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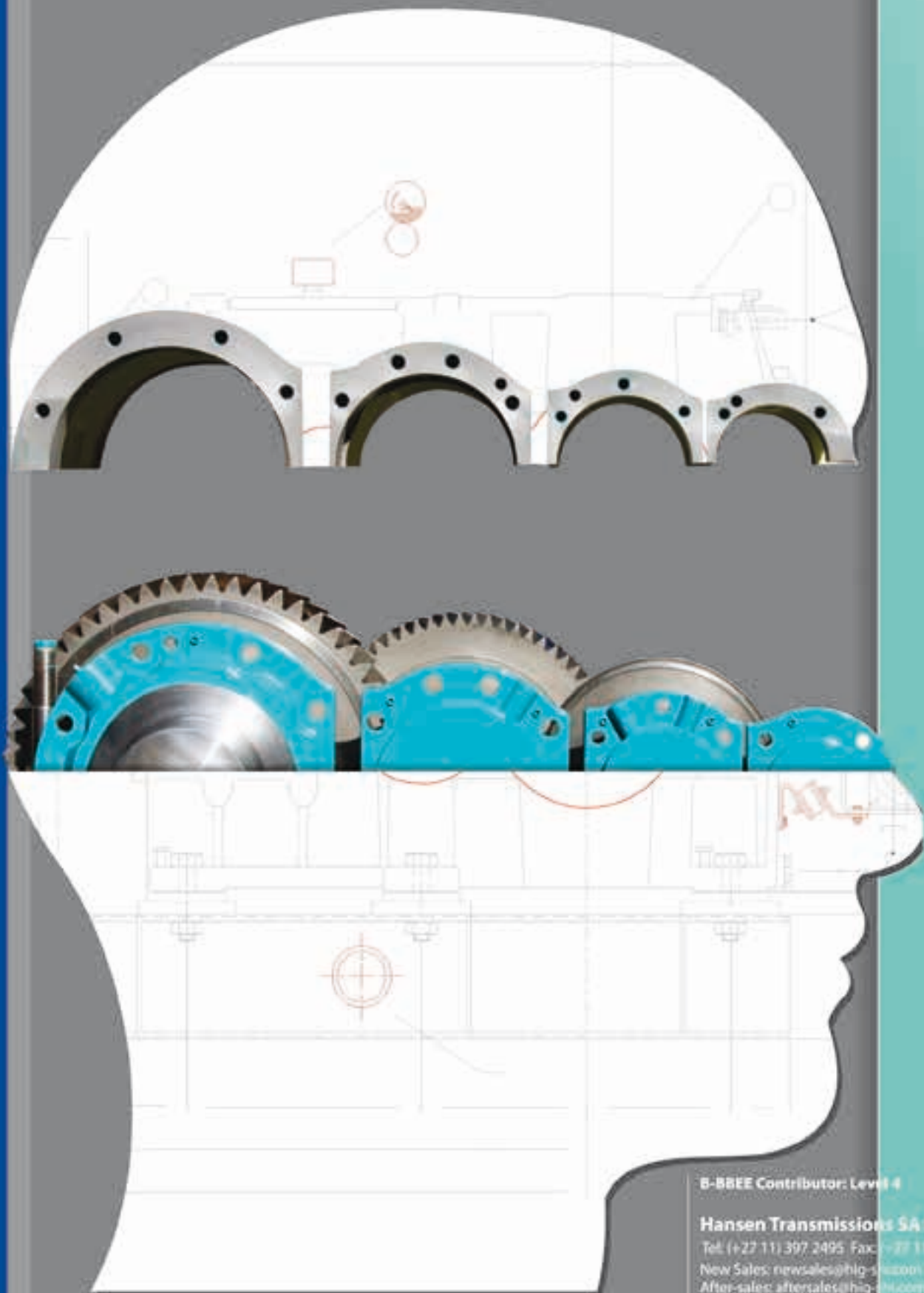


## THIS MONTH:

- The bounty of nothingness
- South Africa's mobile vacuum OEM
- Work harder and smarter in times of crisis
- Adding value: from CAD design to manufacturing efficiency

# MECHANICAL

# Think inside the box!



B-BBEE Contributor: Level 4

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## Adapting to changed economic times

According to an article called *'Crash course: the origins of the financial crisis'*, published by *The Economist*, the 2008 collapse of Lehman Brothers in the US triggered a global 'credit crunch' that transformed a 'nasty downturn' of a year earlier into the 'worst recession in 80 years'. Commentators were soon highlighting the long-term nature of any return to 'normality'.

The article points out that ongoing massive monetary and fiscal stimulus has resulted in a feeble recovery, but global GDP is still way below its pre-crisis peak in rich Western countries – and seven years later, every time the US Federal Reserve attempts to 'scale back efforts to pep up growth, witness the wobbles in financial markets'.

In South Africa, from a real GDP growth of 5.5% in 2007, we dropped to a not catastrophic 3.6% in 2008, followed by a -1.5% recession, which only hit in 2009. We bounced back to 2.8% in 2010 and achieved 3.2% in 2011, which was attributed to the FIFA World Cup of 2010 and its associated infrastructure investment programme, along with the industrial activity generated by the Medupi and Kusile Power station projects.

Ever since, however, growth has been hovering below and around 2.0%, with no obvious signs of 'bouncing' – and the World Bank forecasts that growth in South Africa will only rise to 2.4% by 2017.

In 2015, on top of the power crisis that came to a head earlier in the year, we have experienced commodity price collapses that have hit our primary steel and ferroalloy producers very hard. Also, the Rand has hit record lows against the US\$, the Euro and the Pound. Towards the end of August, with some 19 000 more mining jobs reported to be at risk, the mining industry, unions and the government signed a broad plan to 'stem a wave of job losses'.

Is this a new normal? SEW-Eurodrive's Raymond Obermeyer believes so, suggesting that we are now living in different economic times, even to those of the 2007 to 2014 period. He describes several initiatives he believes will contribute to the company's sustainability in this leaner economic reality.

First among these is service. "Since industrial clients are not investing in new machines, they have to extend the life of existing assets, and this is keeping our service department very busy," Obermeyer says. At SEW-Eurodrive more service staff are being taken on and trained and all local branches are being equipped to better service their local industries. "To enable smarter working practices, staff training is key.... Ultimately, it is the hard work and smarter capabilities of our staff that will enable SEW to better meet and understand the needs of customers," Obermeyer says.

Service excellence has always been a differentiator for industrial customers but, when margins are tight and productivity can make or break a company, the benchmark is inevitably higher. Says Obermeyer: "All deliveries are urgent in today's market, so it seems senseless to differentiate between them."

Localisation is another key survival strategy. SEW-Eurodrive has an established assembly facility in Nelspruit for its large IG range of gearboxes, which supports many local supply industries in the area and ensures that these heavy gearboxes can be supplied to local customers at lower prices than imported equivalents.

In addition, the company is regionalising its localisation drive by equipping all its regional branches with final drive assembly capabilities. In this way, local branches can be of service to local plants from ordering through to commissioning. Final assembly and acceptance testing can then take place at local level, reducing delivery times and travelling costs.

"We are striving to make it easier for staff to win business and for our customers to take up business opportunities with us," notes Obermeyer, "by working harder and finding smarter ways of meeting industry's needs."

In this issue, we feature several other stories about successful companies that clearly follow 'work harder and smarter' principles, local successes such as Highveld Vacuum, working out of a farm in Wonderfontein near Sasolburg, and Unique Hydra, an OEM for hyperbaric diving support vessels in Cape Town. Such businesses are generating their own local IP, employing local people in their regions and fostering local support industries.

As a nation, shouldn't we all – government, industry, citizens and labour unions – be single-mindedly focused on "making it easier for staff to win business" and for "customers to take up business opportunities"?

It is far from obvious that growth rates of 5.0% are likely to return, yet we continue to helplessly depend on high growth rates to reduce unemployment and its inevitable consequence, poverty. We have to find ways to adapt to the leaner times, ways that, as Obermeyer points out, will involve us all working harder and smarter.

*Peter Middleton*



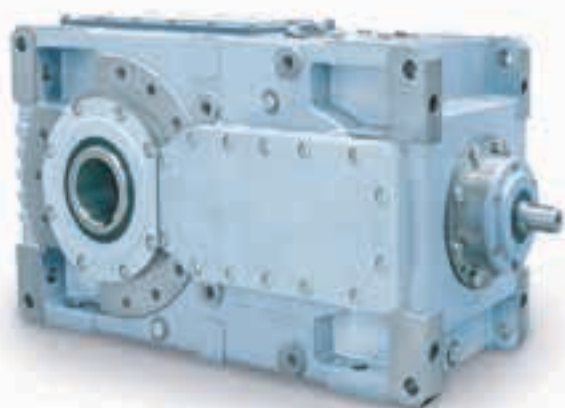
**BONFIGLIOLI***Power & Control Solutions*

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# When Size Matters

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

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

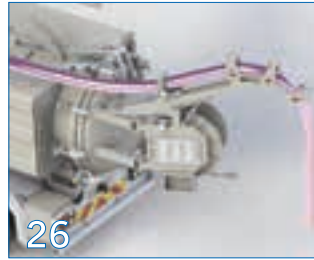




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## ON THE COVER



### Product customisation and evolutionary development

*MechTech* talks to Brian Abbott and Ernst Smith – SMC Pneumatics South Africa's team of product managers – about the company's different approach to customisations and specials and how these enable the company's offering to better match the specific needs of global customers.

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# Product customisation and evolutionary development

*MechTech* talks to Brian Abbott (left) and Ernst Smith (right) – SMC Pneumatics South Africa’s team of product managers – about the company’s different approach to customisations and specials and how these enable the company’s offering to better match the specific needs of global customers.



**S**MC Pneumatics is a global pneumatics market leader specialising in pneumatic control engineering in support of industrial automation. The company manufactures a broad range of pneumatic equipment and associated control systems, such as: directional control valves; pneumatic cylinders and actuators; valve terminal blocks; electrical actuators and controllers; air line filtration and drying equipment; ionisers and a host of supporting components for automation systems and control applications.

“SMC does a lot of things differently,” begins Smith. “As product managers, for example, Brian and I will be working as an integrated team to support the entire range. I am electrically qualified so I am more comfortable with the motor controllers, electric actuators, flow and pressure sensors, fieldbus interfaces, and other electrical devices such as valve manifold solutions, while Brian is mechanically qualified and experienced in all the pneumatic and hydraulic actuators, valves and the motion axes of machines. But we will be taking an integrated approach to the vast product range available from SMC,” he says.

SMC’s global product range lists some 12 000 basic component types, and each one of these is further split to accommodate different sizes, strokes and options. “If all of these are considered, then we offer around 750 000 product variations – all of which are individually available as standard products,” Smith says.

Citing the CP96 ISO standard pneumatic actuator as an example, he says: “The CP96 comes in 32, 40, 50, 63, 80, 100 and 125 mm bore sizes. Then every one of those sizes is available, off-the-shelf, with strokes of 25, 50, 80 and a number more, up to 800 mm. CP96s are available with a single or a double rod, they come with or without sensing magnets, with rubber boot rod protectors of varying length and with several rod end options. And it does not end there, either.

“These are all within SMC’s standard product offering. It is easy to see why SMC has developed an online configurator program to help customers to configure parts exactly to their specification,” he tells *MechTech*. “With so many standard variations, it is logical, efficient and less costly for users to stick to standard options when designing new machines or systems. Customisations are a little more expensive and the availability and servicing becomes easier when one of the 750 000 standard products is being used.

“But, having served customers in almost every imaginable industry for many years, we have reached the conclusion that it is impossible to meet every specific need from the standard product range. Customers always seem to have a cabinet that can’t accommodate a standard actuator and the closest standard product is either too long or too short.

“SMC listens to customers. And because we have been listening for a long time, we have been able to identify a host of extra ‘made-to-order’ options (X-options), to accommodate non-standard variations – a dimension shift, for example, or industry specific features, such as the use of non-wetting grease in automotive assembly plants to prevent problems during spray-painting,” Smith says, adding, “while this is a special requirement, it is common to the worldwide automotive industry, so we provide it as an X-option.



*SMC Pneumatics’ standards product range includes some 12 000 component types with 750 000 standard variations.*

Adds Abbott: “I like to call these X-factors and for every product type there are many of them. For the CP96 actuator, for example, we offer industry specific options for automotive, the food industry and clean room environments; higher pressure options, since our standard products operate at 8.0 bar while some special applications require 12 bar; extreme temperature options, down to -40 and up to +150 °C; different thread size options; smooth shafts; heavy duty scrapers; special rubber seals and special rod and cylinder material options.

“We can also offer double cylinder solutions with multiple strokes. A 50 mm and a 100 mm dual-stroke double cylinder solution, for example, offers a 50 mm stroke with the shorter cylinder extended, a 100 mm stroke by actuating the longer cylinder and 150 mm by actuating both at the same time,” he explains.

“But while these X-factor options are not actually on the shelves, they are readily available as pre-designed and pre-costed customisations,” continues Smith. “The customisation procedures are established and so the prices are known. When ordering, whether it is a single non-standard option or one with multiple X-factors, the quote is immediately available and easily converted into an order with its unique part number,” Smith says.

“And the unique part number stays on our record, so the exact non-standard part can be precisely replicated at any



**Above:** Based on the UK-model, SMC South Africa will offer X-factor and quickly implementable RFS customisations from its Midrand facility. Valve manifold assemblies will also be accommodated in the new South African facility. **Right:** Valve manifold assemblies will also be accommodated in the new South African facility.

time in the future,” adds Abbott.

X-factor customisations involve special assembly and machining, which will be accommodated at SMC Pneumatics’ 4 000 m<sup>2</sup> South African facility currently nearing completion in Midrand, Gauteng. “SMC has invested some R15-million on machining and tooling equipment for this new facility to accommodate customisations such as these,” Smith assures.

The X-factor option, however, is only the first level of customisation that has now become available to South African customers. If a customer’s needs cannot be accommodated via X-factor options, then an SMC sales engineer will help the customer generate what we call a ‘request for special’ or RFS. “If you need to retrofit a CP96 to an existing bracket and the standard holes don’t line up for example, then an RFS customisation may have to be done to drill the mounting holes in different positions,” says Abbott. “Or the standard piston rod material might not be suitable for the application. These are very specific modifications that are not covered by the X-factors and these go through to a team of engineers in our European Technical Centre, based in Milton Keynes England. They assess, design and quote on these more complex customer requirements.

“Locally, with the machine tools we will have in the new facility, many actuator rod special modifications can be accommodated. In the SMC world these customisations are termed ‘simple specials’ and many can be found in our standard catalogue. Most suppliers have a customisation offering, but few will do these detailed customisations such as

moving the mounting holes or adding a pin hole through the rod tip,” Smith believes.

As well as the investment in the machine shop, the current production manager for SMC’s UK production facility, Peter Austin, will be coming to South Africa for a year to manage local production, transfer skills into South Africa and to make sure the facility achieves its customisation goals.

“And while South Africa is a smaller operation than SMC UK and SMC Japan, Peter knows the capability of the UK facility, so if we do not have the local capability to deliver the customised request, we can get it done in the UK within a targeted maximum time of 10 or so days,” says Smith.

“Further, if the RFS is something that the UK has not seen before, then it will be sent to SMC Japan, which will decide whether it is possible or cost effective to supply the customisation. In the case where Japan can’t supply the specific RFS, then it will be passed onto SMC’s global research and development team. While the customer may have to find an alternative solution in the short term, the RFS will be logged and retained for future reference and action. Should similar requests come from other customers around the world, then SMC will invest in the development of a solution, which will be made available to all users via a new X-factor or a quickly implementable RFS,” he explains.

“In this way, we are a company that continually improves its offering. SMC listens and uses the RFS to identify evolving needs in the market,” Smith informs *MechTech*.

“By offering engineering services through X-factor, simple specials or RFS customisations, we are able to retrofit older machines with our more modern components or supply components to best match the designs of new machines,” continues Abbott. “Customers that do not have the machines, skills or component knowledge benefit, not only because of the convenience, but any modification completed in our facility will be fully tested and certified to comply with SMC’s global quality standards. Modifications made haphazardly at a jobbing shop may fail prematurely, impacting the reliability of the machine and the success of the entire operation,” he warns.

During the RFS request, there is continual and up to date communication between the European Technical Centre and our own people here in South Africa. All communications are recorded and time frames given. Once a proposed solution has been found, drawings are made and a quote generated. Only once the drawings and quote have been accepted by the customer will the manufacturing process begin,” says Abbott.

