy. This makes them difficult and potentially dangerous to work on.

"ACTOM Turbo Machines has demonstrated its awareness of the hazards involved and rigorously applies all the procedures necessary to ensure no one gets injured and that the work gets done as per agreed schedules," Hamman says. "On turbo machines, we look for the best skills in the country and globally, and this is what ACTOM Turbo Machines offers."

ACTOM Turbo Machines has a long-term service agreement with the Sasol group, including Sasol Secunda, Sasol Sasolburg, Sasol Mining and Natref.

The agreement is to provide maintenance on a periodic basis at all these sites. At Sasol Secunda's oxygen plant, the company has a permanent presence of 40 personnel to attend to all 16 of the plant's oxygen trains. ❑

Cam clutches for mining and bulk handling sectors

New to BMG's extensive range of Tsubaki cam clutches, is the recently launched BS-F series; designed for high-speed inclined and long overland belt conveyors and bucket elevators, which are used in the mining and bulk handling sectors.

New to BMG's extensive range of Tsubaki cam clutches is the recently launched BS-F series.

South Africa's Mine Health and Safety Act states that the installation of incline conveyor belts must include the fitting and use of one or more devices that prevent run-back or run-on, to avoid injury by materials or minerals falling from a conveyor belt.

Tsubaki backstop cam clutches are designed to prevent reverse rotation of drive shafts - in high or low speed applications - offering a simple and cost-effective means to protect capital equipment and enhance safety.

"The new high-torque, high-speed Tsubaki BS-F series, with a narrow width I-beam torque arm, is a drop-in replacement to conventional anti rollback devices. This allows quick and easy on-site installation, and enables the replacement of an old backstop with the new BS-F design without the need for modification to the existing layout," says Gavin Kirstein, national Tsubaki product specialist, BMG. "Although this series is narrow in width compared to other models, the downsized unit exceeds the requirements of high-speed inclined belt conveyors, with the benefits of space-saving and reduced installation times."

Kirstein explains that a common cause of conventional backstop failure is oil leakage. Tsubaki has eliminated this risk in the new BSF series by designing the backstop to operate with grease and a specially designed labyrinth seal. He notes the absence of an oil level gauge creates a more reliable safety device.

Other important features of the series include a non-rollover cam and roller design, which offers higher backstop torque capacities and lower running temperatures than conventional anti rollback devices. Added to this, a flexible labyrinth seal mechanism prevents the ingress of dust and water in abrasive conditions, while a double-lip oil seal and multi-temperature grease enable safe operation at a wide ambient temperature range of - 40°C to + 65°C.

The cam and roller cage orbit at low speed, continually conveying grease internally from the bottom to the top of the mechanism. The constant circulation of grease minimises internal friction and reduces operating temperature for dependable operation. Maintenance intervals are between 7 500 hours and 8 000 hours and the effective service life of the units is also significantly extended compared with conventional oil-filled units.

BMG's technical team conducts full plant surveys and advises on the selection of the correct cam clutch for each application and the appropriate installation and usage, for optimum performance and improved safety standards.

Apart from the mining sector, BMG's cam clutches are used for belt conveyors for materials handling, metals, timber, pulp and wood chip, as well as for bucket elevators for cement and grain. These units are also installed to enhance performance of large drift conveyors and screw pumps. ❑

Decades of innovation driving WEG product efficiency

Africa has embraced the innovation that drives WEG products and services, with customers seeing value in constant technological improvement. Siegfried Kreutzfeld, CEO of the South African based Zest WEG Group, explains that WEG is quick to introduce its new products into the African market, sometimes even before launching elsewhere in the world.

The WEG CFW 11 variable speed drive along with the WEG IE3-rated energy-efficient motor are examples of innovative new products that can significantly reduce electricity consumption.

"We pride ourselves on the significant investment we, as WEG, make in research and development," says Siegfried Kreutzfeld, CEO of the South African based Zest WEG Group, "About 2.6% of our net revenue is ploughed back into continuous product improvement and new development. This keeps us at the cutting edge of technology," he adds.

The result of this intense commitment to innovation is that 43.7% of all WEG products sold in 2018 were launched in the past five years. Another indicator is that Brazil-based WEG Group holds 174 patents that are used on its products.

Significantly, this has placed WEG among the thousand most innovative companies in the world, ranked by The Global Innovation 1000 of 2014. This world ranking evaluates the total R&D investments of each company, including the strategy, purpose and success of these investments.

"More than 35 years ago, we led the way in South Africa by introducing reliable high performance motors into the mining sector," Kreutzfeld says. "Today, we have a solid market share on the continent based on the trust we have built with our customers. This relationship makes it easier to introduce and test new WEG technologies in Africa."

While continuously improving its products, WEG also closely monitors how they perform in the field, he notes. "An indicator of the confidence we have in WEG technology is that we provide a five year warranty on WEG motors. This is unique on the continent and difficult for competitors to match."

The WEG Motor Scan monitors motor data that can be accessed by App and IoT platforms.

The IEC61800-9 standard and VSD-driven motor efficiency

With electric motors consuming almost 70% of industry's energy, companies are always looking for better motor efficiencies. For many years, motor efficiency has been well defined; however, when driven by a variable speed drive (VSD), the VSD efficiency and its effect on the total efficiency of the VSD and the motor has not been well understood.

Choosing the correct product combination can also be more difficult as manufacturers' data is not always easily comparable. This is where the international IEC61800-9 standard comes to the rescue, according to global motor and VSD manufacturer WEG.

The IEC61800-9 standard – based heavily on the previous EN 50598 standard – gives manufacturers a clear framework for grading a complete motor system. End-users can compare the overall efficiency of a manufacturer's products, irrespective of design and component selection.

The IEC61800-9 standard uses the Extended Product (EP) approach. This considers the efficiency of the whole motor system, which is comprised of the motor, the basic drive module (BDM), and the complete drive module (CDM). Together, these make up the power drives system (PDS), which also includes any switchgear and controls.

This terminology sounds confusing but is just a technical way to say the net efficiency depends on the efficiencies of the Switchgear+VSD+Motor. The efficiency levels are defined by considering eight different operating points, covering low to high speeds and torques. Users can easily compare application load and speed requirements to the motor system at defined speed and torque points.

The EP approach employs a semi-analytical model to calculate the efficiency of each of the components at the operating points of the driven equipment. The calculations are also based on tested and verified values. This results in the most efficient component selection for the application.

Using this standard, the user may be assured that:

- The motor complies with the defined motor efficiency levels of IE1, IE2, IE3, IE4 or IE5.
- The VSD complies with VSD efficiency IE0, IE1 or IE2.
- The manufacturer's motor and VSD used in combination will meet or exceed a system energy standard of IES0, IES1 or IES2.

Using this EP approach, the European Commission expects the increasing use of more efficient systems to help achieve its targets for carbon dioxide (CO_2) reduction. In line with these efforts, WEG VSDs and IE2 motors in combination achieve IES2. And significantly, WEG's VSDs and IE3 efficient

WEG's innovation and market trust are paying dividends. Despite the country's poor overall economic performance, Kreutzfeld says Zest WEG Group is targeting 15% growth with its high quality offerings. Among the latest WEG technologies are energy-efficient IE3 motors which reduce electricity consumption, and the WEG CFW 11 Variable Speed Drive (VSD) which selects the best efficiency, again conserving energy and saving costs. He adds that during 2019 a new series of WEG VSDs, specifically for mine fan applications, were introduced to the market.

WEG's innovative Motor Scan device is another important development, harnessing connectivity and the power of Industry 4.0 technology to monitor motor health. Attached to the motor itself, the WEG Motor Scan gathers vital data including vibration, temperature and running time. This is communicated wirelessly to a hand-held device or to WEG's Internet of Things (IoT) platform.

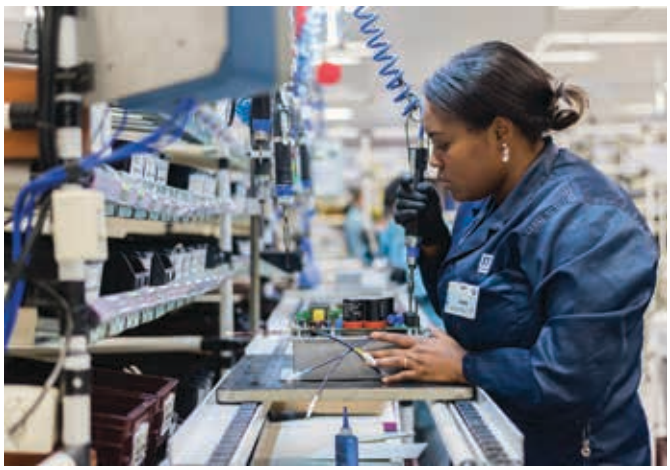
"Extending electric motor life is going to be an important trend in the market, especially in the mining sector," Kreutzfeld explains. "Only a decade ago, mines expected less than two years of life from an electric motor, and we have been able to change that. Using Motor Scan will allow end users to optimise routine maintenance and extend motor life."

Another technological innovation is the large WEG slipring motors considered ideal for the cement industry. Cement plants place high wear demands on electric motors, and WEG has developed features to address this challenge.

"We innovate by being close to our customers and seeing the problems they face," he says. "You cannot pursue innovation without understanding customer applications and market trends."

To drive this process, WEG established a Scientific and Technological Committee in 1998. This forum allows WEG's engineering team to engage with five university specialists, three from abroad and two from Brazil. The forum meets every two years to discuss market trends, technology and innovation, and importantly how to apply these to WEG products.

"During this meeting, we share new concepts and products with the academic experts," he says. "This collaboration has many mutual benefits. We gain ideas and feedback, and the universities can gather topics for their students to research."



The variable speed drive assembly line at WEG in Brazil.

The WEG motor assembly line.

Inside WEG itself, there is a team focused on new product concepts and technologies. Kreutzfeld says many of these might remain in development for years, even decades, and are only commercialised in response to market trends.

"This pipeline of innovation is vital to meet changing customer needs and is what sets WEG apart," Kreutzfeld concludes. ❑

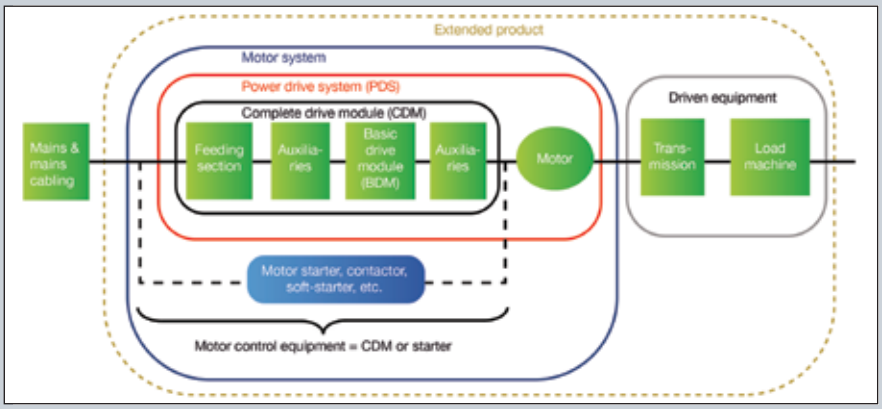
motors exceed the highest system levels of efficiency. Additionally, WEG has product lines that exceed even IE4 and IE5 classifications.

Recognising that global population growth and economic development are driving up energy demand around the world, the European Union has set stringent targets to reduce CO_2 emissions. These aim to cut emissions by 40% by the year 2030. This means creating more renewable energy sources, and increasing the energy efficiency of industrial systems. Studies suggest that almost half of global energy consumption comes from industry – followed by commercial and residential use.

The EC's regulation 640/2009 already requires that all electric motors operated from a variable speed drive or inverter must adhere to a minimum of IE2 to be eligible for sale. Fixed-speed applications must meet a minimum of IE3 to comply.

Where a motor does not operate at its nominal torque and speed, the variable speed drive represents a significant opportunity for energy optimisation. In addition, the greater range of speed variation results in a greater PDS efficiency. Using WEG's IE2 motors with any WEG variable speed drive can achieve an efficiency classification of IES2. However, using other WEG lines of motors with the right drive, much better levels of efficiency can be reached.

WEG has a complete line of variable speed drives which exceeds the IE2 requirements outlined in the IEC61800-9 standard. When combined with its robust and reliable motor line, the products create an integrated solution for all applications. ❑



An extended product range illustration showing the motor system, power drive system (PDS) and complete drive module (CDM).

LNG Hub to be established at Coega

The Coega Special Economic Zone (SEZ) is inviting investors to its shores to take advantage of upcoming gas opportunities related to the proposed Liquefied Natural Gas (LNG) Hub to be established in Coega in the Eastern Cape. Sandisiwe Ncemane, Coega Development Corporation's (CDC's) project development manager for Energy, talks about the initiative.

In his speech in Port Elizabeth at Africa Oil Week 2019 during November, the Minister for Mineral Resources and Energy Gwede Mantashe urged investors to pursue investment opportunities in the proposed Liquefied Natural Gas (LNG) Hub at the Coega Special Economic Zone (SEZ) in the Eastern Cape.

"The call by the Minister is certainly in line with the various activities undertaken by the Coega Development Corporation (CDC) in the past couple of years to advance its gas readiness capabilities," says Sandisiwe Ncemane, CDC project development manager for Energy.

"Within the next couple of weeks, the CDC will be engaging various stakeholders, within both the private and public sector, and inviting them to the Coega (SEZ) for a tour of the proposed site(s) and to update them on progress thus far," highlights Ncemane.

With an established market for Liquefied Natural Gas (LNG) within Coega, the CDC – in collaboration with the Eastern Cape Provincial government – has put in place extensive gas market analysis and preparation to enhance Coega`s readiness for the implementation of high-impact energy programmes for an integrated gas economy.

"The Coega SEZ is advanced in terms of preparations for the LNG Hub and is the ideal location for the associated gas to power programmes. One of the critical game changers for the CDC is the cost factor. The 342 MW Dedisa Power Peaking Plant currently in operation within the SEZ, has existing environmental authorisation for a 400 kV transmission line between the plant site and the Dedisa substation, which reduces the costs of the gas to power project for investors quite significantly," adds Ncemane.

Another factor is that CDC, in as early as 2006, undertook at least five environmental impact assessment (EIA) studies supporting the gas-to-power solution. "EIA studies were concluded for rezoning of land in the SEZ, and the establishment of a 400 kV transmission line between the plant site and the Dedisa substation, including the marine pipeline servitude EIA, which is currently underway."

"Further, the 2015/16 DMRE and Transnet feasibility studies include the liquefied natural gas (LNG) terminal at the Port of Ngqura, identifying several berth options for its deep-water seaport adjacent to the Coega SEZ. As part of the Coega Environmental studies, in 2019, a draft scoping report was prepared for an integrated LNG terminal and gas to power solution at Coega," adds Ncemane.

At Africa Oil Week 2019 during November, the Minister for Mineral Resources and Energy Gwede Mantashe urged investors to pursue LNG-related investment opportunities in the Coega.

"We are also encouraged by recent comments attributed to the Transnet chief business development officer, Gert de Beer, on Transnet's "support & commitment of resources to the LNG Hub intended for Coega," says Ncemane.

The Coega SEZ has a world class infrastructure; it has prime and serviced land that is available to host key gas-to-power projects with spin-offs for other sectors. In addition, the approved Coega Infrastructure Master Plan is in place. It defines a services corridor from the LNG Project site to the Dedisa substation as well as good access via National Road (N2) and ancillary road networks.

The short-term outlook is to import liquefied natural gas (LNG) to trigger the gas economy, which would stimulate the exploration and production of indigenous gas resources in the Eastern Cape (EC).

The EC is endowed with onshore and offshore gas opportunities, gas-driven power generation and gas importation, handling, trans-shipment infrastructure, as well as industrial markets. Potential recoverable quantities of indigenous natural gas are in the order of 20-trillion cubic feet onshore (shale gas), and 26-trillion cubic feet offshore.

The recent deepwater drilling in Brulpadda (approximately 1-billion barrels) in the Southern Outeniqua basin could potentially unlock enough fuel to supply South Africa's refineries for almost four years.

The province has the potential to unlock a value chain of marine/maritime services located at Coega SEZ, which could trigger op-

portunities eastwards to small harbours along the Wild Coast. In line with SA's developmental programme, indigenous gas extracted in the province must be beneficiated within the country's shores, maximising the economic benefit within the region. The EC, through the Department of Economic Development Environmental Affairs & Tourism(DEDEAT) has provided various gas support initiatives organised in a coherent framework and are well positioned to drive enablers for a gas economy. DEDEAT has initiated a strategic framing process for the provincial oil, gas and maritime complex, which has provided much impetus, clarity and support for the socio-economic development of the gas industry.

Currently at the Coega SEZ, within the Energy sector, there are a multitude of operational investors, as a demonstration of the hard work, effort and opportunities available in the Eastern Cape. Some of the projects include:

The Dedisa Power Peaking Plant (Zone 13) – a 342 MW Power Peaking Plant located in the Coega Special Economic Zone, which has attracted R3.5-billion in foreign direct investment. The project has been operational since September 2015 and has created over 1 490 jobs during its construction phase.

Wind Tower Manufacturing (Zone 3), a wind tower assembling plant investment of R310-million located at the Coega SEZ that created over 390 jobs during construction.