“Ultimately, our goal is to accurately match the processes and systems requirements of our customers,” Smith says. “SMC is systematically evolving based on accumulated RFS requests across the globe. This is a key differentiator. We do some research based on futuristic concepts, but we also focus on the present demands and requirements of our market. By doing this we are continually servicing and developing solutions to better meet the real needs of real customers,” he concludes. □

## Atlas Copco promotes clean water in Malawi

Atlas Copco, a leading provider of sustainable productivity solutions, will play a key role in bringing clean water to a rural area of Malawi through its employee-driven Water for All organisation and the Peter Wallenberg Water for All Fund.

Commencing in October 2015, Water for All will finance the installation of infrastructure and facilities that promote clean water, sanitation and hygiene in Malawi. The project, which is expected to benefit some 28 000 locals in approximately a dozen villages and rural communities situated in the south-eastern region of the country, is financed through donations to the Peter Wallenberg Water for All Fund, to which Atlas Copco is one of the larger contributors.

Water for All, Atlas Copco's primary community engagement initiative, was founded by Atlas Copco employees in Sweden 31 years ago, on August 22,

1984. The mission of this non-profit, employee-run organisation is to provide people in need with long-term access to potable water. Today, Water for All has representation in more than 40 countries and supports projects all over the world. Through voluntary donations boosted by the Atlas Copco Group, this organisation has thus far provided clean drinking water to more than 1.5-million people around the world!

The Malawi project was made possible thanks to Atlas Copco employees'

2014 global collection in celebration of the 30<sup>th</sup> anniversary of Water for All, which also involved a number of employees from Atlas Copco South Africa. "Our local Water for All initiative, which was started in 2009, has provided clean water for disadvantaged communities in KZN and Limpopo, thanks to the generous support of approximately 15% of our employees," states Kgothatso Ntsie, Atlas Copco South Africa's corporate communications manager, South and sub-Saharan Africa.

[www.water4all.org/us/](http://www.water4all.org/us/)



## SMC to co-sponsor the PneuDrive Challenge

SMC Pneumatics South Africa recently stepped forward as co-sponsors of the 2016 PneuDrive Challenge, the engineering design competition for mechanical, electronic and mechatronic engineering students in South Africa.

Adrian Buddingh (above), general manager of SMC Pneumatics, believes that systems integration is not often fully realised at a university level. "This competition offers students an opportunity to get exposed to and consider other engineering disciplines apart from those covered in their separate faculties. Showing how unusual pneumatic and drive components can be pulled together in a competition-type experience is a first taster of what they will experience when

they get into industry," he explains.

In the engineering industry, employees of the future will need to be problem solvers, planners, designers and application constructors. They will need to apply innovative ideas and solutions across interrelated disciplines. These are learning skills that cannot take place within the context of a traditional four-year academic degree – learning skills that subject matter experts at SMC Pneumatics are willing to encourage by interacting with students.

"We are confident that we can achieve this through the PneuDrive Challenge," Buddingh concludes.

Industry themes and problem statements for the 2016 competition will be announced before the end of the year.

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



Atlas Copco is bringing clean water to benefit some 28 000 locals in rural of Malawi.

## Eaton opens Experience Centre

Power management company, Eaton, has launched its first ever Experience Centre in South Africa. The Centre is designed to showcase Eaton's innovations in key segments, including commercial construction, renewable energy, data centres, oil and gas, mining and utilities. It also exhibits Eaton's innovative products and solutions for customers operating in mobile and industrial hydraulics applications as well as in the automotive industry.

Having been in Africa since 1927, Eaton understands the local needs of its customers. This can be seen through the numerous practical demos at the Experience Centre, which simulate real time solutions for local industry challenges.

During the launch event, Eaton also launched the Hybrid Inverter, an energy saving and backup power system that allows for continued power during load shedding. It runs on energy from the sun

and can power small to medium enterprises, amongst others, switching between main power, solar power as well as battery power – depending on availability. This solution comes at an excellent time as South African businesses are in need of alternative power solutions that ensure uninterrupted productivity and profitability during power outages.

"There is no better time to launch the Hybrid Inverter as the demand for uninterrupted and affordable power continues to grow. This solution is advantageous to all sectors providing secure power and, in turn, up time and productivity. I encourage business to take the time to come to the Experience Centre to view this innovative solution, which will be available to customers soon," says Shane Kilfoil – managing director at Eaton, Africa.

"Eaton's unparalleled dedication to leadership in mobile and industrial applica-

tions has made us one of Africa's preferred suppliers of hydraulic solutions and we are excited to have our latest innovations demonstrated at the Experience Centre," adds Craig de Vasconcellos, regional sales manager for the hydraulics division at Eaton, sub-Saharan Africa.

"We also provide automotive and commercial vehicle manufacturers in South Africa with products and systems that are designed to improve a vehicle's overall efficiency, performance and safety. At the Experience Centre, visitors can gain first-hand experience of our highly engineered products and solutions," says Tom Kellett, sales, technical support and aftermarket manager for the vehicle division at Eaton, Africa.

The Experience Centre will allow visitors to engage with Eaton's business consulting experts from across the region to help customers to make informed technical and business decisions.

[www.eaton.com](http://www.eaton.com)



## BMG acquires Hansen Transmissions SA

BMG, part of Invicta Holdings Limited, has acquired Hansen Transmissions South Africa (HIT-SA) from Hansen Industrial Transmissions, part of the Sumitomo Group. The South African Competition Commission has approved this strategic acquisition, which came into effect on 30 September 2015.

"HIT SA, which assembles and distributes Sumitomo and Hansen branded industrial gearboxes throughout Southern Africa, now forms part of BMG's electro-mechanical division," says Mark Barbour, BMG business unit manager. "Through this acquisition, BMG broadens its mechanical drives range and strengthens its long term partnership with Sumitomo

as the exclusive local distributor of Sumitomo speed reducers.

"With the combination of HIT SA's established position in industry and BMG's technical engineering solutions service and extensive distribution reach, the Group is set to significantly extend its market share across Africa. Sectors for growth include oil and gas, power generation and coal mining."

BMG, with 12 specialist divisions and a national network of over 180 branches – boasts a team with advanced technical skills to support the company's commitment to optimising productivity and enhancing process plant operating reliability. [www.bmgworld.net](http://www.bmgworld.net)



From left: Fritz Fourie, managing director, HIT SA; Gavin Pelsler, managing director, engineering, BMG; Charles Walters, chief executive officer, Invicta Holdings Limited; Byron Nichles, chief executive officer, BMG; and Shaun Dean, chief executive officer, Hansen Industrial Transmissions nv.

## Technology intervention for sheet metal manufacturer

Assistance from the DST's Firm Technology Assistance Programme (FTAP) has enabled Calculus Products to design a unique lightweight and cost-effective service vehicle toolbox for Eskom maintenance vehicles, reducing the expenditure of state-owned companies (SOCs) on service vehicle fleets and reducing manufacturing time.

Calculus Products is a turnkey sheet metal fabricator with high-accuracy manufacturing capabilities. As a supplier to SOCs, the company was selected to form part of government's drive to improve the competitiveness of local OEMs.

"After understanding Calculus' needs, we approached the Institute for Advanced Tooling (IAT) at Stellenbosch University for its technical expertise in designing the service vehicle toolbox," explains Masande Dlulisa, project manager at the Technology Localisation Implementation Unit (TLIU), a DST-supported initiative

hosted by the CSIR.

"The toolbox has retained full functionality and is manufactured faster and at a reduced cost. Eskom is in consultation with Calculus to test the toolbox as a first step towards national deployment."

This technology intervention has led to increased market share and associated job opportunities for Calculus Products as well as enhanced manufacturing skills. Depending on orders generated from the project, Calculus Products' staff complement could increase by as many as 30.

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



Calculus Products' new toolbox for Eskom maintenance vehicles.

## In brief

**The Weir Group (PLC)** has appointed Ricardo Garib to its Group Executive as divisional MD of the Weir Minerals Division with effect from January 1, 2016. Garib will succeed Dean Jenkins, who will join the Board as Chief Operating Officer, also effective from January 2016. Garib has led Weir Minerals' operations in Latin America since 2001, having previously been MD of the business in Chile.

**VTT Technical Research Centre** of Finland and **Nurmi Cylinders** have developed a cost-effective 3D-printed, reliable hydraulic valve manifold block that is 66% lighter than the original part. The internal channels are optimised for oil flow and space saving, while the potential for leakage is removed because auxiliary access bores, which have to be blocked, are no longer necessary.

**iSolar**, through assistance from the **DST's Firm Technology Assistance Package (FTAP)**, has added a 100% local content, low-cost 100 ℓ SABS-approved solar water heater with a flat plate collector and stainless inner tank to its product range. As a result, the company has secured a contract to supply 463 solar water heaters to the City of Cape Town for a housing project in Langa.

Hosted by **Rockwell Automation** and members of its Partner Network programme, the 2015 Automation Fair event will take place on November, 18 and 19 in Chicago. The show will showcase the latest advancements in tools, technologies, services and solutions to help drive profound changes across the automation investment life cycle.

South African based fan and ventilation firm, **MechCaL**, has announced that their fans will be rolled out to the Zambian mining market. This marks a key point in the company's ongoing geographic expansion strategy, aimed at increasing its presence in key growth markets.

**Rand Air**, the compressed air rental specialist, has obtained Quality Standard ISO 9001 certification in order to provide the service levels mining customers need for business sustainability, health and safety, quality and environmental standards.

In an article entitled 'Digital data centres are the future, is your service provider ready?' **Wipro's** Milind Halepath, GM and Global Head of Data centre Practice says: "Changing technology, and the resultant changes to business environments requires a far more flexible approach from service providers."

# Vacuum trucks and telehandlers launched at Bauma

During September, the Goscor Group of Companies launched several exciting new machines at IFAT and BAUMA Conexpo 2015. Goscor Cleaning Equipment showcased its proudly South African vacuum and cleaning technology, while Group company Bobcat released its new Roto telescopic handler.



At the HPVR-1000 launch are, from left: Gregory Venter, GM Goscor Cleaning Equipment; Jean Visser, head of engineer at Highpoint Vacuum; Derek Watts, launch MC; Tony Siddle, chairman of the Goscor Group; and David Gade, MD of Highpoint Vacuum.

The IFAT Environmental Technology Forum Africa presented the ideal platform for Goscor Cleaning Equipment to launch, on 17 September 2015, two vacuum trucks and a Mobile Vacuum Trailer built by local specialist vacuum manufacturer, Highpoint Vacuum.

First in the impressive line-up was the new HPVR-1000 Jetting/Vacuum combination truck with a unique water recycling capability that presents a first for South Africa. Purpose-built for cleaning sewage and storm water drains, the HPVR-1000 recycler's impressive jetting and vacuum capacities of up to 500 l/min at 200 bar and 3 200 m<sup>3</sup>/hr respectively, make light work of unclogging sand, silt and foreign materials from storm water drains.

"We designed and manufactured this highly specialised vehicle locally with the exception of the recycling system, which we sourced from Dietmar Kaiser, a market leader in this field based in Lichtenstein," says Highpoint Vacuum CEO David Gade. Explaining how the recycling process works, Gade says that once the vacuumed (dirty) water settles in the vacuum tank, it is filtered and for-

ign matter is removed by the recycling system. Water loss is minimal during this continuous process and close to 100% of the water is recaptured for re-use in the jetting process.

Gregory Venter, general manager at Goscor Cleaning Equipment adds: "Recycling jetting water can save up to 20-million litres of clean water per annum, presenting the ideal environmental solution for water-poor countries like South Africa. In addition, the machine's capacity to hold 6 000 litres of clean water saves fuel and time and substantially improves productivity as work does not have to be interrupted by water collection," he says, adding that the recycling system carries a 12 month warranty.

According to Gade, the truck is extremely easy to operate and requires a team of only two or three people. "We provide OEM training to Goscor Cleaning Equipment, which the company then passes on to customers."

"Our three-year partnership with Sasolburg-based Highpoint Vacuum to manufacture and supply a quality range of vacuum truck, air movers, jetting and combination jetting machines has been a win-win for both companies," continues Venter. Established in 2006, Highpoint Vacuum specialises in building its locally designed industrial vacuum and jetting systems on standard truck chassis homologated for on-road use in southern Africa. "The new Mobile Vacuum Trailer is a direct result of our close cooperation and team work with Highpoint Vacuum. This unique machine meets the need that we identified in the market for an easy to set up and manoeuvre machine for plant clean-ups." The unit is powered by a turbo-diesel engine, which drives Highpoint's own unique vacuum pump via a reduction gearbox. The elimination of belts and pulleys increases reliability and reduces maintenance costs for the end-user. Fitted on a heavy duty frame with tandem braked axles and 16-inch



wheels, the compact machine can be conveniently towed behind an LDV to access difficult to reach industrial and mine sites.

Goscor Cleaning Equipment's Bauma stand also exhibited a Positive Displacement Blower (PDB) wet and dry vacuum truck. Featuring a 12 500 l tank capacity, the HPVR-1000 PDB is ideally suited for the efficient handling of a wide variety of materials, from slurries to cement and fly ash.

The mining and industrial trade fair was also the launch platform of one of Goscor Cleaning Equipment's most advanced heavy-duty mechanical-suction sweepers. The new M60's 6,0 m<sup>3</sup> hopper and 6 000 kg net payload ensure unmatched performance in extremely heavy-duty urban and industrial conditions. The machine works dust-free even in the dustiest of conditions thanks to the PM10 large surface filters.

The advanced CanBus (controller area network bus) control system connects all the modules working throughout the machine for maximum effectiveness and efficiency. In addition to the load sensing hydraulic system that reduces fuel consumption, the M60 also features a powerful, quiet suction turbine, 4-wheel power steering and 180° right/left hand side front adjustable brush. Comfortable front and rear suspension, a tilting cab and a central drive position ensure optimum operator comfort.

Rounding off Goscor Cleaning Equipment's display of cleaning technology at this year's Bauma is the Tennant Sentinel power sweeper. The unit's self-adjusting centre-point-suspended main brush efficiently picks up sand, dirt, rocks, broken glass and light bulk debris. The state-of-the-art Sentinel dry



**Above:** Purpose-built for cleaning sewage and storm water drains, the HPVR-1000's recycling system recaptures water for re-use in the jetting process.

**Right:** With a Bobcat man platform attachment the Bobcat TR50210 Rotary Telescopic Handler transforms into an aerial work platform.



dust control system, with its unique twin vacuum design, traps particles as fine as  $3,0\ \mu\text{m}$ , easily meeting the most stringent PM-10 environmental requirements of less than  $10\ \mu\text{m}$ .

Goscor Cleaning Equipment is responsible for all maintenance, service and repair of its vacuum and cleaning machines and equipment. "Our fully qualified after-sales field service team located in various regions around the country is well stocked with parts and spares and offers a rapid 24/7 response to ensure maximum uptime for customers," concludes Venter.

### Bobcat rotary telescopic handler

At an evening function at Goscor Group's Bauma stand, Bobcat Equipment unveiled the flagship in the new four-model Roto telehandler range, the T50210.

"What makes the Bobcat Roto telehandler truly unique is the fact that it offers a 3-in-1 solution," explains Bobcat Equipment's national sales manager, Andre Steenkamp. "When used with a Bobcat pallet fork or bucket, it's a telescopic handler, but by attaching one of our man platforms, the machine transforms into an aerial work platform and by adding a winch or jib attachment, it can be used as a crane." According to Steenkamp, the vast array of Bobcat attachments can be fitted easily in a matter of minutes. "All four rotary models are equipped, as standard, with man plat-

form attachments," he adds.

These versatile, flexible and efficient Roto telehandlers deliver unrivalled value by offering virtually endless possibilities. Efficiency has been incorporated throughout the design of the machines, while improved height and reach, excellent manoeuvrability, ergonomics and low maintenance give new meaning to productivity as the end-user can do so much more on site and perform a greater variety of work in less time using only one machine.

TR50210 Roto telehandlers have four-section booms, offering maximum lifting heights of 20.5 m on stabilisers and 20.3 m on tyres. Its  $360^\circ$  rotating capability improves reach and accessibility, enabling the machine to serve the needs of an entire site from just one position. The machine offers exceptional stability for lifting heavy materials either vertically up to a roof or horizontally onto the edge of an excavated site, providing over 17 m of reach. Load sensing control ensures simple and safe stability management and its four independently controlled stabilisers allow full stability even on irregular terrain.

Driven by 106 kW liquid-cooled diesel power packs, these machines can travel quickly from one job site to another. Compared to a rigid frame telehandler, the Bobcat Roto can cut the time to complete repetitive jobs by less than half, without moving the machine off its stabilisers.

Front-wheel steering is ideal for road

travel while all-wheel steering ensures better on-site handling and a smaller turning radius for negotiating sharp turns in small and narrow spaces. The crab steering function ensures positioning of loads to the side with perfect precision in cramped areas. In addition, the easy-to-use, heavy-duty hydrostatic transmission allows accurate positioning for greater safety and precision, as well as continuous speed control. All the models in the range can be equipped with radio remote control.