The Dedisa Power Peaking Plant, a 342 MW open cycle gas turbine power peaking plant located in the Coega SEZ, has attracted R3.5-billion in foreign direct investment.

Lay Down Area (Port precinct/Zone 1) for abnormal cargo related to the REIPPP programme (Logistics). This is a R9-million investment that has contributed to the distribution of wind turbines throughout the EC.

A Renewable Energy project, the first commercial wind turbine in South Africa valued at R1.2-billion.

"In the broader perspective, the LNG Hub at the Coega SEZ is perfectly located as it opens up a gas corridor towards the East & West coast, and is a response to the recently gazetted South African Integrated Resource Plan (IRP2019), which makes provision for an additional 1 000 MW of gas driven power by 2024," says Ncemane. ❑

Energy Indaba 2020: African Municipalities seek to procure from IPPs

Africa's energy demand is expected to double by 2050 and with its abundant supply of renewables, the continent has adequate capacity to supply this demand. Renewable energy, set to grow exponentially in the next 30 years, can provide the people of Africa with clean, reliable and affordable power, simultaneously and significantly increasing energy access across Africa.

Africa currently has inadequate transmission and distribution capacity. Over 600-million people across the continent still do not have access to electricity. In addition, the rural electrification rate across Africa is only 28%. With this said, the private sector has begun taking progressive steps to ensure accessibility, thereby demonstrating that energy supply is not solely a government responsibility.

In an endeavour to procure from Independent Power Producers (IPPs), some African nations have followed South Africa's lead in developing effective renewable energy programmes. The country has collaborated with legal, financial and technical experts to develop strategies that are acceptable to developers and funding communities.

As the costs of renewable energy technologies decline, renewables are now on a level-playing field with various other technologies, and such projects can be established without the need for government subsidies. South Africa, Egypt and Morocco are leading the way with regulatory and policy frameworks that secure market entry, income streams and contract prices. For instance, South Africa's 102 IPP projects have delivered approximately R200-billion in direct investment within a decade. In addition, increased separation of state-owned generation companies from the main transmission system, as in Kenya, provides equitable conditions for IPPs and increased investor confidence.

As the number of IPPs is steadily multiplying across the continent, municipalities are increasingly recognising this as a viable alternative to supplement their electricity supply. With the electricity sector having undergone such massive changes of late, municipalities are confronted with risks and opportunities for which they need to prepare adequately to adapt to such transitions.

Opportunities exist for municipalities to provide a basket of renewable and alternative energy services to households that do not have access to grid-connected electricity. This could be mainly in areas such as informal settlements, where there is no grid infrastructure. It could also be relevant in grid-connected areas where supply is constrained, or where households are energy-poor.

Municipal energy services may also include a combination of gas stoves, solar water heaters, solar chargers and energy efficient lighting. These can be used instead of fuel sources, such as paraffin, that contribute to the risk of fires and air pollution.

The Africa Energy Indaba 2020 will shed light on what is required of municipalities before considering options to procure from IPPs in finding solutions to energy access. In addition, the conference will unpack the principal success factors regarding IPPs and their procurement, consequently empowering energy stakeholders to proactively and swiftly capitalise on these opportunities.

With the 2020 Theme: 'African Energy – Catalysing Investment and Business Opportunities' The Africa Energy Indaba is taking place in Cape Town on the 3rd and 4th of March 2020 at the Cape Town International Convention Centre. ❑

CSIR and industry collaborate to advance adoption of waste plastics in road construction

The Council for Scientific and Industrial Research (CSIR), in collaboration with the Department of Science and Innovation (DSI), and the plastics and road industries, is working on a demonstration project to evaluate the feasibility of using waste plastic in local road construction.

The project aims to identify different low-value plastic waste types; meaning waste plastics that are not currently attractive to the South African recycling sector, and evaluate their use as a binder/bitumen modifier in asphalt road surfacing.

The 15-month project, which commenced in March 2019, involves laboratory work to evaluate the feasibility of using recycled plastics according to South African standards, as well as a demonstration phase, which will test the application of the technology on a stretch of road, using the CSIR's Heavy Vehicle Simulator.

Georges Mturi, senior researcher and manager of CSIR's Advanced Material Testing Laboratories, says the idea is to support industry and government in finding new and local end-use markets for waste plastic.

"These requirements ensure roads are built using quality materials that comply with proven performance criteria, to produce durable roads," says Mturi. "As such, any new plastic materials or plastic-modified materials utilised in the local industry must be incorporated into road specimens and tested for compliance to the set criteria before they can be implemented in South Africa."

The use of waste plastic in road construction is not new. The technology has been used in Africa and abroad, including Ghana, Kenya, Nigeria, Australia, Canada, India, the Netherlands, New Zealand, the United Kingdom and the United States of America.

However, the South African road construction industry is governed by strict national standards and specifications to ensure the performance of road pavements.

"Unless we are targeting the specific waste problem we have in South Africa, there is no other need to use plastic material in our roads," says Saied Solomons, Sabita CEO. "It is also not sensible to use recycled plastic that is already recyclable in plastic. This is the general view of the asphalt road industry, which is also participating in this project," he adds.

Standards and specifications differ from country to country as a result of differences in legislative and environmental conditions, especially with regard to traffic loading and climate. This, Solomons says, restricts the direct implementation of waste plastic technology from one country to another. Such technology would need to be refined and modified to make it 'fit-for-purpose' for South Africa, as per the existing set criteria.

CSIR expert Prof. Linda Godfrey, who manages the DSI's Waste Research Development and Innovation Roadmap Implementation Unit, which funds the demonstration project, says the intention is to make sure the technology is implemented in a responsible manner in South Africa. "At a time when there is so much attention on the leakage of plastic into the environment, it is important that this technology is implemented in a way that does not cause further environmental harm; for example, through the generation of microplastics from the wear and tear of these road surfaces. We want to support the growth of the waste and recycling sector in South Africa by providing credible evidence to support decision-making," says Godfrey.

Dr Henry Roman, director of environmental services and technologies at the DSI says the demonstration project is one of a number of projects and initiatives that the plastics industry is currently involved in, as part of its drive to end waste plastic in the environment.

The project is a collaborative forum and action group involving the full packaging value chain, where part of the focus will be on supporting and developing projects similar to the demonstration project on road construction.

"It is envisaged that the success of this project could pave the way for the adoption of this technology nationwide. This could provide an avenue to job creation in the sorting and processing of waste plastic material, and help us find scalable South African solutions for plastic waste in the environment," he concludes. ❑

South Africa to trial new 'plastic road' – made from recycled materials

Sisters introduce first plastic bricks in SA

With the aim of reducing plastic waste, sisters Kedibone and Kekeletso Tsiloane successfully prototyped the PlastiBrick; an innovation that uses recycled plastic to manufacture stock and maxi bricks, which are strong, durable, fire retardant and environmentally friendly.

Sisters Kedibone and Kekeletso Tsiloane holding some of the plastic bottles used to manufacture PlastiBricks.

The brick looks and feels like a cement brick, however no water or cement is used in the production of the bricks.

"The idea for PlasticBrick came about after we started a construction business in 2013, and realised that one of our biggest expenses in our income statements was for bricks," begins Kedibone Tsiloane.

"In an attempt to significantly reduce those costs, we went on to look for a formal black female-owned brick manufacturer in the Free State to purchase the bricks from, but we were unsuccessful. This fuelled our interest in starting our own brick manufacturing business where we could collect, crush and melt the raw materials to produce the bricks we required," she says.

Kedibone explains that the company started by manually manufacturing cement bricks at home. They sold their product mainly to households and local hardware stores in limited quantities. "Our capacity was between 300 and 500 bricks a day," she explains.

But the duo had bigger plans. Their ultimate goal was to manufacture a brick that was different, innovative and environmentally friendly.

"We did a lot of research and found that most of the bricks in South Africa are from a few suppliers who dominate the market. We identified an opportunity to enter this market by creating a niche for ourselves to differentiate us from the competition," says Kekeletso.

"We looked for problems we could solve in the sector and identified two: plastic pollution and water scarcity. It takes many years for plastic to break down, so the accumulation of plastic over time and the damage caused by the toxic pollutants when plastic is burned, for example, are long lasting and therefore harm not only humans, animals, flora and fauna, but deteriorate the quality of water and, consequently, its availability.

"We wanted a product that could alleviate the two problems, and provide an eco-friendly alternative to cement bricks; a commonly used material, and something we were already passionate about," says Kekeletso, adding that every effort towards a greener environment, no matter how small, is progress in the right direction. "Even the small steps we take towards reducing plastic pollution will have a significant impact if enough people embrace them," she says.

A solution to SA's plastic problem

Kedibone explains that the pair only started the PlastiBrick company with about R5 000, which was used for the prototype for PlastiBrick. The rest of the funding came from her own pocket, while her sister studies towards a degree in Civil Engineering.

The prototype, which has been tested by a SANS accredited independent laboratory found PlastiBrick to be stronger and less absorbent than cement bricks. The plastic bricks are also particularly good at insulating noise and are thinner and lighter than traditional bricks.

PlastiBrick is made up of various plastics collected from landfills, households and waste pickers or reclaimers. This forms the basis of the material and the primary raw material, Kedibone tells *MechChem Africa*.

"We purchase plastic from waste pickers and buy back centres who do the sorting," she says. "We recycle all types of plastic, including the 'unrecyclable' plastic, which usually ends up in the rivers and landfills as no one sees value in collecting these types of plastic."

The PlastiBrick production process consists of collecting and sorting the plastics depending on the desired compressive strength. It is then crushed and melted, where the melted plastic is mixed with sand and moulded using proprietary additives and left to cure for 45 minutes as opposed to the seven days for conventional bricks.

The bricks come in three shades of grey and in brown. The colours come from an additive and a manipulation of the manufacturing process.

"Interestingly, no water or cement is used in the production of the bricks, which answered our first problem of using a material that consumed less water. The plastic, together with the sand and additives, ensures that the bricks bond together," adds Kedibone.

PlastiBrick has recently been recognised by the Department of Human Settlements in the Free state as an alternative building technology that aides in building proper houses that are durable and cost effective.

"Due to the economies of scale for bigger companies, they are able to price their bricks significantly lower; so, we price our bricks relative to the market for conventional cement bricks. However, our input costs are drastically lower and we use far less energy to manufacture," she says.

The PlastiBrick weighs close to 3.0 kg and has a higher compressive strength of 10 MPa. This means it can be used to build from foundation upwards for single or double storey units. Competitively, the bricks are not only environmentally friendly, but due to the plastic elements, they have a high density and an industry-low water absorption rate of 1.1%, enabling a building to have a longer lifespan.

"Our bricks have also been purchased by local contractors. One success story that stands out is a project for renovating a monument in a rain prone area using the PlastiBricks. We have also donated the bricks to a small-scale farmer who has issues with flooding when it rains. The farmer said since using our environmentally friendly bricks, there have been no issues with flooding," explains Kedibone.

The Tsiloane sisters say the response to the bricks has been unexpectedly amazing although one of the challenges they face is people not taking them seriously and questioning whether they will be able to deliver.

However, Kedibone believes that with the growth of plastic use and an emphasis on eco-friendly and alternative building solutions, now and in the future, there is going to be a drastic shift in trust between consumers and product manufactures like them, and a growth in demand for the PlastiBricks. ❑

Drawing the line on food waste

There is a strong movement towards the immediacy of reducing the effects of climate change, as expressed by Greta Thunberg's recent UN speech underpinned by the sentiment – Right Here. Right Now. Interwaste takes a closer look at the role food waste plays in the fight against climate change, and the solutions that should be considered to change this.

Jason McNeil, CEO at Interwaste.

"Research shows that each ton of food equates to almost 4.14 t CO_{2e}, and that 4.3% of South Africa's greenhouse gas emissions are from the disposal of organic waste. This indicates a high emissions rate, and provides grounds to argue that food waste is an important contributor to climate change – a contributor that can, and should, be avoided," says Jason McNeil, CEO at Interwaste.

"What is worse is that, in a country that is already water scarce, the very food that is being wasted is using up 22% of the country's water supply through the agricultural process – a significant impact on the larger climate change discussion. As such, there is no doubt that food waste needs to be stopped, to curb hunger and, as importantly, to make sure the water used to grow it, is not used in vain."

McNeil says food waste is more than just a major climate issue – it is an economic, sustainability and socio-economic issue. "Statistics show that 27% of available food in sub-Saharan Africa is wasted, resulting mostly from production and retail, and edible food waste through the value chain in South Africa is costing the country R61.5 billion per annum, and 2.1% of National GDP.

"In a country that is economically and socio-economically challenged, we have to ask ourselves if we can afford to waste food. Similarly, as a global player, what are we doing to aid the global climate?" asks McNeil.

The answer lies in effective management of food waste. Corporate South Africa has a fundamental role to play in reducing the food waste numbers. Minimising wastage and overproduction remain critical, but finding ways to reduce and repurpose food waste that is safe and makes financial sense can create opportunity in other economic areas too. In fact, there is a profound, positive ripple effect and impact of sound food waste management on the country. It provides the opportunity to recover foods for redistribution to those in need and also repurpose food waste through composting, anaerobic digestion and bioremediation.

"The amount of energy wasted each year in South Africa by producing food that is not consumed, equates to the amount of power required by the City of Johannesburg for roughly 16 weeks," says McNeil. "Considering the numbers, there is no doubt that innovative solutions such as anaerobic digestion – that extracts energy from composting food waste and creates a source of power – is a very viable solution for socio-economic gain."

However, if companies themselves are not examining ways in which to set a benchmark for deriving better and more sustainable waste management solutions – solutions that focus beyond the landfill model – alternatives will not make the impact that is needed.

"We are seeing a serious shift in this space, with many companies taking a proactive and committed stance to reducing and repurposing their food waste. After all, there is much more than just a commercial value for corporate South Africa– there is a socio-economic obligation, ensuring we are helping to feed South Africa's people, and not draining our planet's resources," continues McNeil.

To this end, the South African Government has made a global commitment to halve food waste in the country by 2030. In support of this, new laws have been legislated and regulations are being rolled out, all aimed at cleaning-up South Africa and reducing the negative environmental and health impacts caused by waste.

"If we consider the aspects that make up the circular economy, then the effective management of food waste – through the removal of unnecessary excess materials, energy losses and related carbon emissions – and by allowing the food waste to be 'fed' back into the cycle, we enable the reutilisation of a resource to further contribute to the fight for real climate change," concludes McNeil. ❑

"In a country that is economically and socio-economically challenged, we have to ask ourselves if we can afford to waste food. Similarly, as a global player, what are we doing to aid the global climate?" asks McNeil.

Independent mechanics urged to keep used oil out of the environment

The ROSE Foundation recently commissioned an in-depth survey on independent mechanics informally operating from Cape Town and Gauteng urban township areas. If the survey is anything to go by, business is booming.

The survey looks at self-employed mechanics operating from their homes in Langa, Khayelitsha, Phillipi, Mitchells Plain, Soweto and Alexandra, and the results reveal a thriving industry, with backyard mechanics servicing up to 20 cars per week in some instances.

However, there have been some concerns about environmental contamination as the increased business generates increased volumes of dirty, used oil that the mechanics have to store and dispose of. Used oil is a hazardous substance containing a host of harmful chemical compounds and carcinogens; one litre of used oil can contaminate one million litres of water.

The ROSE Foundation is most concerned about how mechanics are getting rid of their oil. "We know that this segment of the market is not very compliant – mostly because they aren't aware of how hazardous used oil is and they don't know how to dispose of it correctly," says Bubele Nyiba, CEO of The ROSE Foundation.

"In our survey, we asked questions about their volumes of new oil purchased, their buying preferences and, most importantly, their approach to the collecting, storage and recycling of their used motor oil, so we can approach them correctly.

"When they're busy, independent mechanics can purchase up to 30 litres of new oil a day. Accurate figures around the volumes of used oil generated are not easily available and we have to estimate these figures based on the number of cars being serviced and new oil purchased," says Nyiba.

"It was worrying to see that the majority of the mechanics surveyed are only vaguely aware of, or concerned with, the hazards of used oil. The survey revealed that there is little to no understanding about the harmful effects of used oil on the environment, and although these mechanics are capturing used oil in a variety of make-shift containers it is done to keep the oil out of their yard – often as a result of pressure from wives and family members about the unsightliness of spilt used oil."

According to Nyiba, while some admitted to having poured the oil down the drain in the past, most said they had stopped this habit for fear of the oil clogging their drains. Some disposed of their used oil by pouring it out into nearby open land, but noted that the grass no longer grew in the area. Others said they had sold or given their used oil away to people who used it to preserve the wood on their wendy houses or had painted it onto their dogs to kill fleas. "These are all harmful practices that allow the used oil to make its way directly into the environment," says Nyiba.

A few mechanics said they did try to take the oil to drop-off points but that it was a hassle for them, costing time and money for petrol to drive to those locations.

ROSE appealing to mechanics

The ROSE Foundation urges all independent mechanics and anyone who works on their cars please to think twice about what they do with used oil. "Put it in a drum or old oil can or any clean container with a tight lid and take it to the nearest drop off point, at a local depot, municipal garden refuse site, or auto workshop. Or call the ROSE Foundation on 021 448 7492 and ask about a collector coming to take it away for you." concludes Nyiba. ❑

Used oil is a hazardous substance containing a host of harmful chemical compounds and carcinogens; one litre of used oil can contaminate one million litres of water.