Operator safety and comfort is fundamental to productivity and here too the new Bobcat Roto delivers. The oversized ROPS/FOPS cab provides generous space with air-conditioning, road lights, a boom light and a radio/CD as standard features in the T50210. The instrument panel is designed to allow an easy overview of the machine's operating status for increased safety. Low noise levels (104 dB) and low body and hand-arm vibration levels further contribute to operator comfort and reduced fatigue.

All the components and service points are located in the same, easy-to-access place on every machine, thanks to a common platform and consistent design, a feature that greatly facilitates maintenance and maximises uptime.

"Our service and parts department delivers a uniquely wide offering that includes genuine Bobcat parts, tyres and specialised lubricants, service contracts, rentals, repairs, operator training and free technical advice," notes Steenkamp. □

# Work harder and smarter

## in times of crisis

In the light of increasingly tough economic condition in South Africa, Raymond Obermeyer, the new MD of SEW-Eurodrive, talks to *MechTech* about his vision for maintaining the company's positive growth path.



“While we had several damaging strikes last year, during 2015 we entered different times in terms of the economy,” begins Obermeyer, citing business rescue conditions at steel producer Evraz Highveld Steel and Vanadium; the shutting down of Assmang/ARM's last operating ferroalloy smelter in Machadodorp; and the maintenance and care conditions threatening the futures of several other smelters, mines and processing plants.

“Many mines, steel plants and the coal facilities are finding survival difficult and are having to run in crisis management mode. Significantly for our business, very few new projects are being implemented and customers' budgets are extremely tight,” he says. “Since industrial clients are not investing in new machines, they have to extend the life of existing assets, and this is keeping our service department very busy,” he adds.

Obermeyer response to the crisis is proactive: “We are investing significant amounts money and effort into upgrading our entire service offering, starting with staffing levels,” he tells *MechTech*. “We are adding more skilled and experienced artisans and technicians to the company in all three areas of our offering: fitters for the large industrial gearbox (IG) range

and the industrial geared motor offering; along with electronic and mechatronic technicians for our Maxo/variolution products and systems, which include MoviDrives and VSDs,” he says.

“We are striving to make sure that all of our branches are able to offer SEW-Eurodrive's full suite of service offerings. In the past, we have had a nationwide capability on the geared motor side – our historical strength – but to streamline service delivery efficiency, we want all of our branches to be able to supply and service the large IG gearbox range and maxo/variolution products.

While some facilities are using the current slow market conditions to service and upgrade their plants, many others have been forced into operating on lean margins. “Marginal plants are having to run their equipment as hard as possible and these customers depend on excellent service turnaround times when things break down,” he says, adding, “in current times, being able to offer that level of service is not an option, it's a survival imperative!”

With SEW-Eurodrive products being so specialised, he says: “Very few facilities have the skills needed to service our products. So we tend to take care of all servicing and repair on a contract basis, generally through field services.”

To improve service delivery, service centres at SEW-Eurodrive branches are being re-equipped to enable them to do more of the servicing work locally. “They are being fitted with 30 t cranes to cater for the heavier machines, for example. As well as servicing, this will also enable all of them to offer final drive assembly services at local level – fitting motors, gearboxes, couplings and drives onto base-plates for delivery to site as a single unit. This will enable more local retrofit and replacement services for faster turnaround times. The branches are being fitted with tooling and testing equipment required to enable this.

He cites laser alignment equipment as a typical example. “More and more



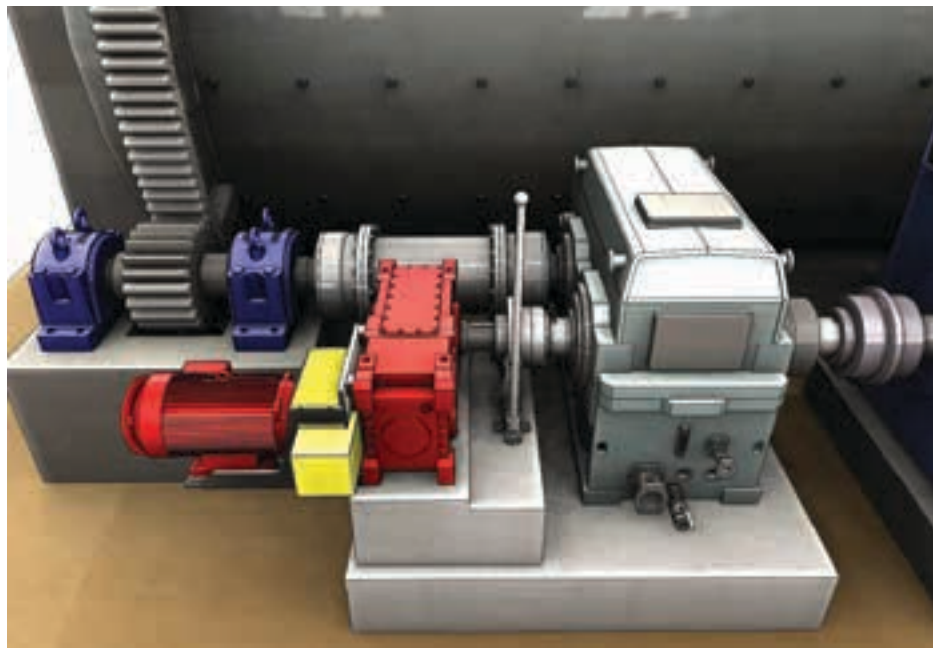
*As well as servicing, all SEW-Eurodrive branches are being equipped to enable them to produce final drive assemblies – fitting motors, gearboxes, couplings and drives onto base-plates for delivery to site as a single unit.*

clients want a fully engineered drive solutions, rather than simply buying an IG gearbox from us and assembling and aligning the motor and couplings on site. To accommodate the need for quick response times and local customisations, we are acquiring R200 000 laser alignment systems in all of our branches.

“The designs need to be close to the customer, so it seems silly to fly a customer from Namakwa Sands to Nelspruit to inspect a final drive unit, when it can be assembled in Cape Town and the acceptance test can be done immediately before delivery,” he adds.

Local assembly of new gearboxes also supports these efforts. “We have now expanded the range of X-series IG gearboxes and we can assemble all of these ourselves in our Nelspruit facility. SEW-Eurodrive's Nelspruit assembly facility was custom-built to meet the company's global specifications,” he says. “It was built as an expansion to the Nelspruit branch, but the facility has expanded several times since assembly began. Initially, we were looking at the Mozambique export/import corridor, which has now fallen by the wayside, but Nelspruit has still been a good choice us. It enabled us to expand quickly into the local platinum industry and, although times are tougher, we remain strong in the region,” Obermeyer relates.

Describing the advantages of local assembly, he says: “Localisation offers



**Above:** Having launched its mill drive offering only three years ago, SEW-Eurodrive has now installed seven of these units locally. It has also recently installed its first girth gear.

**Left:** SEW-Eurodrive's Nelspruit facility has expanded the range of locally assembled X-series IG gearboxes. Local assembly is less expensive than finished units imported from overseas factories, but more importantly, it offers benefits for local industry and jobs in and around Nelspruit.

better availability, shorter lead times and much quicker deliver times. On the service side, because parts and skills have been made available, we can repair all of our own product with fast turnarounds. This is most important in the current climate. Components are readily available and we can react proactively to urgent or special requirements."

He also points out the cost and extended economic benefits. "Because of locally sourced content, such as bearings, seals, shafts, couplings, guards, lubricants and base-plates, locally assembled IG units are less expensive than finished units imported from one of our overseas factories. We are even able to source oil cooling systems locally, and all of this benefits local industry and jobs in and around Nelspruit," he argues.

"Also, although our currency has weakened significantly in recent times, this may end up being good for exports. We are in communication with other countries, who are interested in taking advantages of our weak Rand, and several African countries are US\$-based, so they can also benefit by importing SEW gearboxes assembled in South Africa," he adds.

SEW-Eurodrive's IG gearboxes are a modern, modular design, optimised in terms of torques and ratios to use the minimum number of individual gears and components. The casings are reversible, so the same housing is used for horizon-

tal and bevel helical gearboxes as well as vertical shaft mixer-type units. This makes them ideal for local assembly as fewer parts need to be imported. "As well as platinum, mixing applications and the cement industry have been good for us in recent years and our local market share continues to improve," Obermeyer says.

Having introduced its mill drive offering only three years ago, the company has now installed seven of these units locally. It has also recently installed its first girth gear onto the kiln of Mamba Cement in Thabazimbi.

To further improve response times and efficiency, SEW-Eurodrive South Africa has streamlined its ordering, quoting production and delivery processes. "We have implemented a management system called SLAP – streamlining of logistics and production – to improve our back office efficiency and to switch to push-production. By speeding up production, we have managed to reduce the stockholding required," he says.

The SLAP system can currently track the progress of an order via five confirmation points, letting customers know, for example, whether the ordered product has left internal sales, is 'in picking', on the assembly line, or ready for dispatch. "Ultimately we intend to take the tracking system all the way through to logistics and delivery, so that customers can track delivery progress all the way to the gates of their facilities,"

Obermeyer informs *MechTech*.

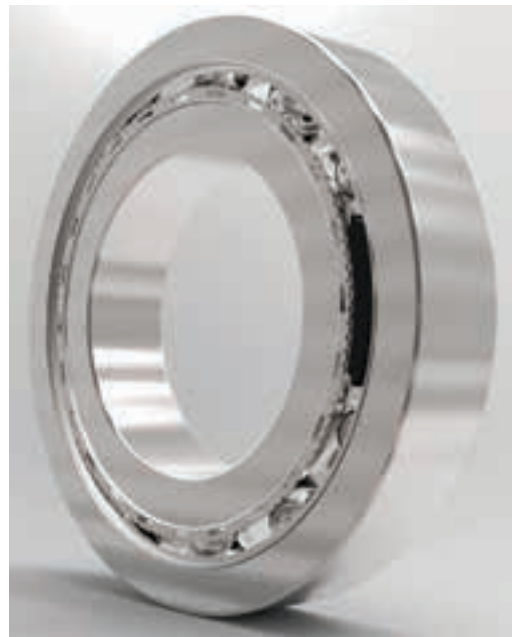
"Going forward, we need to, and want to, become more aggressive. Not in the bullying sense, but by working harder and finding smarter ways of meeting industry's needs. I still believe that there is business out there, but we have to work harder and smarter to get that business.

"Service excellence is the essential element, but in addition, we are removing as many bureaucratic hurdles as possible. We are striving to make it easier for staff to win business and for our customers to take up business opportunities with us. We have, for example, removed many surcharges on the small variations we used to consider as 'extra'. If a mine needs a gearbox, then we will strive to deliver and charge for that gearbox, without adding additional charges for small changes or accelerated delivery. All deliveries are urgent in today's market, so it seems senseless to differentiate between them.

"To enable smarter working practices, staff training is key: All of our staff are going benefit from a renewed training focus from HR. We are looking to use our Drive Academy to improve the capacity of our people in areas from computer and software skills to technical competence. Ultimately, it is the hard work and smarter capabilities of our staff that will enable SEW to better meet and understand the needs of customers," Obermeyer concludes. □

# Intelligent bearing trialled in railway and wind sectors

At the Hannover fair, SKF demonstrated how its revolutionary SKF Insight technology is improving bearing health management in the railway and wind energy sectors.



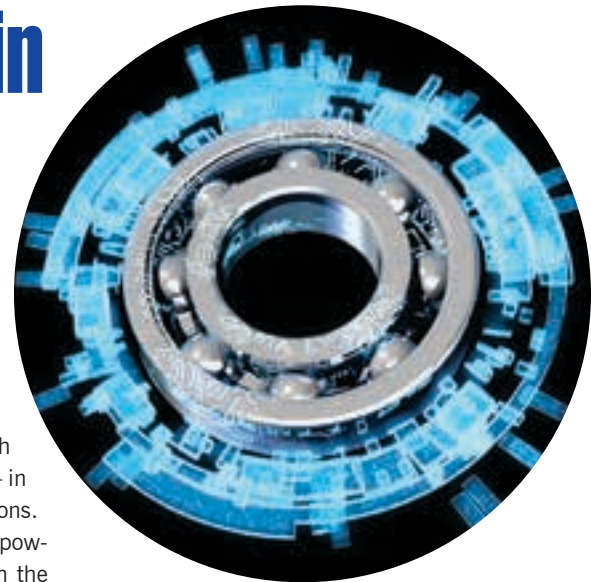
SKF Insight is a revolutionary bearing health management technology.

**S**KF has begun to apply SKF Insight – its revolutionary bearing health management technology – in several high-end industry applications.

The technology, which uses self-powered, intelligent wireless sensors in the SKF bearing to provide instant condition monitoring data via the Internet, is undergoing trials in challenging projects in the wind turbine and railway industries.

Applying SKF bearing health management algorithms to the data provided by SKF Insight enables an adaptive approach to maintenance. While traditional condition monitoring detects bearing damage, SKF Insight spots the abnormal conditions that cause the damage, which allows early action to be taken to prevent damage.

“Insight technology goes beyond current sensorised bearing technology



Insight uses self-powered, intelligent wireless sensors in the SKF bearing to provide instant condition monitoring data via the Internet.

by integrating a broader range of sensors, and can include self-powering and intelligent wireless technology,” says Ronnie Spolidoro, business development manager of SKF Insight “These bearings are connected to the SKF Cloud, giving customers access to a range of SKF diagnostic and support services, which ensure complete bearing health management.”

SKF Insight monitors dynamic para-

## Oil-free, energy-efficient magnetic bearing system

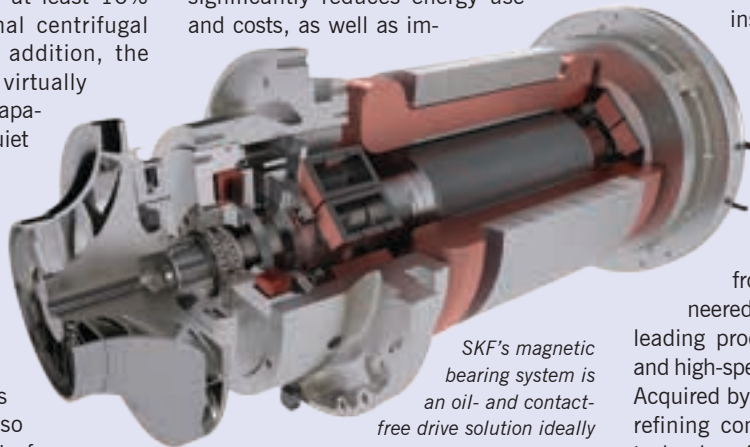
**S**KF has launched a new magnetic system, an oil- and contact-free drive solution for centrifugal compressors in chillers.

Combining a high-speed permanent magnet motor and active magnetic bearings with integrated controls, the magnetic system can operate with variable speed drives from various manufacturers to deliver energy savings of at least 10% compared to conventional centrifugal compressor designs. In addition, the system’s vibration- and virtually friction-free performance capabilities enable extremely quiet operation.

“Our magnetic system can help OEMs streamline product design, development and assembly, as they produce new highly energy efficient centrifugal compressor chillers. This innovative technology also reduces maintenance costs for

the user and provides reliable and cost-effective air conditioning,” says Richard Law, SKF global segment manager, Fluid Machinery.

Electromagnets levitate the compressor shaft, allowing it to rotate without contact. By eliminating the mechanical contact and the losses that occur with oil-lubricated bearings, the magnetic system from SKF significantly reduces energy use and costs, as well as im-



SKF’s magnetic bearing system is an oil- and contact-free drive solution ideally suited to centrifugal compressors in chillers.

proving heat transfer efficiencies in the evaporator and condenser.

The permanent magnet motor at the heart of this SKF solution is more energy-efficient than induction motors – at full and partial loads – and offers a higher power factor and lower current draw. It can also operate with a smaller variable speed drive than induction motors.

The system’s active magnetic bearings are capable of speeds in excess of 40 000 rpm and can accommodate instant and frequent start-ups and transient surge forces. An active control system tracks and maintains rotor position to micron accuracy at up to 15 000 times per second, eliminating vibration.

High-speed permanent magnetic motor solutions from SKF use technology pioneered by S2M, one of the world’s leading producers of magnetic bearings and high-speed permanent magnet motors. Acquired by SKF in 2007, S2M has been refining contact-free, levitating bearing technology for more than 30 years. □

meters – such as vibration, temperature, lubrication condition and load – and informs the user when conditions are abnormal and can threaten to cause bearing damage.

When it was launched at Hannover in 2013, SKF Insight was a technology concept – a way in which maintenance engineers might improve condition monitoring by keeping tabs on bearing health. Two years on, it is a fully functioning solution running as customer pilots, capable of supplying data directly to diagnostic centres for better condition monitoring via the SKF Cloud using SKF @ptitude. From there, dashboards and reports can be supplied to the plant operator, machine manufacturer, SKF or any other authorised person with Internet access.