Factory harmony: humans and machines to work side-by-side

In this opinion piece, Evert Janse van Vuuren of Omron Industrial Automation in Johannesburg, South Africa, a subsidiary of Omron Corporation, talks about 'Factory Harmony' a future trend involving humans and machines working in harmony in the factory of tomorrow.

Exports are a key indicator of the economic performance of any industrialised country. With export volumes of US$1.44-trillion, Germany ranked third behind the USA ($1.54-trillion) and China ($2.26-trillion) in a global comparison in 2017. To ensure that the German economy does not lose out in the long term, new concepts are needed to optimise the efficiency of industrial production. In view of the progress made in automation and artificial intelligence, a well-established and improved interaction between man and machine could help to ensure high economic standards and productivity. A promising model for the 'new harmony' on the factory floor is based on intelligent, integrated and interactive design of tomorrow's manufacturing processes.

Many still believe that man and robots can only work against each other or, if need be, side by side; moreover, there is still a fear that machines will replace human workers. However, the coexistence of human workers and automated machine solutions and robots has become commonplace in more and more companies.

But that's not all: digitalisation provides companies in the manufacturing industry with an enormous inventory of technological options for implementing the factory of the future. Smart networking using artificial intelligence offers the opportunity to convert manufacturing data into strategic information. It also enables the smooth integration of high-precision robotics technologies that work at high speed, supplemented by methodically safe and simple interaction between man and machine.

The OMRON TM Collaborative Robot lets you attain better efficiency with its wide range of industrial applications.

A new era of intelligent, integrated and interactive production

Increased efficiency, reduced costs, strengthened competitiveness: these are all necessary to secure a competitive global market position and they can be achieved using innovative solutions for flexible and efficient production. An impressive example of the potential of a technology that can revolutionise the factory floor of the future, while promoting harmony between human and machine, is a new Omron Collaborative Robot (Cobot) that emerged from the partnership between Omron and Techman.

This innovative solution enables simple automation of applications that have traditionally been carried out by humans and where automation has so far been very difficult. The robot can be seamlessly integrated into an autonomous mobile robot and also enables the automation of complex tasks using a 3D camera.

One example of such a futuristic solution is bin picking: The robot quickly and precisely sorts different articles and deposits them where they are needed. The 3D camera locates the items and sends their coordinates to the robot, while the software, supported by AI algorithms, performs the advanced calculations required for optimised goods picking, for example, for customised orders.

Meanwhile, a mobile robot is responsible for the subsequent transportation of the goods. In this respect, the efficient combination of different production processes forms the basis of particularly flexible and reliable production and materials handling. It also gives a foretaste of what will be possible in the future with 'Factory Harmony', where integrated, mobile and collaborative robots work in harmony with humans, to ensure flexible manufacturing and customisation.

Systematically avoiding malfunctions and breakdowns

Operational excellence is an important basis for investment security – especially in view of the current changes in the industrial production organisation. Changing consumer behaviours are forcing manufacturers to flexibly produce smaller quantities in a larger number of variants, saving as much time as possible. The factory of the future must therefore become more flexible and be able to convert production more quickly and produce smaller runs. The ultimate goal is to be able to deliver personalised products from an agile and networked production line. In an automation model that meets this requirement, all devices, machines and solutions should operate in an integrated manner.

Effective quality control is essential in all production and packaging lines. Those who can identify defective products before they leave the factory, or even before they are produced, benefit from considerable time and cost savings and avoid costly product recalls, loss of productions and possible damage to brand reputation.

The unique built-in vision and integrated lighting, make inspection, measurement and sorting applications easy.

Equally important is the quality control of packaging for products such as food or medicines. An illegible barcode or a wrong expiration date can lead to the need to dispose of defect-free products. In addition, there is a trend towards stricter legislation, which gives top priority to unambiguous labelling for all types of products. For example, the EU has introduced new regulations in 2019, requiring production lines to meet even higher quality control standards.

As a result of the increasing degree of automation in production lines, the need for automated processes in quality control has also been amplified. Among other things, it pays off if the machines are able to collect data in order to optimise predictive maintenance. The more data collected and processed, the more 'intelligent' the machine can be to help extend production line life, reduce downtime, and increase productivity.

For example, Omron's Sysmac AI controller includes a predictive maintenance library based on AI, which collects, analyses and uses data on Edge devices to extend their life, detect anomalies and prevent failures. No Internet connection is required: users are no longer dependent on cloud computing and can leverage AI potential anywhere and at any time for their business advantage.

Image processing supports error detection

An increasingly important factor in quality control on production lines is smart image processing – technically implemented either as a completely new solution or by partially retrofitting an existing system. Very compact image processing systems monitor production in real time and react immediately to any error. The data transmitted by an image processing system is processed on site and made available centrally via the cloud for detailed analyses so suitable measures can be taken.

In order for an inspection system to make intelligent decisions data must be captured by a sensor, such as a camera, for image processing. These cameras can be set up to monitor various aspects of a product, such as detecting defects or checking labels for printing errors or missing information. The data is then analysed with high computing power to compare the process with the actual and targeted results. When problems are detected, the system responds according to programmed rules. Sometimes it can automatically correct the errors but, even then, the operator is always informed to ensure correct processes and in case additional action is required.

Since this system is fully networked, it provides a better link between the machines on a production line, resulting in more precise quality control and greater efficiency. When an error is detected, the system can often automatically compensate for it and production is not affected.

Intelligent automation solutions of the latest generation work fast, offer high computing power, are easy to operate and thus ensure transparent quality control in the factory of tomorrow.

Flexibility is the engine for customer satisfaction and business success

Since customer and business requirements are constantly changing, the factory floor must also be more flexible in the future. Flexibility in the organisation and the allocation of production resources is one of the key success factors for efficient production.

Placed on a work station, the robot can be relocated and recommissioned for any new task.

This includes on one hand the mobility of the robots used and, on the other, their adaptability to concrete requirements in practical use. This is another advantage of an effective quality control and process management system.

By combining image processing, motion, control, functional safety and robotics in a single management system, production lines can be more easily adapted to short production runs and changing market requirements. The line layout can be quickly redesigned and the recognition pattern for quality control can be easily updated in the software.

This ensures that different product variants or even different products are produced and packaged flawlessly. In addition, such a system brings the benefits of future-proof orientation, because it can be easily adapted to new regulations. As a result, manufacturers do not have to worry about changing their production lines but can simply initiate a firmware update for the existing solution if necessary.

In conclusion, 'Factory Harmony' is likely to define production of the future. The networking of humans and machines is more than just a trend towards the efficient organisation of processes and the distribution of tasks in manufacturing plants.

The tangible benefits of tomorrow's high-performance factory are already showing how the systematic harmonisation of human and machine-based capabilities is revolutionising production with the help of artificial intelligence and robotics – breaking new ground for future production. ❑

80 GHz: High frequency level measurement

Changing media, as well as process pressures and temperatures, characterize the typical reaction processes in the chemical industry. Thanks to precise signal focusing, the VEGAPULS64 maintains maximum performance in complex liquid processing vessels with agitators or other internal components. And its very small process fittings also make it suitable for compact vessels. The level sensor is ideal for continuous measurement of any liquid in the pharmaceutical and chemical industries.

120 dB
Dynamics

± 1 mm
Measurement accuracy

-196 ... +200 °C
Process temperature

Thread, flange, hygenic fitting
Antenna version

30 m
Measuring range

Wireless operation

80 GHz
Transmission frequency

ATEX, IEC, FM, CSA, EAC
Approvals

-1 ... +25 bar
Process pressure

3°
Focus

www.vega.com/radar

Looking Forward VEGA

Turnkey containerised substation for DRC mine

Innovative and fit-for-purpose design was the winning formula that secured WEG Automation Africa formerly Shaw Controls, the contract for a containerised substation and control room solution for a remote tin mine in the Democratic Republic of Congo.

According to Tyrone Willemse, business development consultant for projects and contracts at WEG Automation Africa, the isolated location of the mine and the challenging logistics made a modular solution ideal. The substations are each housed in a six-metre-high cube container. A total of 14 units were supplied, comprising MV rooms and LV rooms.

Willemse says: "The unit's dimensions and robustness had to allow for a long journey, including along a very difficult 200 km road to reach the mine site. Every part of the process plant has its own designated motor control centre (MCC) that provides electrical power and control for areas including the primary crushing circuit, the plant feed, regrind mill, tailings thickener and the product dewatering and handling circuits".

In addition to meeting safety compliance regulations, the design includes three-way locking systems, LED lighting, fire detection systems and a safety interlock to the fire system for air conditioners. Backup power is provided to all the exit lighting and, to ensure easy cable entry, glanding plates were carefully located so as not to overlap with the container's support beams. "Working in close collaboration with the engineering house, careful planning could be done upfront to ensure that nothing was overlooked," Willemse says.

"In the design, full consideration was given to the placement of elements such as platforms, walkways, doors, viewing windows and air conditioning units," he continues. "We also took responsibility for the logistics of getting everything to site."

Willemse explains that this turnkey solution demonstrates WEG Automation Africa's containerised substation design and engineering capability, as well as its full local manufacturing capacity, lifting it above other MCC manufacturers or assemblers.

Part of WEG Automation's SC 300 MCC rack.

Final electrical installation in the Motor Control Centre (MCC) for the mine's 600 sulphide rougher float container.

The containerised solution comes with a full data pack, quality control documentation and an operation and maintenance manual in accordance with ISO 9001.

"With our expertise, capacity and experience of working in Africa, we were able to reduce the risk and turnaround time by tackling the entire contract in-house," Willemse says. "The extensive testing and cold commissioning enabled by our *modus operandi* and facilities also gave the mine peace of mind that the unit would function as required when it arrived on site," he concludes. ❑

The busbar trunking support bridge mounted to the roof of the container.

Wagner Systems awarded National Productivity Award

Cape Town-based producer of fine mechanics components and assemblies, Wagner Systems, was recently awarded Productivity SA's prestigious National Productivity Award in the Emerging Business Sector category.

"The aim of the competition is to recognise South African companies that represent the highest qualities and attributes of productivity, and reward their efforts to improve efficiency, competitiveness and sustainability," says Wagner Systems managing director, Lasni Millar. "We feel honoured having received this significant acknowledgement, especially as it gives recognition to our hard work and dedication to improve productivity and the efficiency of our business."

The company embarked on a productivity improvement initiative in 2016, with Productivity SA becoming involved a year later. The objective was to advance Wagner Systems' competitiveness, profitability and sustainability. The programme extended across all segments of the business with the aim of increasing efficiency of production and enhancing the utilisation of resources by, amongst others, minimising wastage. In practical terms this meant the improvement of manufacturing processes and the reduction of variables to increase production output while still using the same workforce and equipment.

"The programme was decidedly successful and the impact of the productivity improvement far-reaching," says Millar. "We quantified the results in eight functional areas – production efficiency, production quality, customer satisfaction, staff component, resource utilisation, use of capital employed, sales and profitability – and recorded extensive improvements in all of them. Customer satisfaction, for example, improved from 60% to 90%, while the improvement in the number of items shipped on average per month came to 117%."

With the award (from L-R) Albert Brink, Regional Manager: Cape, Productivity SA. From Wagner Systems: Wilna Harmse, Quality Manager; Alex van Rooijen, Production Manager; Nizaam Manuel, Foreman; Giuseppe Geldenhuys, Technical Manager.

Millar has no doubt that the successful outcome of the programme has placed Wagner Systems in a favourable position when it comes to proficiency and output. "It makes a difference where it matters most – with our customers. With improved operational efficiency and increased production capacity, we're now able to respond to customer orders and requirements with enhanced flexibility, and deliver within shorter lead times – competitive benefits that favour the end-user."

Millar makes it clear that Productivity SA played an important role in their project. "Their hands-on guidance provided us with simple and easy-to-understand techniques that helped us gain momentum. Without them we would not have been as successful," he concludes

www.wagnersystems.co.za

Verder retains top position in the Dutch manufacturing industry

Verder Group has reinforced its top position after being named the number one brand in the Maakindustrie100 (Manufacturing Industry100) in 2019, for the second consecutive year. The Maakindustrie100 is an annual list of the best performing manufacturing companies in the Netherlands, compiled by CFI and Management Team (MT).

According to mt.com; the family group from Vleuten, led by CEO Andries Verder, produces high-tech laboratory equipment and a very wide range of pumps and mixers for industrial applications. The top five are completed by Moba (food & agri), MGG Groep (aluminum foundry), Christiaens Groep (food & agri) and Terberg Benschop (Automotive).

The completely independent family business has been playing in the "champions league" of its own sector for years and serves customers from all over the world. In 2018, revenue amounted to more than 302 million euros, with revenue and profit growth over the last four years reaching 16 and 15% respectively. The company has 1 850 employees worldwide.

Companies with a Dutch origin

The Maakindustrie100 is published annually and consists of the 100 best-presenting SMEs in the Netherlands. The list is compiled by MT in collaboration with CFI (formerly MBCF Corporate Finance).

"We look at manufacturing companies with a Dutch origin and a turnover of up to 500 million euros," says Kevin Driesen of CFI. "We want to pay attention to the hidden champions of the Dutch economy.

"Publicly available information is used in the composition of the list. The criteria are revenue, revenue growth, EBITDA and return on invested capital. This leads to four rankings, where each ranking amounts to a certain number of points. By adding up all the points, you get a total score," explains Driesen. "Similar to 2018, Verder Group topped the list."

Darryl Macdougall, MD of Verder Pumps SA, adds that the recognition demonstrates the Verder brand's unwavering commitment to bringing high quality and fit-for-purpose pumping solutions to market. This is backed by performance warranties and an integrated service offering.

"We are delighted to represent the Verder brand and its wide range of products and solutions in Africa – and grateful for continued support from our clients, partners and peers who contribute to the growth of the local and international business," concludes Macdougall.

www.verder.co.za

Electric controllers for heating and cooling applications

BMG's range of Danfoss electronic, mechanical and intelligent 'mechatronic' devices, includes the VLT® AutomationDrive FC 300 series, designed for variable speed control of all asynchronous and permanent magnet motors on most industrial machines or production lines.

The Danfoss VLT AutomationDrive FC 300 series, with intelligent drive functions, is based on a flexible and modular design to optimise energy-savings, versatility, efficiency and maintenance.

The robust drive system, with reduced harmonic impact and a spark-free design, is protected against the negative effects of vibration, moisture and dust and has the flexibility to operate pumps, conveyors, palletisers and material treatment equipment, ensuring optimum control and dependable operation for extended periods.

"The VLT AutomationDrive – which has received global awards for innovation and user-friendly features – reduces project costs, ensuring the lowest possible cost of ownership while maintaining high-efficiency processes," says Mick Baugh, electronics manager: electromechanical division, BMG.

"As with all Danfoss drives, this system is motor independent to offer the flexibility to be able to select the correct motor for specific applications. Danfoss makes an ongoing investment in advanced technologies to ensure all systems comply with current and future demands in the drives sector. With the implementation of the VLT AutomationDrive into a plant, the BMG team ensures a seamless transition into Industry 4.0."

The VLT AutomationDrive FC 300 series boasts hardware and software enhancements that maximise performance and a new Ethernet platform for improved communication. The range also encompasses new generation E-frames and lower temperature ratings.

Compatible with leading motor and fieldbus technologies, offering web-based configuration, Electronic Data Interchange (EDI) and access to drawing and engineering diagrams, the system also provides tools for harmonic and motor-drive system efficiency calculations. There is a flexible interface to the drive data from multiple access points, including directly at the drive, via mobile applications, through an integrated web server and via cloud connectivity.

It has a modular and adaptable drive system that is suitable for installation in any environment – close to the motor, in electrical panels, switch rooms or outdoors and as a stand-alone unit in the production area.

The system has an advanced thermal design and back-channel cooling and is one of the most compact and cost-efficient air-cooled drives in the range 90 kW to 800 kW at 500 V.

Typical applications for this system include mining and minerals, food and beverage, packaging, water and wastewater, marine and offshore, chemicals, cranes and hoists, elevators and escalators, materials, oil and gas and textiles.

mickb@bmgworld.net

M&C upgrades its Zambia facility

A new 435 m² machine shop workshop and transformer department at Marthinusen & Coutts' facility in Kitwe, Zambia, will further improve the quality and turnaround time of its offerings in the region.

According to Marthinusen & Coutts Zambia general manager, Eugene Lottering, the commissioning of the machine shop workshop in January 2019 created significant space in the 1700 m² main workshop, allowing for the investment in a transformer department.

"We now have a dedicated factory for machining work-pieces for the main shop," says Lottering, adding, "the Marthinusen & Coutts head office in Johannesburg makes a vital contribution by sending its machine shop foreman to provide training. This upgrades local Zambian machining skills on a continual basis."

The division's machine shop facility boasts five machining lathes, two milling machines, and a submerged arc welding machine. It also has a 50-tonne horizontal press and rotor binding machine. All equipment operates under two 6.3-tonne jib cranes.

www.mandc.co.za

A new 435 m² machine shop workshop will further improve turnaround time.