The data can also be accessed on mobile devices such as iPads – and this is how SKF Insight was demonstrated during Hannover, in a live working exhibit.

Using dynamic bearing data provided by SKF Insight, an innovative new approach to bearing health management is under development, which can determine how actual conditions are affecting bearing health and trigger corrective action to cure it – such as the automatic addition of lubricant or altering machine conditions. This prevents damage to the bearing to maximise its useful life.

One of the most promising areas of application for SKF Insight is in wind turbine monitoring, because of the huge cost of maintenance. In some cases, changing the main bearing on a wind turbine is so expensive that it undermines the business case for building the turbine in the first place. Used here, SKF Insight could monitor loads and lubrication conditions in service, giving plenty of time to limit or reverse the occurrence of damaging process conditions.

The company is already working with a wind turbine customer to develop such a system. It measures dynamic bearing information in the true operating state

## The TKSA 41 shaft alignment tool

SKF has announced the introduction of the TKSA 41 shaft alignment tool with enhanced measuring and reporting capabilities. Developed for use in rotating-machine applications in industry, the instrument helps customers identify and correct shaft misalignment to improve equipment uptime and lower maintenance costs. The TKSA 41 has been designed to make shaft alignment easy, even for operators with minimal experience.

Comprising two wireless measuring units, large detectors and bright lasers, the TKSA 41 provides precise measurements, even in challenging conditions or difficult-to-access areas. Its liquid crystal display (LCD) with touchscreen navigation makes alignment fast and simple, and its free measurement feature allows alignment

measurements to start at any angle and finish with a total angular sweep of only 90°. The TKSA 41's live view supports intuitive measurements and facilitates horizontal and vertical alignment corrections.

Because the instrument enables hands-free measurement by detecting when the heads are in the correct position, operators can use both hands to rotate and hold the shafts in place. After each alignment, the TKSA 41 automatically generates a customised report with notes and pictures available from its built-in camera.

This camera also enables QR codes to be scanned for machine identification and access to the machine library to review past alignment reports or to start a new alignment process. The TKSA 41 replaces its predecessor, the widely used TKSA 40. □

SKF's TKSA 41 shaft alignment tool has enhanced measuring and reporting capabilities.



and wirelessly communicates it to remote monitoring centres or local maintenance crews. The solution being developed will monitor bearing speed, vibration, temperature and lubrication condition. Most importantly, it can be retrofitted – so could enhance the operational potential of both new turbines and the many thousands that are already in operation worldwide.

The company is developing a similar solution in the railway sector, for wheel-

end bearings, which are critical railway vehicle components that are usually changed at set intervals, regardless of their condition. SKF Insight creates a cost effective way of collecting condition-monitoring data so that bearing life and change-out intervals can be determined based on real operating conditions.

SKF Insight and bearing health management are among a series of innovations that SKF showcased at this year's Hannover fair. □

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# SKF and Lincoln Lubrication SA

*In February 2015 SKF successfully acquired South African-based Lincoln Lubrication SA (Pty) Ltd and the company now forms part of SKF's Lubrication Systems core technology.*

Lincoln Lubrication SA specialises in Asset Protection Management with Full Circle Reliability. Our understanding of assets includes not only machines, and equipment, but also staff and their safety.

Lincoln Lubrication specialises in automated lubrication systems that can be fitted to any application, machine or piece of equipment. In addition to lubrication systems and equipment, Lincoln Lubrication also offers other asset protection management technology including hose reels, liquid Fast Fill, and fire suppression systems.

As a complementary product, GreenLinc offers environmentally accredited spill kits.

For more information about the acquisition and Lincoln/SKF Products and Services, please contact your nearest SKF/Lincoln Lubrication Distributor or Branch.

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# Self-contained servo drive reduces energy consumption

Grant Robinson of Voith Turbo talks about his company's new closed-loop differential pump (CLDP) servo drive.

Industrial operations in South Africa that are being placed under increasing pressure from rising energy costs and interrupted power supply as a result of load shedding can save substantially on energy costs, using Voith Turbo's advanced new closed-loop differential pump (CLDP) servo drive.

"The servo drive design is simple. The heart of the unit is an integrated servo pump consisting of a servomotor and an internal gear pump. Its flow rate is perfectly matched to the cylinder surfaces of a differential cylinder," says Grant Robinson, Voith Turbo vice president – EMEA Division, Mining and Metals Southern Africa.

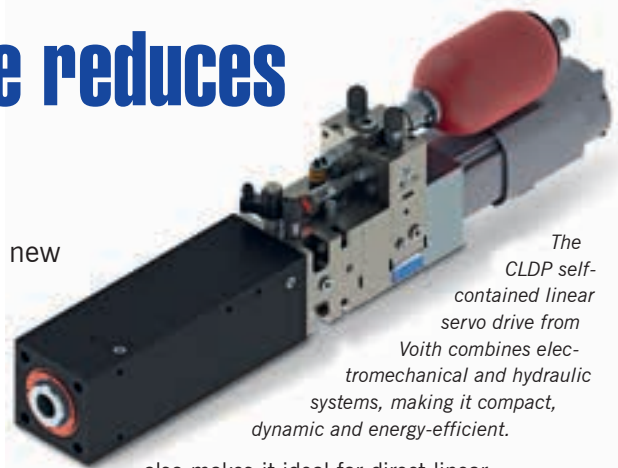
The unit also includes intelligent control via fieldbus connection, a pressure limiter and a small compensating tank. This control system design renders other components, such as expensive valve engineering, unnecessary.

"As a result, energy losses caused by throttling effects do not occur with the CLDP. This increases the machine energy savings by up to 50% compared to machinery using conventional drive systems," adds Robinson.

The self-contained linear drive combines electromechanical and hydraulic systems, making it compact, dynamic and energy-efficient. Additional benefits include; overload protection, a high power density and virtually wear-free operation.

Robinson indicates that the servo drive is essentially a hydraulic gearbox with an almost unlimited gear ratio, making it ideally suited for use in applications with high dynamic speed requirements and high power demands.

"Thanks to the integrated servo pump, the energy efficiency is far greater than that of conventional solutions. This



The CLDP self-contained linear servo drive from Voith combines electromechanical and hydraulic systems, making it compact, dynamic and energy-efficient.

also makes it ideal for direct linear motion – primarily when dynamic response, reproducibility and reliability are needed," Robinson continues.

The CLDP servo drive can be easily integrated into new or existing machines. Only the electrical connection for the servomotor is needed.

Customers from many industries – such as oil and gas, energy, mining and metal processing, mechanical engineering, shipbuilding, rail and commercial vehicles – can benefit from this advanced technology.

Voith Turbo, a Group Division of Voith GmbH, is a specialist in intelligent drive solutions and global customers from highly diverse industries rely on its advanced technologies. □

## Electromagnetic feeder drives

In addition to importing a range of electromagnetic drives exclusively from Aviteq of Germany, specialist vibrating equipment supplier Joest Kwatani also supports its range of locally, in-house manufactured SFH electromagnetic super feeder drives.

Kim Schoepflin, managing director, Joest Kwatani, says that the company has built its reputation on developing an in-depth understanding of its customers' specific application needs, and this has ensured that customised solutions which reduce downtime are developed.

The SFH range of electromagnetic vibrating drives is designed for feeding bulk materials at a controlled rate from stockpiles and hoppers to bulk materials handling equipment such as belt conveyors, crushers and screens. Joest Kwatani attained this product range through its acquisition of Lockers Engineers over two years ago.

"These are designed for use in medium to heavy applications such as quarries, coal plants, steel works and the chemical and food and beverage industries, as well

as food-processing plants," says Theresa Walton, general manager: Service, Joest Kwatani.

"The Aviteq range of electromagnetic drives is particularly suited to standard volumes where a high dosing accuracy is required," Walton adds. Joest Kwatani has been appointed the exclusive distributor in Africa for Aviteq products, formerly AEG, including electromagnetic drives and controllers.

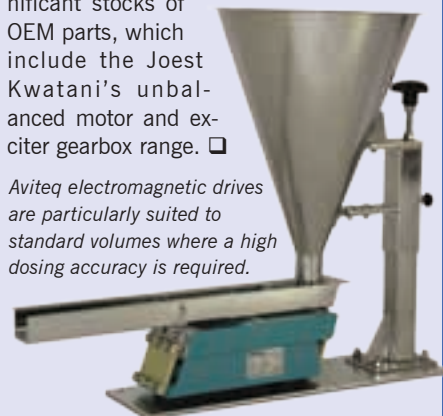
The Aviteq drives are especially useful for smoother stop-start operations, as opposed to using exciter gearboxes and unbalanced motors, which have a more immediate stop action. "This is useful in the example of a food processing company, where precisely measured ingredients are required for each batch. The Aviteq drives can control these ingredients down to the kilogram," Walton explains.

Joest Kwatani is a locally owned OEM that designs and fabricates vibrating screens and feeders in-house. It has a 39-year track record of developing and supplying products for the African mining and bulk materials handling market.

Joest Kwatani's custom-designed vibrating equipment is engineered for tonnage, meaning the equipment is characterised by its robustness and longevity in support of improving uptime. "We make a difference to our customers by means of unique engineered solutions, which translates into the lowest cost of ownership for our clients," Schoepflin says.

The company is committed to providing a fast turnaround time, with 24/7 customer service through its comprehensive network of service centres and branches located in all of the major mining areas in South Africa. The company holds significant stocks of OEM parts, which include the Joest Kwatani's unbalanced motor and exciter gearbox range. □

Aviteq electromagnetic drives are particularly suited to standard volumes where a high dosing accuracy is required.



# Advances in motor protection systems

Stephen Cook, switchgear manager at Zest WEG Group, talks about the company's latest developments in the field of electric motor protection and control.

**T**he continuous pursuit for improvement and cost reduction in industry has seen a rapid evolution in the development of electric motor control, relays and protection systems. "To ensure that we meet all the needs of industry in this regard, as well as keeping abreast of the latest trends and developments, the Zest WEG Group has introduced the WEG range of RW\_E electronic motor protection overload relays, to complement its range of smart relays," says Stephen Cook, switchgear manager at Zest WEG Group.

The WEG RW\_E electronic overload relay is designed for increased reliability through the protection of low voltage three-phase motors in sinusoidal 50/60 Hz networks, where reliability, low power dissipation and ease of maintenance are critical requirements. The WEG RW\_E electronic overload relay has been developed in accordance with the IEC 60947-4-1 and UL 60947-4-1A (UL 508) international standards.

RW\_E Electronic overload relays are highly reliable devices intended to protect motors, controllers and branch circuit conductors against phase failures and overloads that can result in overheating.



The WEG RW\_E electronic overload relay is designed for increased reliability.

ing. These critical products play a vital role in overall system performance and efficiency and are designed to protect three- and single-phase ac motors.

The electronic overload relay has no power contacts and therefore cannot disconnect the motor by itself. Instead, motor overloads or phase failures increase the motor current, which in turn trips the mechanism and switches the auxiliary contacts. When wired properly in series with the coil of the contactor, these auxiliary contacts will de-energise the contactor in the event of an overload.



Engineered as a plug and play solution, the compact WEG SRW01 is ideal for applications where space is limited.

This means the contactor itself disconnects the power supply to the motor, halting its operation. Another handy feature is that, once tripped, the relay will only reset once the motor has cooled down, preventing costly damage. The WEG RW\_E electronic overload relays are temperature compensated, which means that the trip point is not affected by temperature and it performs consistently at the same current value.

In order to ensure rapid tripping in the case of phase loss, and thereby protecting the motor and avoiding costly repairs or additional maintenance, the WEG



Designed for use with power supplies from 24 to 220 V ac/dc, the WEG SRW01 has a facility, if selected, to monitor voltage up to 690 V ac and measures current from 0.25 A up to 840 A.

RW\_E relays include phase failure sensitivity protection as a standard feature. They can be mounted directly onto the WEG CWB and CWM contactor ranges, which make for highly reliable and flexible motor starting units.

## Compact SRW smart relays

The modular design of the WEG low voltage electric motor management system offers flexibility by allowing expansion of its functionalities. Engineered as a plug and play solution, the compact WEG SRW01, with state of the art technology and network communication capabilities, is ideal for applications where space is limited.

Designed for use with power supplies from 24 to 220 V ac/dc, the WEG SRW01 has a facility, if selected, to monitor voltage up to 690 V ac and measures current from 0.25 A up to 840 A. The reliability and precision achieved with the WEG SRW01 smart relay makes the device suitable for the toughest industrial applications. Pre-programmed operation modes allow use in several starting and monitoring configurations, and this includes a mode that allows the device to be programmed for an individual application allowing optimum flexibility. The unit provides LED indication for input and output activation status, operation mode status, power supply status, and alarm status.

The digital input and output functions of the control unit are automatically configured when the operation mode is selected. The system will also automatically recognise which protocol is in use. The digital inputs can be configured to monitor external digital signals. Using this feature, the output contact from an external relay can be connected to the digital input of the smart relay. Significantly, it is this feature that enables the user to incorporate various protection mechanisms, such as earth leakage and thermal (PTC), in the same relay.

The WEG SRW01 supports a range of communications networks including DeviceNet, Modbus-RTU, Profibus-DP, and Ethernet (2016). The communications modules can be easily exchanged due to the design of the system. The WEG SRW01 has a USB port for relay monitoring, programming and online backup through a PC when using WLP software.

Rapid system monitoring and relay parameterisation is done via a Human Machine Interface (HMI) keypad, and the device's internal memory makes it possible to record up to three parameter



Stephen Cook of Zest WEG Group shows the company's extended range of off-the-shelf low-voltage protection equipment, which now includes RW\_E electronic motor protection overload relays and the compact WEG SRW01 electric motor management system.

settings or user programmes. The relay incorporates a thermal memory circuit, which will maintain the motor thermal image, even in the event of power loss. This handheld keypad allows engineers to link up to 250 WEG SRW01 smart relays offering great flexibility.

The WEG SRW01 smart relay is available from Zest WEG Group's network of branches and representatives.

The Zest WEG Group's range of motor protection and starter products also includes modular contactors of up to 800 A (three-phase ac), compact contactors of up to 22 A (three-phase ac), control relays, motor protective circuit breakers of up to 100 A, enclosed starters (plastic or metallic), as well as customised starters and overload relays for OEM applications. □



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Cooper vice president of sales, Tom Black.

# New angled support pedestal for Cooper split bearings

A new angled support pedestal for Cooper split bearings was unveiled at Beltcon 18 by Bearings International, a leading Southern African distributor of bearings and power transmission products.

Cooper Roller Bearings is a globally recognised expert in the design, manufacture and supply of specialist bearings. Founded back in 1907, the brand has been distributed in Southern Africa by authorised distributor Bearings International since 1937.

The launch of Cooper's latest product is testament to the collaboration between these two companies. Cooper vice president of sales, Tom Black, explains that the new product represents the latest refinement of the initial development of the pedestal in the 1960s. "The new version saves a considerable amount of time and manpower due to the fact that it slides directly under the shaft at an angle, so does not need to be raised with a hoist or a jack," explains Black.

Available previously as a bespoke solution, Cooper is now rolling out the angled pedestal across its standard range of SN and SD equivalent pedestal housings. Coupled with Cooper split bearings, customers and end users now have a total solution to reduce their maintenance requirements and subsequent downtime.

"With a split bearing, all of the components are essentially split, including the pedestal. The angled pedestal from Cooper facilitates quick insertion of the pedestal underneath the shaft. What Cooper has developed is a pedestal that, instead of being horizontal with the base, is angled to allow it to slide easily under the shaft," adds Matthew Tyler, Cooper product manager, Bearings International.

Tyler says that the new product was well received at Beltcon 18, attracting attention from major consultancies involved in designing materials handling systems for the mining industry. "All the major project houses who design conveyor systems took the time to come and see us."

With the mining industry under pressure to cut costs due to falling commodity prices, the focus is now on sweating existing assets and increasing the productivity of current operations. Reducing maintenance requirements is therefore a key focus for major component suppliers such as Bearings International.

"Some of the conveyor systems deployed to transport ore in the mining industry, both overland and underground, can be up to 20 km long. If these systems come to a standstill due to bearing failure, for example, it has tremendous implications on the bottom line," Tyler argues.

Cooper split bearings are split to the shaft, which means that all necessary components can be changed-out in as short a period as possible. Combined with the new angled pedestal, proactive maintenance is now simpler than ever, requiring minimal equipment such as allen keys and a few basic tools.

Bearings International has been attending Beltcon since the 16<sup>th</sup> event was hosted in 2011. General marketing manager Gugulethu Nkutha believes that, as a long-standing member of the Conveyor Manufacturers' Association (CMA), it is impor-

tant for the company to support industry-specific events such as this.