Tectra Automation PLSAs improve efficiencies on vulcanising press

The project team at Tectra Automation devised a solution for Elimen Engineering to replace the hydraulic system in a vulcanising press. The solution, which had to guarantee an accurate pressing cycle that distributes a 130-ton press load evenly, consisted of four Bosch Rexroth size 75 flanged nut planetary screw assemblies (PLSAs), also called roller screws.

Compared with its hydraulic predecessor, these PLSAs offer improved speed, simplicity and energy efficiency, and provide an effective drive solution for applications requiring up to 29 500 Kgf. The roller screws attain very high positioning and repeat accuracy, even when minimal travel distances are involved. In addition, the compact design means they are easily integrated into applications that require high load capability, precision and low environmental impact.

Unlike hydraulics, PLSAs are driven directly by electrical motors, which require less heat, and experience reduced electrical and mechanical energy loss. The direct drive also ensures that PLSAs can be electrically controlled, offering accuracy and high repeatability.

"Combining a roller screw with a servo motor produces a mechatronic unit with the nominal force of an hydraulic cylinder," explains Jaco de Beer, projects manager, Tectra Automation. "Ultra-high accuracy, positioning and flexibility, as well as low energy consumption make the design perfect for use as a feed axis in modern servo presses, machine tools and injection moulding machines."

De Beer adds that the planetary design, with planets positioned axially parallel around a rolled threaded screw, ensures smooth running characteristics and noticeably lower noise emissions compared to ball screws. "The numerous contact surfaces inherent in the design lead to a high load-bearing capacity and long service life," he says.

Another advantage is the roller screw's innovative sealing system, which provides for long lubrication intervals. This reduces maintenance costs and helps protect the environment by keeping lubricant consumption to a minimum.

julie.vandenberg@boschrexroth.co.za

Steel Awards showcase steel innovation

On October 10 at the Coca Cola Dome in Northriding, Gauteng; the D'Aria in Durbanville, Cape Town; and the Mount Edgecombe Country Club, KwaZulu-Natal, the Southern African Institute of Steel Construction (SAISC) showcased local steel construction and innovation at the SAISC 2019 Steel Awards.

Adversity often brings opportunities. South Africa's steel industry has been going through a period of severe challenges, affecting the entire supply chain and seeing the most serious contraction for many years in the sector. Despite the prevailing doom and gloom, however, the South African Institute of Steel Construction (SAISC) has remained true to its role of industry champion during this challenging time, focusing on innovation, positivity and creativity – particularly with regards to this year's Steel Awards.

This approach bore fruit, with the SAISC 2019 Steel Awards achieving record entries and sponsorship along with growing diversity of the entries received. This year the SAISC received 94 entries for the awards as opposed to 70 in 2018 and 59 in 2017. In addition, sponsorship of the Steel Awards has grown by remarkable 40% from 10 sponsors in 2018 to 14 this year.

This is according to Paolo Trinchero, CEO of the SAISC, who explains that the marked increase in sponsorship was largely due to a restructuring of the Awards sponsorship options, which made these more affordable and accessible to potential sponsors. "Another important factor contributing to the increased entries and sponsorships in 2019, was the intensive and dynamic communications campaign undertaken to market the Awards – across all platforms from social media to online, print and broadcast media – which also significantly increased the overall visibility and traction of the Awards throughout industry," Trinchero adds.

"This year, we can say that a wide range of stakeholders in the greater built environment – from architects and engineers to riggers, welders and even university students – actively participated in the Steel Awards and have started to recognise the pivotal importance of steel. We are particularly pleased with the greater diversity of entries received this year," he remarks.

The aim of the Awards is to highlight the use of steel in the built environment. "The annual Steel Awards are intended to create a sense of inclusivity and community and to resonate with a wider audience including a wider representation of gender, generational and ethnic groups," explains SAISC Chairperson Nicolette Skjoldhammer.

This aim was brilliantly realised by the entry of the overall Steel Awards 2019 winner and winner of the SAFAL Steel Innovation category, the Durban Christian Centre. The building was commissioned to replace an earlier church which had burnt down, and is in the shape of a large dome. Here, the innovation lay in the geometry of the roof arches, inclined in different planes, which provide support for the roof as well overcoming tight site access issues.

The innovative design of the Durban Christian Centre lay in the geometry of the large roof arches, inclined in different planes, which provide support for the roof as well overcoming tight site access issues. ***Inset:*** *A view of the complex structural detail of the steelwork for the Durban Christian Centre's roof.*

"The Durban Christian Centre is a very bold project. For the engineer to realise the form the architect envisioned must have been very complex," Skjoldhammer continues. The nominator and structural engineer was NJV Consulting; the architect, Elphick Proome Architects; and the steelwork contractor Impact Engineering.

"The members of the Durban Christian Centre project team epitomise all the aspects of diversity the SAISC is striving for within the steel industry, all working in harmony to achieve an amazingly creative and innovative outcome," she adds.

The overall winner of the SAISC 2019 Steel Awards was NJV Consulting for its design of the Durban Christian Centre: the nominator and structural engineer was NJV Consulting; the architect, Elphick Proome Architects; and the steelwork contractor, Impact Engineering.

Other category winners are as follows:

- In the Mitek Industries South Africa Light Steel Framed Building category, the winner was the Protea Glen Secondary School, constructed for the Gauteng Department of Education. This was one of nine schools commissioned by the Department, the aim being to adjudicate various building systems and their advantages – and how these could create structures conducive to learning. The project capitalised on the key features of light steel frame building,

The steel mesh of the wraparound balconies of the Peech Hotel – winner In the ArcelorMittal South Africa Architectural category – was used to create the articulate façades of an urban village, while also serving to integrate the building with its green surroundings.

namely: speed, thermal efficiency, acoustics and flexibility of design. The architect on this project was Local Studio; the structural engineer, the Structural Workshop; the engineer Luleka Consulting Engineers; and the main contractor, Abacus Space Solutions.

- In the ArcelorMittal South Africa Architectural category, the winning entry was the Peech Hotel located in Melrose, Johannesburg. Meshworks, the architect on this project, and structural engineers EVH Consulting, were charged with extending the existing hotel onto a newly acquired adjacent property. Steel was used throughout the project to express a layered architecture of lightness, and as a tool in the integration of built form and landscape.
- In the Industrial category, the winner's trophy went to the Omnia Nitro Phosphate Plant constructed for the diversified chemicals group Omnia. The nominator, steelwork contractor and steel erector was SE Steel Fabrication Pty Ltd. With tight project deadlines and multiple challenges including working at a height of up to 46 m, this complex plant construction was achieved safely and on time.
- Winner in the Global Roofing Solutions Metal Cladding Category was a building named the 1054, designed and nominated by architects DMV Architecture, with the main contracting carried out by Jeremy Delport Construction. The contrast of the building's solid exterior with a light and airy interior succeeds in creating a welcoming and connecting space.
- In the SAISC Steel Awards Commercial Category, the building constructed for KTM Raceworx made innovative use of a steel frame system with cellular beams to support the floors and accommodate HVAC and other services. The nominator in this instance was Macsteel while the structural engineer and main contractors were J and C Structural and Civil Design.
- The Association of Steel Tube and Pipe Manufacturers of South Africa's (ASTPM's) Tubular Category was won by the structure Fourways Mall Promotions Court. As part of the upgrade of the Fourways Mall, the new roof is essentially a tubular structure, which is lightweight and aesthetically very pleasing. The nominator and steelwork contractor was CADCON (Pty) Ltd, and the architects were Boogertman & Partners.
- In the Safintra South Africa Factory and Warehouse category, top honours went to Chilleweni Cold Storage Solutions. Constructed in Gosforth Park Germiston, the building's fresh design approach has given rise to a visually appealing industrial, fit-for-purpose industrial building. The nominator was Global Roofing Solutions, the structural engineers were DG Consulting Engineers and the architect was Empowered Spaces Architects.
- The SAISC Steel Awards Bridges Category went to the CTICC Skybridge, which connects the Cape Town International Convention Centre with the CTICC East Expansion. This bridge allows the two buildings to function effectively as an integrated unit and epitomises the CTICC's main purpose of connecting people. The nominator was Anchor Steel Projects, while the architects of this graceful structure were Convention Architects. The steelwork contractor and steel erector was Anchor Steel Projects.

The SAISC is profoundly grateful to major sponsors Aveng Trident Steel, which sponsored the Durban and Cape Town events and was the national entertainment sponsor; and BSI Steel, which sponsored the Johannesburg event. In addition, the SAISC would like to thank Cadex Systems SA for sponsoring the photo competition and Macsteel for the Digital Trailblazer sponsorship responsible for the Steel Awards App. "We are also indebted to NJR Steel, Stewarts and Lloyds, Pro Roof Steel and Tube for the sponsorship support of the Steel Awards," Trinchero continues.

"Aveng Trident Steel is proud to be associated with the SAISC annual Steel Awards. We are very pleased at the quality and innovation of the entries, and trust that this is the forerunner of an improved South African steel industry and overall economy," says Hercu Aucamp, managing director of Aveng Trident Steel.

Commenting on behalf of BSI Steel, Sales Executive Peter Smith says: "We are proud to be sponsoring this event and would like to thank the SAISC and all the role players involved for the hard work and time that they have invested – not only into the Steel Awards, but into the growth and development of the steel construction sector, too."

"In the light of the current economic pressures we face in South Africa, we are hugely encouraged by industry's response to, and involvement in, this year's Steel Awards – the sponsorship, the number of awards and the diversity of every aspect from the entries to the judging panel and sponsors," says Trinchero.

"South Africa needs a healthy and vibrant steel construction industry, and this year's highly successful Steel Awards event will do much to showcase not only the capabilities of steel as a material of construction, but also all the amazing people who work throughout the entire sector to promote the future sustainability of our industry," he concludes. ❑

High frequency for small vessels

VEGAPULS 64 allows for more flexibility in the chemical industry.

Engineers, including those in technical centres and pilot installations, have often times run up against limits when they try to use radar level measurement technology in very small production setups.

Factors like the dead band of the sensors, the size and design of the antennas as well as the measurement uncertainty at the tank bottom have led them to use weighing systems or pressure transmitters instead.

VEGA's VEGAPULS 64, the world's first radar level sensor for liquids with 80 GHz, includeds an antenna system integrated directly into the process fitting. Since no antenna protrudes into the vessel, it is possible to measure up to the process fitting itself. This gives greater flexibility because almost all of the container volume can be utilised.

Thanks to the tightly focused measuring beam, with an antenna diameter of 80 mm, the transmission signal has an opening angle of just 3° and using the instrument in tanks with heating coils and agitators has become much easier. Another advantage of VEGAPULS 64 is its larger dynamic range which results in higher measurement certainty, especially when there is build-up, condensate, foam or a turbulent liquid surface in the vessel.

In pilot plants or in applications where a very high chemical resistance is required, glass facilities are often used. Because of the small sensor dimensions and the small process fittings, the VEGAPULS 64 can easily be adapted to these applications. Radar sensors are able to measure the level of the product through the surface of a glass container. The good focusing of the VEGAPULS 64 makes this much easier than in the past when big antenna systems were necessary.

In recent years, non-contact radar level measurement technology has taken over many applications in the chemical industry. The big advantage of radar technology is its immunity to process conditions such as temperature, pressure and density. With the VEGAPULS 64, levels can now be measured in applications where the process and structural conditions were previously not suitable for radar.

www.vega.com/radar

Africa Energy Indaba 2020

3 – 4 March 2020 at CTICC, Cape Town

The South African Renewable Energy Council (SAREC) is consulting with Minister of Mineral Resources and Energy, Gwede Mantashe, on the significant contribution of renewable energy in accelerating growth. One noteworthy solution introduced by discussions is to increase the time frames for power purchase agreements in order to lower tariff charges.

These initiatives can range from offering previous coal miners employment preferences in the new renewable energy projects, to establishing manufacturing enterprises that have capacity to supply renewable plants. Ultimately, a long-term framework is necessary to realise the shared vision along with a steadfast plan to lower scepticism regarding the impending change through just transition and its reinforcement.

This sentiment coincides with the debates and discussions set to take place at the Africa Energy Indaba from 3 – 4 March 2020 at CTICC, Cape Town. Sessions will delve into renewable energy as a viable investment option for economic growth, thereby utilising climate change as an opportunity rather than a looming threat. ❑

Bulk bag discharger with safety cage

Flexicon has introduced the new BULK-OUT™ Model BFF Bulk Bag Discharger, which has a steel safety cage to prevent contact with moving parts during operation and automated unloading of bulk bags. The enclosure features externally-mounted controls and full height doors with an Intrinsically Safe Relay (ISR) that halts operation when the door is open.

The discharger is equipped with top-mounted receiving cups and a removable bag-lifting frame for forklift loading of bulk bags. Z-CLIP™ strap holders at the frame extremities allow rapid, secure insertion and removal of bag straps.

A manual SPOUT-LOCK™ clamp ring positioned atop a pneumatically-actuated TELE-TUBE™ telescoping tube provides quick, dust-tight connections between the bag spout and hopper, and maintains downward tension on the spout as the bag empties to eliminate creases, folds or bulges that could hinder material flow.

Additional flow promotion is afforded by FLOW-FLEXER™ bag activators that raise and lower opposite bottom sides of the bag at timed intervals, loosening compacted material and directing it into the discharge spout. As the bag lightens, the stroke of the bag activators increases, raising the bag bottom into a steep 'V' shape, while top-mounted POP-TOP™ extension devices elongate the entire bag, promoting total discharge with no manual intervention.

The universal flanged outlet of the hopper allows connection of a rotary airlock or charging adapter to feed optional pneumatic or mechanical conveyors, or other downstream equipment. This unit is constructed of carbon steel with a durable industrial finish, with stainless steel material contact surfaces, or in all-stainless steel finished to food, dairy or pharmaceutical standards.

The company also manufactures bulk bag conditioners, bulk bag fillers, flexible screw conveyors, tubular cable conveyors, pneumatic conveying systems, bag dump stations, drum/box/container tippers, weigh batching and blending systems, and engineered plant-wide bulk handling systems with automated controls.

Steel safety enclosure of BULK-OUT™ Model BFF Bulk Bag Discharger ceases operation of moving parts when safety interlocked doors are open.

sales@flexicon.co.za

WEG DRIVES EVEN MORE EFFICIENCY TO YOUR SYSTEM

A WEG Variable Speed Drive and motor combination will meet and exceed the highest efficiency standards as defined by the European standard for efficiency for VSD and motors combined, EN50598 (IEC61800-9).

ZEST
WEG Group

0861 009378 | www.zestweg.com | info@zestweg.com

CONVEY

FLEXI-DISC™ Tubular Cable Conveyors gently slide fragile foods and non-foods through smooth stainless steel tubing routed horizontally, vertically or at any angle, over short or long distances, dust-free. Single or multiple inlets and outlets.

DUMP

FLEXICON™ Manual Dumping Stations allow dust-free dumping of bulk material from bags and other containers. Automatic reverse-pulse filter cleaning allows continuous, efficient operation. Available with integral bag compactors for total dust containment.

UNLOAD

BULK-OUT™ Bulk Bag Dischargers unload free- and non-free-flowing solids from bulk bags automatically. Allows untying, discharging, retying and collapsing of bulk bags—all dust-free. Available with weigh batching controls.

CONDITION

BLOCK-BUSTER™ Bulk Bag Conditioners loosen materials that have solidified during storage and shipment. Variable height turntable positions bag for hydraulic rams with contoured conditioning plates to press bag on all sides at all heights.

FILL

SWING-DOWN™, REAR-POST and TWIN-CENTREPOST™ Bulk Bag Fillers can fill one bulk bag per week or 20 per hour at the lowest cost per bag. Numerous performance options. Available to industrial or sanitary standards.

CONVEY

FLEXICON™ Flexible Screw Conveyors transport free- and non-free-flowing bulk solid materials from large pellets to sub-micron powders, including products that pack, cake or smear, with no separation of blends, dust-free at low cost. No bearings contact material. Easy to clean quickly, thoroughly.

CONVEY

PNEUMATI-CON™ Pneumatic Conveying Systems move a broad range of bulk materials over short or long distances, between single or multiple inlet and discharge points in low to high capacities. Available as dilute-phase vacuum or positive pressure systems, fully integrated with your process.

TIP

TIP-TITE™ Container Tippers dump bulk material from drums (shown), boxes or other containers into vessels up to 3 metres high. Dust-tight (shown) or open chute models improve efficiency and safety of an age-old task.

SUCCEED

The FLEXICON™ Lifetime Performance Guarantee* assures you of a successful result, whether you purchase one piece of equipment or an engineered, automated plant-wide system. From initial testing in large-scale laboratories, to single-source project management, to after-sale support by a worldwide network of factory experts, you can trust your process—and your reputation—to Flexicon.

SOUTH AFRICA
sales@flexicon.co.za
+27 (0)41 453 1871

UK +44 (0)1227 374710
GERMANY +49 170 818 76 13
FRANCE +33 (0)7 61 36 56 12
SPAIN +34 930 020 509
USA +1 610 814 2400
AUSTRALIA +61 (0)7 3879 4180
SINGAPORE +65 6778 9225
INDONESIA +62 81 1103 2400
CHILE +56 2 2415 1286

Flexicon™ .co.za

HH-0741