"The CMA is involved with numerous decisions that are made in the South African conveyor industry. As a leading player and supplier in the bearing and power transmission field, we aim to promote the company and the major brands that can add value to the industry," she elaborates.

"Beltcon is attended by high-profile decision makers, designers, engineers and manufacturers in the mining and materials handling industry. It serves as the most effective medium to promote the Bearings International brand, by exhibiting products best suited to the conveying industry in South Africa," Tyler concludes. □



Cooper's new angled support pedestal for its split roller bearings slides directly under the shaft at an angle, so it does not need to be raised with a hoist or a jack.



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# Adding value: from CAD design to manufacturing efficiency

MECAD Systems – the original developer of SigmaNest, a material optimisation package for CNC plate and pipe cutting systems, is a South African company originally established to support analysis and manufacturing software. Today, SigmaNest is a SolidWorks Gold Partner. *MechTech* talks to Robert Pereira, product manager for DS SolidWorks.



**M**ECAD Systems has origins going back to 1985, when Megkon Systems was established as a provider of finite element analysis (FEA) services through a product called NISA, which was the very first FEA package to run on personal computers (PCs). “We did consulting work on the use of this software and soon became a reseller,” Pereira begins.

The company took on sole South African distribution rights to MasterCAM in 1992 and changed its name to MECAD Systems the following year. “We also took on a dealership for the early 2D draughting and direct solid modelling package, CAD Key (now KeyCreator), which was one of the first PC-based design packages to incorporate 3D capabilities.

“Then, in 1995, the first release of SolidWorks emerged and we immediately saw the potential and became a local

reseller,” Pereira tells *MechTech*.

The development of SolidWorks began in 1993, when a Massachusetts Institute of Technology graduate, Jon Hirschtick, put together a team of high-end CAD systems’ developers to create a powerful and cost effective package that would run on the Microsoft Windows platform. “Up to that time, there were two branches of CAD software. At the high-end, there were large and expensive programs such as CATIA, IDEAS, Unigraphics and Computervision’s CADD5, which all ran on UNIX-based mainframe computers.

“On the other branch, you had the low-end CAD packages that ran on the DOS-based PCs, such as AutoCAD and CAD Key. Jon Hirschtick’s idea was to create a mainstream CAD package that would be powerful, less costly and did not depend on expensive mainframe hardware platforms,” Pereira explains.

The first release of SolidWorks

emerged in 1995, and according to Pereira: “This was the first parametric CAD package to be developed to run specifically on the Windows platform. Almost all other PC-based design software packages were ported across to Windows from the DOS or UNIX platforms, which created some awkwardness with respect to functionality in Windows,” he suggests.

For the first two years, the company released two version updates per year, followed by a new release every year since. “And MECAD in South Africa has been involved from the very first releases,” Pereira relates.

In 1997, Dassault Systems (DS), the CATIA developer, decided to buy SolidWorks and to push the program aggressively into the broader marketplace. “SolidWorks had already run out of growing space and needed a bigger partner, while DS hadn’t yet acquired a lower-end product to supplement CATIA. I think DS paid around US\$310-million for the company, a bargain considering what it is worth today,” he says.

Dassault Systems immediately began to foster partnerships and to acquire software add-ins to supplement the central package. “SolidWorks has established a large collection of solution partners with programs to suite every conceivable design and analysis requirement. At the pinnacle of this idea are the Gold Partners, which offer fully integrated software that runs inside the SolidWorks environment.

“MasterCAM is a key example of a SolidWorks Gold Partner. The interface is very close to that of SolidWorks, its annual release dates are always ‘in-sync’ and 100% compatible, and MasterCAM is translated into the same seven or eight key languages adopted by SolidWorks. Globally, there are some 700 Gold partners such as these,” Pereira says.

He further cites the development of SolidWorks Simulation, which includes



Johannesburg-based equipment manufacturer Osborn is a specialist OEM of crushing and screening equipment for mining, quarrying and road construction.

finite element analysis (FEA) and computational fluid dynamics (CFD) tools. Dassault Systems bought out a company called Structural Research Analysis Corporation (SRAC), a developer of high-end design analysis programs such as Cosmos/Works, which became the FEA solution for SolidWorks.

"SolidWorks took over development responsibility for these software packages so that they would run seamlessly inside the SolidWorks Windows user interface. So a simulation can be run directly from the SolidWorks model without having to de-feature it or lose embedded data. Simulation results can be directly and immediately used to revise the model, and without any further effort, the simulation can be rerun to determine the effects of changes," he says.

A rigid body motion analysis tool for kinematic analysis is also now available in the simulation suite, along with a host of more specialised tools, such as Bulk Flow Analyst and Belt Analyst, SolidWorks partner products to help designers of chutes, conveyors and bulk materials handling equipment.

SolidWorks Enterprise product data management (EPDM) is another of the current tools available to SolidWorks users on the Windows platform. In keeping with the company's low-cost, high-powered vision, this is a full-featured data management solution that is suitable for organisations of any size. It is no longer necessary to be a global corporate to access the power of PDM solutions.

### MECAD Systems and added value

With branches in Midrand, Gauteng; Cape Town; Durban; and, most recently, in Port Elizabeth, MECAD has been the sole value adding distribution partner for sub-Saharan Africa since 1995. "As well as our Southern African core business, we support the software across the sub-Saharan region, including Nigeria, Ghana, Angola, Namibia, Botswana, Tanzania, Kenya and more.

"And our involvement does not stop as soon as people purchase the software. We offer subscription services, specialist privileges and free support. Supporting clients to resolve specific problems is much easier than it used to be. On receipt of an email or telephone call, from any client anywhere, we can log onto their computer via TeamViewer and remotely work with the designer to resolve issues.



Cape Town-based Unique Hydra uses SolidWorks to design hyperbaric diving support vessels. The product above is an A1800/100, one of Hydra's most popular commercial diving chambers. Designed for use on board diving support vessels (DSVs) and coastal support bases, these hyperbaric recompression chambers can be built into the DSV or containerised. The dive chamber is rated to a depth of 100 m in accordance with the latest PD5500 code, the design is approved by Lloyd's Register of Shipping and the construction of the vessel is reviewed and witnessed by Lloyd's Surveyors.

Modern connectivity makes it as easy to support clients in Nairobi as it is in Johannesburg," Pereira says.

"We employ highly qualified mechanical engineers and computer specialists, all experienced in the field of computer-aided engineering. Currently, our technical staff consists of 21 qualified engineers and computer scientists with combined experience in excess of 100 years in the field. This allows us to offer support services in the form of demonstrations, benchmark testing and productivity consulting," he adds.

But the most important service associated with the use of design software is training. "Each of our four South African venues is an Authorised SolidWorks Training Centre, fully equipped with high-powered workstations. Courses in all of our software solutions, including: SolidWorks (essentials, advanced, simulation and enterprise PDM, amongst others); MasterCAM; and SigmaNest are scheduled throughout the year," says Pereira.

"We are also currently putting a lot of effort into university level education. About a year ago, we put a team together to look after the engineering and industrial design departments. To date, we have put about 8 000 licences into universities across the country and we are now offering additional support via

lectures and project support for student.

"We are also sponsoring, via software, specialist training and consultancy services, the Baja Challenge project, an initiative to engage engineering students in designing and building their own off-road buggies, which are then raced at an inter-university event towards the end of each year," Pereira reveals.

He says that MECAD Systems is one of the few companies to have specialist skills and solutions for all aspects of the product development process. "Through SolidWorks, we offer expertise in creativity, design and 3D CAD modelling; simulation and engineering analysis; documentation and data management. Then, through MasterCAM, we offer machining and manufacturing tools – and MasterCAM can generate programs for robotic machining using up to nine axes. And, through SigmaNest, MECAD provides a material optimisation solution that is ideal for improving production efficiency.

"MECAD recognised Jon Hirschtick's vision for SolidWorks very early. In South Africa today, large organisations such as Metso, Osborne, GLPS, B&E International, Eskom and CSIR, as well as smaller ones, such as Highpoint Vacuum, Sibyl Project, The Airplane factory and Desert Wolf are testament to his foresight," Pereira concludes. □

# Optimisation drives 3D printing design

Simulation-driven design has dramatically altered the engineering landscape, helping companies condense development cycles, better refine products, and greatly diminish costs. Grunum Smith develops the argument and highlights the benefits of Altair's OptiStruct and solidThinking Inspire software tools.

**O**ptimisation is the next logical step, driving a paradigm shift that replaces trial and error engineering with a new way of conceptualising designs. In lieu of the traditional iterative process in which engineers create, test, and validate designs

only to identify problems, make changes, and start all over again, optimisation-led design enables engineers and designers to conceptualise ideas in a more efficient manner.

Optimisation leads organisations down a different path toward greater innovation, the exploration of light-weighting opportunities and the discovery of potential failure modes that might not be visible to the average design engineer.

However, the dynamic duo of simulation and optimisation has primarily been limited to domain experts, often only tapped mid-stream or later in the design cycle. Limited access to these new tools amid proven legacy design practices exacerbates the highly iterative and time-consuming design process,

requiring multiple hand-offs between design engineers and CAE specialists, which does little to streamline workflows or help teams achieve optimal results.

Optimising early provides a variety of benefits. Design concepts are more likely to meet requirements, minimising the back and forth between team members. Optimising during the early concept stage also gives engineering organisations a jumpstart on identifying optimal structure, system, materials distribution, and weight targets while improving safety, durability, and other performance attributes. The end result is a streamlined development process, which cuts back on costly prototypes and ensures aggressive time-to-delivery objectives are met.

Altair opens up simulation and optimisation practices to mainstream engineers and designers alike. For traditional CAE experts, Altair offers OptiStruct, a proven structural analysis solver that tackles complex linear and non-linear problems under both static and dynamic loads. With its built-in finite element and mul-



*Polaris, a snowmobile manufacturer, is driving efficiencies and design improvements throughout its engineering workflow, thanks to the use of Altair's OptiStruct and solidThinking Inspire software tools.*

## Altair's solidThinking Inspire 2015

The 2015 version solidThinking Inspire® has been released, promising increased speed, accuracy and better support for assemblies. Grunum Smith, South African country manager for parent company, Altair, along with David Anderson, founder and principal mechanical engineer of Exact Engineering, introduce the release.

**T**he latest generation of Inspire combines faster geometry functions with an updated user interface, which significantly expand the scope and complexity of problems that can be addressed. Several new functions have been added based on the most common requests from the Inspire user community. These include: Fasteners (bolts or screws), Joints (pins or sliding pins) and Contacts (bonded, contact, or no contact). Leveraging these capabilities, Inspire users can now easily model, optimise, and analyse complex model assemblies.

"Professionals using Inspire rely on its ability to simulate realistic loading

conditions," says Smith. "With support for assembly optimisation, users can now incorporate a surrounding structure into their optimisations and gain a deeper understanding of the relationship between multiple components."

Adds Exact Engineering's David Anderson: "Designing components for high performance applications has never been easier. solidThinking Inspire lets my team explore optimised designs at the beginning of the development process and gets us started on the right foot. The tool consistently helps us deliver lighter, stiffer parts for a wide variety of products."

Key updates for Inspire 2015 include:

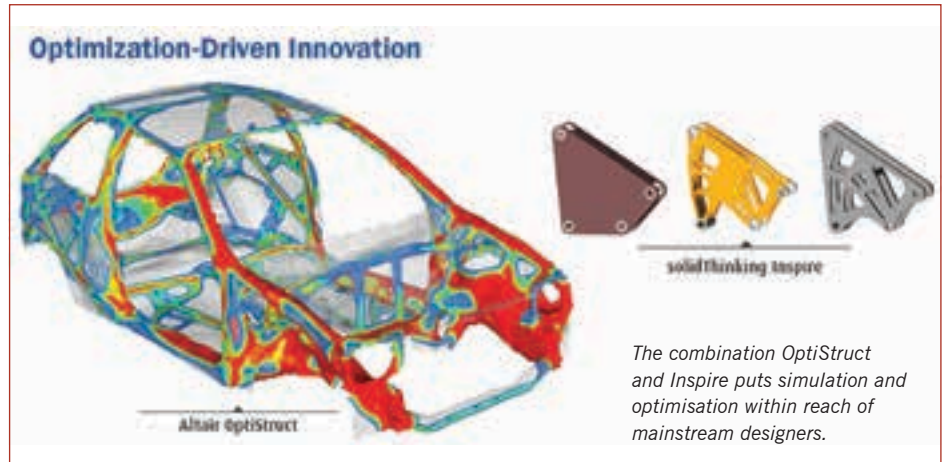
- **Fasteners and joints**, which allow multiple parts in a model to be connected using bolts, screws, pins or sliding pins. Inspire's workflow identifies areas in the model with aligned holes to make the process easy and intuitive.
- **Contacts**, which enables users to designate whether neighbouring parts should be bonded, contacting, or have no contact for more realistic optimisation results.
- **Gravity loads:** G loads can now be added to a model through the Model Browser.
- **Updated user interface:** To accommodate the new tools offered in Inspire 2015, a new ribbon style interface organises the tools into tabs. Users are able to customise the tabs to tailor the workflow to their process.
- **Faster geometry functions:** Geometry functions in the program are running up to 300% faster than previous versions of Inspire.

"solidThinking Inspire enables design engineers, product designers, and architects to create and investigate structurally efficient concepts quickly and easily, leading



tibody dynamics technology, combined with advanced optimisation algorithms, OptiStruct lets engineers analyse and optimise structures and mechanisms for their strength, durability and noise and vibration harshness (NVH) characteristics. While OptiStruct has the muscle to tackle the most complex design problems in great detail, Altair's solidThinking Inspire unleashes the power of simulation and optimisation for concept designers during early idea validation.

Inspire masks the complexity surrounding simulation and optimisation and makes it accessible to a less simulation-savvy audience. For example, the software treats tasks like creating meshes and boundary conditions in a way that's friendly to non-experts so they can immediately dive in. Through its intuitive user interface, Inspire performs such tasks with the click of a button, opening up a world of optimisation possibilities for design engineers without any hand-holding or direction from time strapped simulation experts. In addition to its intuitive user interface, Inspire delivers simulation and optimisation capabilities that meet the needs of design engineers. It can depict stress distribution, displacement, or deformation characteristics like traditional CAE tools, plus Inspire helps design engineers determine the optimal load path and where materials can be



removed to improve the design.

In a continuous engineering workflow, design engineers work with Inspire to come up with concepts that meet basic performance requirements, while CAE experts pick up where they leave off, leveraging OptiStruct's more advanced functionality to further refine designs.

Polaris, a snowmobile manufacturer, is driving efficiencies and design improvements throughout its engineering workflow thanks to the use of OptiStruct and Inspire. On a specific chassis project with pretty rigorous weight reduction goals, Inspire was tapped during the concept stage to quickly identify the basic shape and engineering, while OptiStruct was brought in to refine the shape for manufacturability and stress requirements.

Inspire and OptiStruct were also paired to help evaluate the weight reduction potential of using aluminium as a substitute for steel in several subassembly structures.

Not only did OptiStruct and Inspire help Polaris engineers substantially reduce the weight of the structures, it also greatly reduced the number of design iterations – from 10 to 12 cycles down to 5 or 6.

Simulation and optimisation work best as an integrated team that is put to use continually throughout the design workflow. By democratising the practices so they are within reach of mainstream designers, not just simulation experts, companies can achieve dramatic engineering efficiency that will steer them on a course to greater innovation. □

to reductions in cost, development time, material consumption, and product weight, says Smith. "The program's optimisation capabilities are sought after in multiple industries including aerospace, automotive, heavy equipment, architecture, and consumer products," he adds.

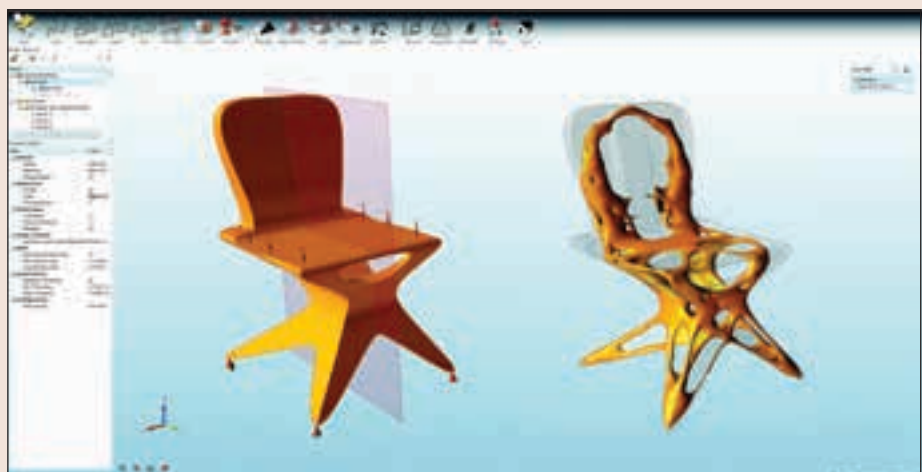
Altair is focused on the development and broad application of simulation technology to synthesise and optimise designs, processes, and decisions for improved business performance. Privately held with more than 2 300 employees, Altair is headquartered in Troy, Michigan, USA, and operates more than 40 offices throughout 22 countries. Today, Altair serves more than 5 000 corporate clients across broad industry segments.

The solidThinking set of tools is aimed at structural analysis and optimisation, as a precursor to full-scale CAD (pre-CAD). "Inspire's power is in early design exploration and puts high level analysis tools in the hands of designers so that CAD users can focus on the detailing without worrying quite

so much about the structural or functional engineering side," Smith exclaims. "Any company looking at lightweighting in product design has three basic options: using advanced materials; changing the topology/geometry; or redesigning the entire product," he adds. "solidThinking Inspire focuses on the topology/geometry optimisation option

and, with Inspire 2015, users can do this faster and more easily and accurately than ever before," he concludes.

Earlier this year, solidThinking announced the signing of channel partnership agreements with productONE, Rapid3D and Access CAD/CAM to introduce the South African market to solidThinking Inspire. □



With solidThinking Inspire 2015, Smith says users can do topology/geometry optimisation faster and more easily and accurately than ever before.

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# ATS announces statistical process control software

**A**ppled Tech Systems (ATS) is proud to announce the acquisition of the real-time SPC measurement software package, QS-Pro (formerly known as Cadar), from DTS Digital in the United Kingdom. This software solution is now being introduced under the new brand name of ATS SPC.

ATS SPC is a comprehensive statistical process control software measurement and analysis application, in which results are displayed in real-time. ATS SPC offers drag and drop visual configuration and an infinitely customisable screen, creating intuitive and recognisable measurement reports.

Features include:

- Real time direct measurement.
- Drag and drop visual setup.
- Powerful multiple feature handling.
- Multiple views.
- Statistical data collection and analysis.
- Serial numbering and data tagging for traceability.
- 6 sigma, QS9001, ISO16949 compliance.

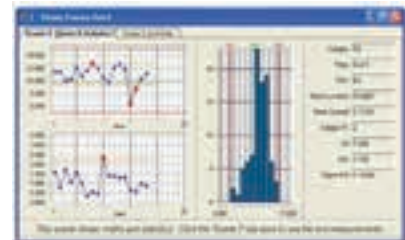
- MS Office software compatibility.
- Full multi-tasking capabilities.

“This new addition helps to build on ATS’s strong offerings in software products. There is already a wealth of knowledge and experience within ATS with regards to attribute and variable data (ATS Inspect), operational data such as OEE (ATS Intelligence) and dimensional data (ATS CM4D) so ATS SPC is in good company,” says Paul Bron, director of global operations. “Whatever the industry, ATS SPC has a solution that will fit its needs and will provide a return on investment from the very first measurement by strengthening 6 Sigma processes,” he adds.

ATS is an Independent Solution Provider, with more than 27 years of experience and a wealth of experience undertaking continuous improvement initiatives and Manufacturing IT solution design, deployments and 24/7 support assignments. Its solutions are available in South Africa from Cape Town-based ATS, Applied Tech Systems. □



Available for use via tablets, ATS SPC is a comprehensive statistical process control software measurement and analysis application.



Features include, amongst others, real time direct measurement and statistical data collection and analysis.



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# South Africa's mobile vacuum OEM

Founded only 10 years ago, Highpoint Vacuum is a Sasolburg-based original equipment manufacturer of industrial and municipal vacuum trucks for mineral recovery, waste disposal and cleaning. *MechTech* visits the manufacturing facilities and talks to engineering manager, Jean Visser, about the company's designs, its vacuum pumps and the sophisticated hydraulic systems used.



Shown here under test at the company's Wonderfontein facilities near Sasolburg is the 'backbone' vehicle for industrial cleaning in South Africa, Highpoint Vacuum's HPVR-1000 Liquid Ring.

**H**ighpoint Vacuum was founded by its current CEO, David Gade in 2004, initially to support the mining industry. Visser explains: "We started out providing capital equipment rentals of vacuum machines on skids and trailers to recover fines on the mines. Once drilling operations are completed at a gold mine, for example, the area is covered with gold-bearing dust. The traditional method of recovering these fines was to wash it into a central area and pump it from there. But gold is heavy, so it does not always move with the surrounding dust and this was a very inefficient process. Using vacuum is far more efficient and, since the product is valuable, more cost effective," he explains.

To overcome replacement component supply shortages and long lead times, Highpoint began to manufacture components and units for its rental fleet, including its own vacuum pumps. This healthy business has now been split off into Highpoint Rentals.

"Then we started to supply vacuum trucks to industrial cleaning companies such as Enviroserv and Bidvest. These companies go into plants and refineries to recover hazardous materials that need

to be collected, transported and disposed of in the safest and most environmentally responsible way. At Holfontein on the road to Delmas, Enviroserv manages the only toxic waste dump in the country," Visser continues. "Our vehicles are cleaning ash plants at the older power stations, which contains sulphur that can cause acid rain if it enters the atmosphere, so it has to be collected and disposed of. We are also active in the cement industry with a truck designed for dry bulk such as cement powder and lime.

"More recently, we have started to look at the municipal waste and sewage markets, with vehicles for unblocking and cleaning sewage and stormwater drains," he adds.

The vehicle and equipment arm of Highpoint Vacuum is now capable of manufacturing four vehicles at a time on a to-order basis, within a four-month lead time from order to delivery – and production capacity is now more than 20 vehicles per year.

"We make vehicles in three basic categories: HPVR Liquid Ring vehicles for hazardous industrial waste; HPVR PDP trucks for dry bulk materials; and HPVR Combi trucks, which combine jetting and vacuum for line cleaning," Visser tells

*MechTech*, adding that several variants and customisations of each of these are available.

## Liquid ring vacuum HPVRs

The 'backbone' vehicle for industrial cleaning in South Africa is Highpoint Vacuum's HPVR-1000 Liquid Ring, which has a 12,5 m<sup>3</sup> stainless steel (316L) tank that is kept under vacuum by a 1 200 cfm (2 038 m<sup>3</sup>/h) liquid ring vacuum pump designed and manufactured by Highpoint.

Explaining how a liquid ring pump works, Visser says that an impeller is rotated inside an eccentric barrel that contains a quantity of liquid 'sealant'. When the pump starts, the impeller slings the liquid sealant by centrifugal force to the outside walls of the barrel, forming a concentric ring of liquid around the outside walls. The liquid seals off the space between each impeller blade, trapping air in each of the void spaces, called impeller cells.

"Because the impeller is off-set from the barrel walls, when the blades are close to the walls, the cells are nearly fully immersed in liquid and the pockets of air are small. But when the impeller tips are further away, the impeller cells



Highpoint Vacuum's 1000-PDB dry bulk vehicles use positive displacements roots blower-type vacuum pumps.

trap a larger volume of air. The rotation of the impeller creates a liquid piston that expands and compresses the trapped volume of air in each impeller cell," he says.

By aligning an air inlet port to the position where the water ring is receding from the rotor axis, air from the vacuum tank is sucked into the impeller cells. As the impeller rotates, the liquid ring then advances, compressing the air. When compression is at its highest, this air is then discharged to atmosphere through an exhaust port aligned to this position.

"The big advantage of liquid ring vacuum pumps is that it is intrinsically safe. They are contact-free and self-cooling, so there is never a risk of sparking or ignition. And we manufacture these pumps ourselves, based on our own designs. This allows us to carry exchange units and components, so we can repair and replace from our own components with very short lead times," says Visser.

Designed to be simple, robust and easy to maintain, High Vacuum's HPLR Liquid ring pump casings can be easily split to remove and replace bearings, seals or impellers. "We are among the 20 or 30 companies in the world that make these pumps. They feature CNC-machined aluminium casings with steel in the high wear areas, and we use locally available standard seals and bearings sizes to simplify maintenance," he adds.

The vacuum pumps are used to extract air from the vehicle's waste storage tank, creating the suction needed to draw up the waste. "On our Liquid Ring trucks, twin cyclone filtration systems are used to trap carry-overs and to isolate the waste medium from the pump. A service liquid tank with a 2 000 l capacity supplies and circulates the liquid ring water and separates out any air.

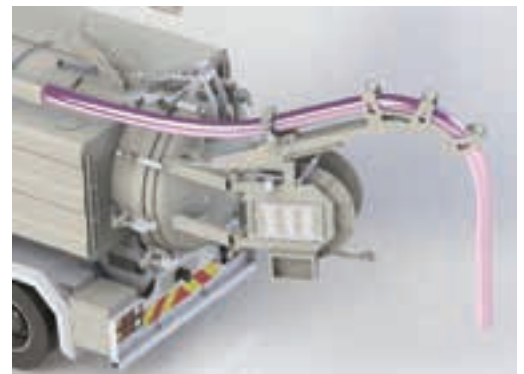
### Dry bulk PDBs

While liquid ring pumps can be used for dry bulk vehicles, particularly where the powdered product is flammable, Highpoint Vacuum PDB vehicles use positive displacements roots blower-type vacuum pumps. "These rely on intermeshing lobes rotating in an eccentric chamber to create the vacuum. They have 98% displacement efficiency when new and can hold a vacuum of -90 kPa. But friction due to lobe contact does create heat, which makes these unsuitable for flammable materials," he explains.

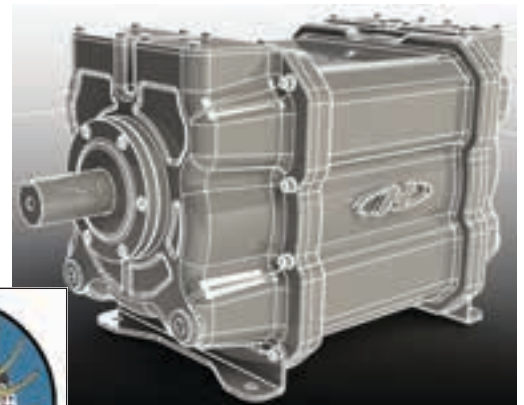
On PDB trucks, the superior filtration system is a differentiator. As well as deflector plates inside the tank and a high performance cyclone filtration system, a bag filter system with pulsating air injected cleaning is installed to separate solids and air.

"We use an electronic system to control the pulsation, which measures the pressure differential ( $\Delta P$ ) using sensors on either side of the filter. As the filter media gets blocked, the  $\Delta P$  rises. Initially, this triggers an increase in pulsation rate, but if this fails to improve the situation, then the operator will be warned and ultimately, at a 20% threshold, the vacuum breaker opens and the operator is instructed to attend to the filters before being allowed to continue," he says.

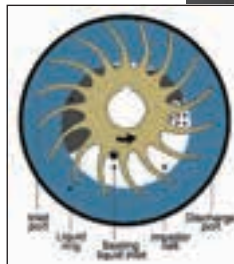
Describing how the system works, Visser says that a 3,5 mm Venturi sits above the cage holding the bags. "Via an accumulator, the air pressure is built



A SolidWorks rendering of the company's new Recycler Combi truck, which includes an onboard system to filter the water from the waste so that it can be reused for jetting.



A rendering of Highpoint's liquid ring pump design. **Left:** In a liquid ring pump, the rotation of the impeller creates a liquid piston that expands and compresses the trapped volume of air in each impeller cell.



The hydraulic control system, with its manifold block and Sun Hydraulics "kick-down" cartridge valves, is designed, built and manufactured in South Africa by Axiom Hydraulics. **Left:** A SolidWorks rendering of the hydraulic clamping mechanism.



up to about 8.0 bar, then we release the pressure through the Venturi for half a second, which sends shock waves through the centre of the filter. The air pulses – like smoke rings – travel down to the base of the filter, shaking the filter media and releasing surface dust," he explains.

"If a dry bulk truck is later used for wet waste, this can be dangerous," he warns. "If any residual cement is on the

# Key Drivers of Profitability

# Reliability, Efficiency and Productivity



## Rotary Screw Compressors

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- Oil-Free Variable Speed
- Contact Cooled

## Rotary Screw Compressors tailored to your specifications

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filters, for example, a little moisture will trigger the reaction to set the cement and destroy the filter. This has really happened! That is why we have the electronic monitoring system fitted, to protect the truck from costly damage," he says.

### HPVR Combis

Designed for combined jetting and vacuum applications, such as municipal sewer and line cleaning, Highpoint's Vacuum trucks can also be used for vacuum applications such as emptying industrial sumps and slurries, removing toxic waste, and wet and dry ash removal from power station boilers.

"In the rainy season, a lot of mud and silt accumulates in the drains, which cannot be carried away by subsequent liquid flows. To clean this from the drain, we use a retrojet nozzle, which has more jets pointing backwards than forwards," Visser explains. Typically, this nozzle is fitted to the end of a 120 m sewer cleaning hose on a hydraulically driven hose reel behind the truck. "This jetting nozzle is placed down a manhole into the drain line. Water is pumped through the nozzle at about 200 bar and, because there are more jets pointing backwards than forwards, a net forward thrust is generated. This propels the jet and hose up the drain towards the next manhole.

"Once there, the hydraulic reel is activated to withdraw the hose, causing any sediment to be washed down towards the entry point, where a separate vacuum tube sucks the waste and water back up into the truck, allowing it to be safely disposed of at an appropriate dump or sewage plant," Visser says.

When using a traditional Combi truck, according to Visser, the operator might spend a third of each day looking for water from fire hydrants, for example, refilling and returning to the manholes. Overcoming this problem is the company's recently released Recycler, which, in addition to all of the features of its traditional Combi trucks, also includes an onboard system to filter the water from the waste so that it can be reused for jetting. "The water recycling system itself is sourced from Dietmar Kaiser, but all of the rest is built here in our facility just outside of Sasolburg," he adds.

### The hydraulic door clamping system

All Highpoint vehicles contain a range of hydraulic pumps and circuits to support

the vehicles' functions. A particularly sophisticated hydraulic system is used to handle the opening, closing and clamping of the tank door. "These vehicles are emptied like tipper trucks. The back door opens and a hydraulic ram raises the cab end to discharge the tank's contents through the door at the back. But in operation, the tank needs to be well sealed to hold the vacuum. We use six hydraulic clamps around the rear door seal. Each of these each has an interlock and a hydraulic cylinder for opening and closing the clamp mechanism. And when open, hydraulically actuated hooks secure the door to allow people to safely enter the tank to clean it," Visser says.

The clamping and interlocking system is operated via a hydraulic sequencing circuit that uses a manifold block with Sun Hydraulics cartridge valves. "We use kick-down valves, which deliver a pressure spike as a circuit is completed. By designing the system to produce spikes at the appropriate pressures, we achieve a very robust cascade activation sequence," he explains.

"The clamps open in the first hydraulic sequence. Then the door opens and, finally, the safety lock engages – and the sequence control is 100% mechanical. We do not depend on any electronic controllers."

The system also has an equivalent reverse sequence to close the door again, with the lock releasing, the door closing and the clamps re-engaging. This is achieved via a separate hydraulic circuit built into the same manifold block. "Both sequences are fully automatic, so an operator cannot close the door while the lock is still engaged, for example, which would damage the mechanisms.

"Sun Hydraulics cartridge valves are so accurate that you can activate them during a half cycle. If the door is half open, the system can be put into reverse, which will close the door safely in the reverse sequence. Nothing needs to be reset. The sequence simply triggers immediately on activation," he tells *MechTech*.

Highlighting the advantages of using hydraulic controls, Visser relates that the Highpoint HPVR 1000s typically work at acid plants and in petrochemical companies, which are highly corrosive environments. "Exposed electrical connections in these environments will corrode, making the vehicle unreliable.

"The nice thing about hydraulic con-



*The vehicle and equipment arm of Highpoint Vacuum now has a production capacity of more than 20 vehicles per year.*

trols is that the whole system is hermetically sealed and 100% protected from outside influences. Everything is running in very clean oil, which makes it ideal for use in dirty, corrosive and aggressive environments. We also use hydraulics for most of the physical actuation tasks, such as the tank tipping and aligning the hose reels, with pneumatic actuators for the valves. But we try to stay away from PLCs as much as possible on the industrial vehicles," he says.

"When we have to use electronic controllers, for municipal vehicles, for example, we use IFM-controllers, a German specialist in mobile electronics that manufactures 100% sealed IP65-rated, so they are not prone to dust or moisture ingress," he adds.

"Like-for-like, our vehicles are about 20 to 30 % cheaper than imported equivalents. Compared to our European competitor, our trucks are at least R1.5-million cheaper and, more importantly, our turnaround times are much better. If ordering from Europe, first, you are forced to use a MAN truck, which is already about R400 000 more expensive than the UD's we use, and we can deliver in four months, from order to delivery. In addition, we can offer unparalleled turnaround times on spares and repair," Visser concludes. □

## Cabinet-free hydraulic drive control

Reallocating control functions to the individual machine modules allows machine engineers and operators to make maximum use of valuable site space, enhancing their production capacities. The cabinet-free drive technology IndraDrive Mi from Bosch Rexroth is enabling this idea to be implemented in automation applications across numerous industries and production sites.

**T**he IndraDrive Mi merges its drive electronics and motors/servomotors into an integral unit. This combination, which can also comprise I/O units and pneumatic and hydraulic actuators, virtually eliminates drive electronics housed within a cabinet and drastically reduces the wiring required to connect the individual components. With an integrated drive control unit from Bosch Rexroth, drive functions, motion control and flow logic merge into an open automation platform. Complex motion tasks can be handled with the motion logic system, which is fully designed in accordance with IEC 61131-3.

"The cabinet-free drive technology extends the possibilities in modularising machine concepts," explains

Georg Venter, divisional manager, Tectra Automation. "Machine manufacturers pre-assemble machine modules and then connect them to one another at the cabinet without any further work."

Central to the reallocation of drive control components are the Bosch Rexroth decentralised supply and mains modules. "This is how machine manufacturers can integrate all drive components directly into the machine without needing a cabinet," Venter adds.

The mains module includes a mains filter, mains regulator and mains protection in a single unit. The supply module includes an energy-recovering power supply, control electronics and brake resistors. The connection of the machines or modules to the power supply is carried out directly and without deviation via

the cabinet. This reduces wiring in the assembly by as much as 90%.

A newly developed hybrid plug for adjacent near-motor drives further reduces assembly work. These protected connector pieces for communication and power supply are simply plugged into adjacent IndraDrive Mi units by assembly technicians.

IndraDrive Mi supports all of common Ethernet-based protocols, including ProfiNet, EtherNet/IP and EtherCAT, all on a single piece of hardware with the Multi-Ethernet interface via the automation bus Sercos. The hardware remains identical, with selection occurring purely via software parameters. A connection to Profibus can be created via Gateway.

The motor-integrated and near-motor drive modules are designed in accordance with IP65-class protection for dust and water stream protection.

Up to 20 IndraDrive Mi modules can be connected in series in a cable harness up to 200 m long. The drive-based control by Bosch Rexroth coordinates up to nine IndraDrive Mi as slaves in real time.

The IndraDrive Mi cabinet free drive technology is available in sub-Saharan Africa through Tectra Automation, a Hytec Group company. □

## Hydrostatic and planetary drive combination

**B**osch Rexroth's HYDROTRAC GFT 8000 drive enables an approximate 10% increase in drive train performance for larger mobile working machines. Launched earlier this year and now available from Hytec, a Hytec Group Company, these transmission units are based on a modular design. Ideal for use in harsh, rugged environments including African mining operations, they have two- and three-stage combined planetary gearing driven by axial piston motors to match the needs of heavy and bulky mobile working machines such as trucks and excavators.

An optional internal brake reduces the installation space needed, but adheres to the safety specifications for worldwide roadworthiness certification. The mechanical planetary drives in these transmission units transfer the torque from the hydrostatic drive to the wheels or tracks. Bosch Rexroth uses the newest versions of variable axial piston motors or fixed-displacement axial

piston motors, which operate in either an open or closed circuit mode.

Travel capacity is significantly improved as the higher fluid capacity of the motors and the higher hydraulic pressures, along with exact matching with the two- and three-stage planetary drives, boost torques and therefore performance by approximately 10%.



At the same time, vehicle manufacturers can sometimes select a smaller nominal size to achieve the same output. This saves installation space.

The optional integrated multi-disk brake inside the unit requires minimal maintenance and is designed for protection against soiling, an added advantage when working in demanding environments. Also, when used in conjunction with Bosch Rexroth's high level braking system, they satisfy the exacting safety requirements for speeds up to 50 km/h.

All units are delivered as complete assemblies, ready for installation, and vehicle manufacturers can select a smaller nominal size to achieve the same output, which also saves on installation space. Due to the platform's modular concept, OEMs can vary the drive torques and transmission ratios, closely matching them to the vehicle used.

Two models in the 8000 series, which achieve nominal torques of 20 and 30 kNm, are available off-the-shelf and an additional seven models are currently being rolled out to the market. □



# Variable speed rotary screw compressor — order to installation in seven weeks

**G**auteng-based Dintsu Engineering Technologies (DET), one of Ingersoll Rand's distributors, supplied, installed and commissioned a 160 kW oil-free variable speed Ingersoll Rand Nirvana rotary screw compressor that is four times faster than any commercial competitors could offer. With the average delivery time from order to installation for this compressor type being about 24 weeks, the fast turn-around time is unprecedented at Ingersoll Rand South Africa.

The client – with whom DET has a standing relationship in the provision of air quality monitoring, air dryer refurbishment and filtration maintenance – supplies all the bumpers for a niche range of top quality vehicles targeted at the upper-income market. Three of the client's air compressors needed replacing and DET motivated that two of them be replaced with a single Ingersoll Rand solution: the 160 kW Ingersoll Rand variable speed oil-free compressor which, among other benefits, realises an energy cost saving during less air-demand times due to the variable speed. The order was placed on the day of the motivation, shipment commenced a few days later with commissioning taking place only seven weeks after the initial contact.

"The variable speed 100% oil-free compressor market is somewhat limited," points out Pierre Doman of DET, "and taking the cost of these units into consideration, stock held by South African OEMs is relatively small. The demand, therefore, flows over to their overseas manufacturers, which compounds the problem. Ingersoll Rand in Europe, however, held this specific compressor ex-stock. Given that the average time to build a variable speed oil free compressor takes between 16 and 20 weeks, Ingersoll Rand's readiness granted us a substantial advantage."

To ensure long equipment life and reduced downtime, plant operators were trained in the basic operating principles during commissioning stage and, in addition to the standard warrantee provided on all Ingersoll Rand products and equipment, the client has opted for Ingersoll Rand's extended five-year Air Care warrantee.

Ingersoll Rand is a leading brand in



*Dintsu Engineering Technologies (DET), one of Ingersoll Rand's South African distributors, supplied, installed and commissioned a 160 kW oil-free variable speed Ingersoll Rand Nirvana rotary screw compressor in just seven weeks.*

the market and has a large share of the South African and African markets. "We already have several turnkey projects

involving compressors in the pipeline for a variety of markets including one of the larger hospital groups," says Doman. □

## Festo expands its distribution network

**F**esto South Africa, has expanded its network of product dealers and customer facilities to ensure greater access to its products and services. With the inclusion of BMG as one of its official distributors and reinvestments of over R7.5-million in sales resources, Festo has increased its face-to-face sales presence by 20%. In addition, the company has developed online stores, contact call centres and direct delivery distribution options.

The addition of BMG as an authorised distributor provides for an increase in sales-customer interaction points throughout South Africa and Africa, ensuring customers have easier access to Festo's offering and market-leading technical expertise. Festo products are now distributed through 12 BMG stores in South Africa's major cities, 150 local distributors nationwide and almost 200 throughout Africa.

Describing the expanded sales network, Warren Harvard, national sales manager for Festo, says, "Our aim is to provide customers with more access to Festo products and services. Our increased distribution network will benefit those customers who prefer walk-in purchase points, while those who still wish to place an order over the phone or through our website for next day delivery, will still enjoy the same service.

"Our additional distribution sites allow us to commit our resources to ensure gains in

efficiency. This will mean that point-of-sale facilities are no longer required in some of our branches, so we are deliberately reinvesting these resources in sales engineers and Didactic training facilities, resulting in a significant increase in our sales force and affording customers more time and access to the engineering support team.

"Ultimately we want to grow. Over the last 40 years, Festo has grown steadily within the South African market and we intend to continue that growth for the next 40 years. To achieve this we recognise the real need to ensure our products become more widely accessible, while at the same time investing resources in our online distribution and Didactic training services," Harvard explains.

By working with BMG and Festo's local distributors, the company is able to offer customers a large range of products and support services. "We have always taken pride in being able to offer unique services, specialised technical support, and efficient logistical processes that allow customers to fully access and utilise the world's best automation technologies.

"Now, with our increased distribution network, we are able to do more with our resources and ensure that our customers receive the best possible products, support and training so that they are able to enhance their own business interests," Harvard concludes. □

# Pitting corrosion repairs in process vessels

This article from AESSEAL, the South African distributor of modern Belzona paste grade epoxy surfacing materials, describes the repair of an amine reboiler vessel at a gas terminal in the UK.

**T**he costs of corrosion can be colossal, especially where safety critical equipment is concerned and especially in the oil, gas and petrochemical industries. There are direct costs involving equipment and part replacement, while hidden costs include downtime, delays, litigation and other unplanned overheads.

The most damaging form of corrosion is localised corrosion, which does not proceed uniformly and is focused on particular sites of a steel substrate. Crevice and pitting corrosion (Figure 1) represent the main types of localised corrosion.

In pitting corrosion, an anode develops and maintains its electrical potential with respect to the surrounding metal, with a large cathode to anode ratio that allows the corrosion to rapidly form a pit. Pitting corrosion is especially prevalent in steels that have the ability to passivate – especially in stagnant conditions where the formation of a protective film is hindered by the presence of chloride ions. It is considered more dangerous than uniform corrosion because it is more difficult to detect, predict and design against. It is also difficult to repair.

Pitting can be prevented and controlled by using corrosion inhibitors, cathodic protection, and protective coatings, but these protective systems have been known to fail. Once pitting occurs,

a solution is needed that can satisfy three basic needs: First: quick repair; second: ease of repair; and third: rapid return to service. Additionally, the maintenance solution should withstand service conditions for a considerable time.

Localised corrosion in the form of deep pits can be weld repaired to restore the original profile, but expertise and special tools are required. If either is lacking, repairs can do more harm than good, because of the risks of distortion, weld cracks, stress corrosion and health and safety considerations. Welding repairs carried out on metal substrates over 30 mm thick must also involve post-weld heat treatment (PWHT), which may result in the loss of weld metal strength and toughness. PWHT is also costly because of the time that it takes – up to 40 hours. Further, welding over a metallic substrate involves metal being applied to metal, which does not remove the original problem unless the metallic substrate is coated with an organic protective material.

Another viable option to repair pitting corrosion is the use of cold applied epoxy materials. These 100% solid, paste grade materials have been on the market since the 1960s and have been continuously improved to withstand greater temperature and pressure levels as well as various in-service conditions. One example from

the UK is that of an amine reboiler vessel at a gas terminal, which, in 2011, was discovered to have suffered heavy pitting corrosion (Figure 2).

The operator required the vessel to be back in service as soon as possible and was looking for an alternative solution to hot work. A paste grade epoxy material was chosen to fill the pits and afterwards, the wall was protected with a modified epoxy novolac coating (Figure 3). Both the coating and paste grade material were designed to achieve full curing in high-temperature immersion service, minimising downtime.

The reboiler was opened up for inspection in July 2015. No further pitting damage or corrosion was identified (Figure 4). Minor localised repairs were completed on the coating and the reboiler was returned to service.

In order to ensure fitness for service of pit-filling epoxy paste grade materials, the application should be carried out in strict accordance with manufacturer's requirements. The contracting company must ensure that the surface is prepared correctly, that the repair material is mixed and applied properly and that it is allowed to cure in accordance with manufacturer's instructions. A typical pit filling procedure is summarised as follows.

1. All work must be carried out in accordance with the manufacturer's instructions.
2. The vessel substrate must be dry and contaminant-free.
3. Sharp edges or irregular protrusions

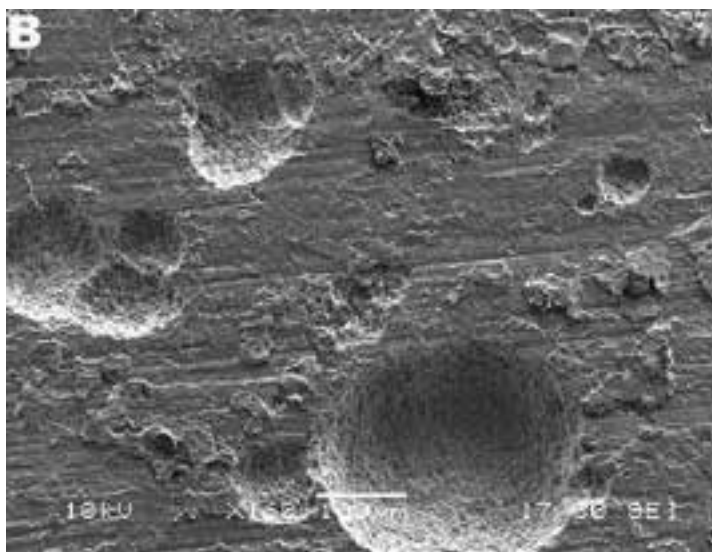


Figure 1: The most damaging form of corrosion is localised corrosion, such as crevice and pitting corrosion, which is shown above.



Figure 2: An amine reboiler vessel at a UK gas terminal was discovered to have suffered heavy pitting corrosion.

should be ground down to a smooth contour with a radius of not less than 3.0 mm. All surfaces must then be grit blasted using an angular abrasive to Swedish Standard SA 2½ (near white metal finish) with a minimum profile of 75 microns.

4. Paste grade epoxy material must be mixed in the correct ratio.
5. The material needs to be applied onto the substrate until the original wall thickness is restored.
6. The material must be allowed to solidify at ambient temperatures before achieving full cure in service.

One drawback traditionally associated with the use of epoxy materials for pitting repairs has recently been overcome, namely the amine bloom film that would appear on the surface during curing. The bloom would manifest in the form of sticky deposits that affected overcoat-ability and intercoat adhesion. It had to be removed by first washing with a hot detergent solution followed by a fresh water wash, and then frost blasting prior to the application of a protective coating on top of the pitting repair, leading to extended application time and labour costs.

The latest innovation in raw materials has brought on non-bloom technology, where frost blasting of the applied material prior to the application of protective lining is not required. This feature was incorporated into the reformulated version of the Belzona 1511 (Super HT-Metal), which has been on the market since 2001. In addition to incorporating non-bloom technology, further evaluation revealed the following enhanced features:

- Frost blasting of the Belzona 1511 is

no longer required when a protective lining is being applied on top with a 24-hour overcoat window, thus reducing application costs.

- Application is also simplified with mixing and application possible at temperatures as low as 10 °C (50 °F).
- The rubbery domains used in Belzona 1523 and Belzona 1593, which were also incorporated in the polymer matrix of Belzona 1511, have improved the adhesion, flexibility and toughness of Belzona 1511. Tensile shear adhesion (ASTM D1002) has increased by 46% regardless of the cure tempera-

ture. Pull off adhesion has increased by 34% (ASTM D4541/ ISO 4624). Continuous advancements in raw materials make it possible for coating and composite manufacturers to produce systems that are better value and easier to apply, at the same time minimising the risks typically associated with hot work. In this way, the indirect costs of corrosion, including downtime, delays, litigation and other unplanned overheads, can be significantly reduced.

Belzona compounds are distributed and supported in South Africa by AESSEAL. □

### About Belzona

Established in 1952, Belzona has pioneered innovative polymer technology that has revolutionised industrial repair and maintenance procedures.

The company is a leader in the design and manufacture of polymer repair composites and industrial protective coatings for the repair, protection and improvement of machinery, equipment, buildings and structures.

The full Belzona product range is manufactured in Harrogate, England, to stringent quality and environmental control guidelines to comply with the requirements of ISO 9001:2008 and ISO 14001:2004.

As well as AESSEAL in South Africa, Belzona has over 140 distributors in more than 120 countries ensuring not only the availability of Belzona materials, but also specification support, project management, application and supervision services. Distributorships and their teams are supported by Belzona Corporate offices in Europe, North America and Asia.

### About AESSEAL

AESSEAL is a specialist in the design and manufacture of mechanical seals and support systems.

The company's mechanical seals are used in a wide range of pumps and rotating equipment worldwide to prevent liquids and gases escaping into the environment. AESSEAL manufactures mechanical seal types to suit all industries and its investment in modular designs means that it can provide the best on-time delivery performance in the industry.

The AESSEAL range of seals, seal support systems and bearing protectors are all designed to improve pump reliability and reduce maintenance costs. The business is built around giving customers such exceptional service that they need never consider alternative sources of supply.

AESSEAL operates from 230 locations in 104 countries, including nine manufacturing and 58 repair locations, and has more than 300 customer service representatives who visit industrial plants every day. □



Figure 3: A paste grade epoxy material was chosen to fill the pits and afterwards, the wall was protected with a modified epoxy novolac coating.



Figure 4: In July 2015, after four years in service, the reboiler was again opened up for inspection. No further pitting damage or corrosion was identified.

# Materials Engineering in Practice: the micro

This month's *Materials Engineering in Practice* column by Tony Paterson from Wits' School of Chemical and Metallurgical Engineering describes a corrosion case study involving the roofing of a new reception area for the Children's Memorial Institute on the border between Parktown and Braamfontein.

Johannesburg has a relatively benign environment, but with some light industry and heavy traffic it is categorised as C3 in terms of ISO 9223: *Corrosion of metals and alloys*, which is not as benign as undeveloped country areas. But corrosion is usually not top of the mind when considering material options. There are often reasons to encourage more careful consideration, however.

The Children's Memorial Institute is situated on the Parktown/Braamfontein border, south of Empire road and north-west of the Constitutional Court. It houses some 30 non-governmental organisations concerned with children's challenges. A common reception area to assist clients was envisaged and a suitable area for this was identified in the east/west lying broad passageway between two parts of the building. In principle, this reception area could be created by spanning the existing north and south buildings and adding a roof and an entrance façade.

A Chromadek coated corrugated iron roof to cover the existing passageway coupled to a glass and aluminium façade seemed the simplest choice. To avoid the need for other modifications, the



In Johannesburg, where uncoated zinc roofs are positioned below steel railings, security barriers or similar – typically on roofs built over pavements outside shops – the dissolved rust runs off from the upper level, rapidly rusting the sheeting below.

proposed roof fell from north to south with drainage along the south wall to existing drainage grids.

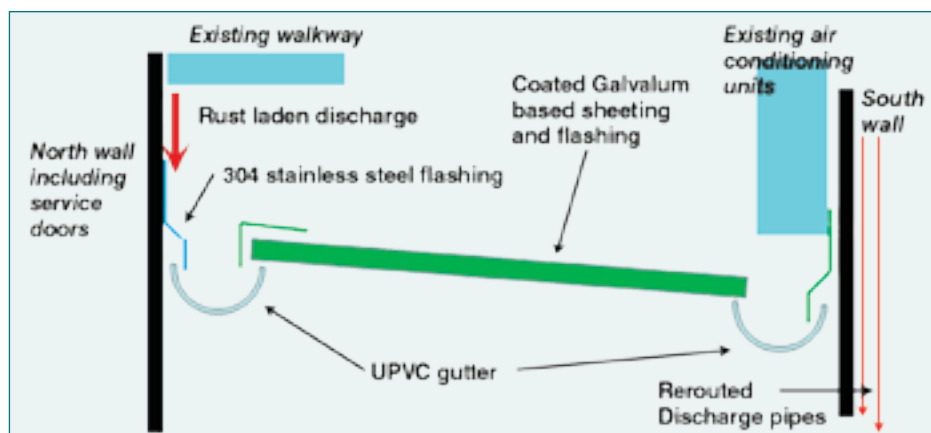
However, when considered from a corrosion point of view, concerns emerged. The reception area was in an area generally shielded from sunlight by the four-storey buildings on either side. Similarly, it was shielded from wind. A normal wet/dry cycle was unlikely and humid conditions were more likely to prevail. An ISO 9223 C3 to C5 corrosion environment is considered likely.

While the southern building section was a solid concrete wall, the northern section included continuous rows of service access doors at every level. These doors were of painted mild steel fabrication. Erected in the 1960s, the doors were corroding and rust was evident.

Associated with the access doors were steel walkways spanning east/west at every floor level. It was anticipated that rain would drain from the sides of the building and from the walkways onto the proposed roof. Thus the roof could not be considered as a stand-alone fabrication in the same way as a freestanding house in the same general area.

One can observe numbers of examples in Johannesburg where uncoated zinc roofs are positioned below steel railings, security barriers or similar – typically roofs built over pavements outside shops. The rust run off from the railings and rapidly rusts the roofing sheet below. This is because dissolved rust has a pH of down to about 2, well below the pH limit of Zinc of 5,5 – and since pH is a log scale, a pH of 2 is 1 000 times more aggressive than a pH of 5.

This 5,5 pH limit may be seen as a little high for uncoated zinc as, exposed to the atmosphere, zinc develops an oxide/carbonate patina, stable in the 6-12 pH range. As 5,5 is the pH of normal rain (as a result of dissolved CO<sub>2</sub> from the atmosphere) and uncoated zinc roofs have lasted well, the possibility of a slightly lower corrosion resistance limit is credible. However, rust run off is potentially far more aggressive. Many zinc roofs are coil coated in production with Chromadek, a 7.0 µm layer of coloured primer, which resists corrosion down to a pH limit also cited as 5,5. The factory application to coils means that the zinc



A simple graphic of the solutions: The decision was made to remove as much of the runoff as possible by providing a plastic gutter on the north (higher) side – this fed via 304 stainless steel flashing. On the south side, a second plastic gutter was proposed.

# environment reality

is not exposed to the atmosphere and does not have time to build the carbonate protective patina.

Secondly, a question arose as to whether, in this inner city C3 environment, one should not consider acid rain, which is associated with dissolved SO<sub>2</sub> and NO<sub>x</sub> from the pollution over cities. Certainly the first rains of the season are likely to be more acidic.

To test the life expectancy of the roof, corrosion tests were initiated. Rust and associated detritus samples (probably including lime dissolved from the concrete columns, bird droppings and dust) were taken from the site. 10 grams of rust/litre was dissolved in each of two prepared solutions, these of pH 5.5 representing normal rain, and a pH of 4, representing acid rain. Two sets of bare zinc and Chromadek coated zinc coupons were prepared and weighed. The coupon sets

were immersed in the prepared solutions for a week (168 hours) at 30 °C. Both coupon types failed rapidly in each solution, the rate determined by mass balance. The results suggested an aggressive rust influence rather than the difference between acid and normal rain.

New coupon sets were prepared, these of Galvalum (35% aluminium by mass and more than 75% by volume) and Galvalum-coated with a modified polyester coating. Aluminium is more resistant to corrosion than zinc by one order of magnitude but is not resistant to the lower pH levels potentially associated with the dissolved rust. As anticipated, the tests showed better results for the bare sheeting, but better again by more than an order of magnitude for the coated sheets.

Whilst this clearly indicted the desirability of changing the sheet material

and coating, it did not answer all the concerns. The direct drainage from the service doors remained a potential problem. So the decision was made to remove as much of the runoff as possible by providing a plastic gutter on the north (higher) side – this fed via 304 stainless steel flashing. On the south side, a second plastic gutter was proposed. Existing discharge pipes on the south wall, one from existing air-conditioning units and a second from a fourth floor storage tank, were rerouted to prevent discharge onto the roof and avoid the possibility of galvanic corrosion effects.

A previous column suggested that corrosion is all around us. Corrosion is a natural process. The case study was chosen to give a simple example of the reality and effect of micro environments, the tests conducted and the design solutions proposed.

When one moves from the general to the specific a reality check is worthwhile. □

## Extrusion equipment for fibres and yarns

**P**FE Extrusion, a leading producer of polyolefin staple fibres and yarns in Hammarsdale near Durban, has just commissioned state-of-the-art new equipment aimed at producing a wide range of yarns that have, until now, been imported at premium prices.

Mehran Zarrebini, head of the PFE International Group, which includes Van Dyck Carpets, says that the new investment will enable the company to produce highly specialised products and add value to the yarns produced. UK-based PFE International has more than 30 years' experience in the extrusion of polypropylene staple fibre and bulk continuous filament (BCF) yarn.

At present, he explains, Safripol and Sasol are the only local suppliers of the polypropylene raw material used to manufacture these fibres and yarns. Much of the value created in the processing of this raw material is created downstream. The group had invested in this equipment to optimise this and to enable it to diversify into new markets as well as export.

The Hammarsdale factory currently develops, manufactures and markets up to 15 000 t of staple fibre and 2 000 t of BCF yarn annually. These are used for the production of flooring and carpets, geotextiles, filtration materials, automotive components, spun yarn, equestrian footing and concrete applications. Continuous polypropylene fibre is also used to make artificial hair.

Although 80% of production goes to Van Dyck for the manufacture of carpets and carpet tiles, the number of outside customers is growing, says Zarrebini. Whilst ensuring that Van Dyck's reliance on imported materials remains as low as possible, he says the company is looking to diversify into other niche markets.

Zarrebini explains that the first of the new machines due to come on stream is a twisting machine. "In the yarn manufacturing process, fibre bundles are brought together and wound around each other (twisted and then heat-set), binding them together in a continuous strand. This helps them to stay together and improves

performance by increasing resistance to pile crush."

The second is a heat setting machine that is used for the production of carpet yarn. Heat setting is a process that sets the twist in a carpet pile with heat or steam. This process enables fibres to hold their twist over time, allowing them to bounce back with great resilience whenever they are stepped on. It also gives yarns stability, higher volume, wrinkle resistance and temperature resistance.

Overall, he says, the new investment will create further versatility in terms of carpet production, "enabling PFE Extrusion's customers to add value to their existing product ranges and source different types of yarn without having to import". □



The newly installed yarn twisting machines at the PFE Extrusion factory in Hammarsdale.

# The bounty of nothingness



Krishan Chawla (left) and Gary Gladysz have released a book *Voids in Materials: "From Unavoidable Defects to Designed Cellular Materials"* (Elsevier, 2014), which explains how to understand the role of voids and how to use them profitably to design new materials.

Voids are everywhere – even in the most solid materials. In this article, Krishan Chawla, Professor Emeritus of Materials Science and Engineering at the University of Alabama, Birmingham in the US; and Gary Gladysz, partner/owner of Empyreus LLC, explain how to understand the role of voids and how to use them profitably to design new materials.

“We may think of empty space as nothingness – space that’s perhaps waiting to be filled with something useful – but scientists and engineers know that the voids are intrinsically valuable. They can fortify structures to make them stronger without burdening them with weight. The ability to manipulate that nothingness brings new opportunities to many fields, from deep sea and aerospace exploration to the management of methane gas and its impact on global warming,” says Chawla, adding: “Extra weight takes energy to move.”

Chawla and Gladysz have dedicated a good part of their careers to the study of voids to help bring better understanding to this essential feature. Since 2004, Chawla and Gladysz (previously Vice president of R&D within Trelleborg Offshore & Construction) have hosted the conference series Syntactic and Composite Foams, organised by Engineering Conferences International.

The pair released their book *Voids in Materials: From Unavoidable Defects to Designed Cellular Materials* (Elsevier, 2014) in September, and the fourth conference was held in November last year, attended by about 40 accomplished researchers from universities, national laboratories and industry. The conferences are a vehicle to explore the mysteries they study. Says Chawla: “We

look at all types of foams – metallic, polymeric and ceramic – characterising them with very sophisticated equipment and looking at different aspects of the same topic. We always learn new things from other people.”

Both scientists say that voids are rarely recognised for their value. “Voids are everywhere whether you want them there or not – you just have to deal with them,” says Gladysz. “Solid or not, there is void space that adds functionality to all materials. Sometimes the presence of voids can be harmful, but we need to understand the circumstances when that is the case. It’s about building

materials from that atomic scale up, through the nano scale and on up to the macro scale, while incorporating voids at each level to add functionality. This approach will bring about combinations of functionalities that have never been achieved before.”

“We go to great lengths in the book about how to understand the role of voids and how we can use them profitably to design new materials,” he says. “Biomaterials are a technology area that we think will be very important in the very near future for implants.”

The authors hope that their book will provide a road map for designers. “Maybe we can incorporate more functionality into materials and components by incorporating voids on different scales,” says Gladysz. “At universities very few foams courses are offered, but the applications are vast. It’s hardly ever mentioned. We want to raise awareness of what happens



“We can incorporate more functionality into materials and components by incorporating voids on different scales,” says Gary Gladysz.

with voids and what happens with these materials.”

One application that Chawla and his colleagues have developed shows promise as a means to clean water that's been polluted by industrial textile dyes, oil spills, antibiotics or other pharmaceuticals. “We take tiny microspheres of glass and coat them with titanium dioxide,” says Chawla. Under the action of ultraviolet rays, titanium dioxide breaks up pollutants into harmless by-products. Putting the titanium dioxide around the outside hollow spheres is novel. When introduced into water it becomes foam that floats on the water surface. It's very benign.”

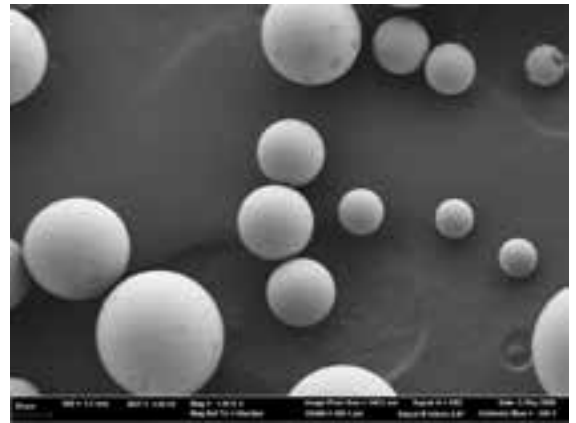
Another significant application of the work is its potential to curb global warming caused by methane gas. “Methane is starting to enter the atmosphere at higher rates because of melting of natural deposits of methane hydrate from global warming, agriculture and landfills,” Gladysz says. “It all just goes into the atmosphere. The one path we can take is to capture methane in a stable solid cage and then use it as a fuel to serve as a bridge to renewable energy. This meth-

ane hydrate structure consists of a single molecule of methane inside an ice cage, so there is a void at that scale in the cage. By studying the structure and void spaces in methane hydrate; we can create organic molecules with larger void spaces that can hold more methane. Potentially we can capture this methane and put it in a more thermally stable solid.”

Gladysz says the implications are impressive. “As in the methane hydrate example, we look to nature for solutions and we then try to improve on them.”

#### Microspheres from Trelleborg

Trelleborg's Eccospheres® are thin-walled, hollow glass microspheres (HGMS) developed to meet the demanding strength, weight and electrical specifications of companies in the aerospace, defence and industrial markets. Magnification reveals the near perfect spherical shape of HGMS, which to the naked eye resemble a fine, white, free-flowing powder. The unique properties of Eccospheres can help reduce costs, enhance products



*Trelleborg's Eccospheres® are thin-walled, hollow glass microspheres (HGMS) developed to meet the demanding strength, weight and electrical specifications of companies in the aerospace, defence and industrial markets.*

and improve material processing. Eccospheres can be incorporated into a wide range of polymer and resin systems and can replace or combine with other materials to create composites. Areas of applications are extreme processing conditions (extrusion, roller milling, and injection moulding), chemically sensitive systems (silicones, vinyl esters, long pot-life epoxies), high viscosity systems, high temperature systems and low dielectric/loss tangent materials. □

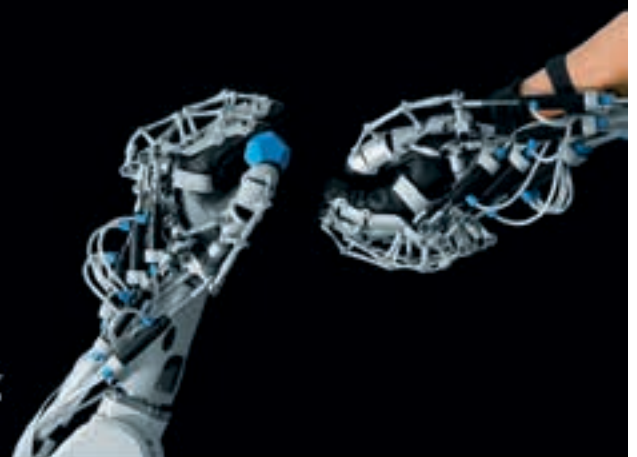
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## Variable displacement pump for lower-power applications

In introducing a variable displacement axial piston pump for hydraulic systems in the new size 18, Bosch Rexroth has narrowed the price gap to similarly sized gear pumps. Manufacturers of mobile equipment in the agricultural and construction sectors can now implement this efficiency-enhancing technology on tractors and vehicles of 37 kW and the low-power auxiliary drives on larger vehicles.

By using demand-controlled power generation associated with variable displacement technology in the lower-power range, manufacturers and operators of mobile equipment can improve machine efficiency by up to 16%, while simultaneously lowering exhaust emissions.

The use of variable displacement pumps has previously been restricted to machines in the upper power ranges, with lower-powered machines having to use energy-intensive fixed displacement pumps. The A1VO axial piston pump from Bosch Rexroth offers a range of available control types – pressure control, load-sensing control and electronic control – providing an economically attractive alternative for many hydraulic systems that previously

used fixed displacement pumps.

Comprehensive simulations using OEM engine map data of a commercially available 66 kW diesel motor demonstrated that the A1VO reduces energy savings by between 10 and 16%. On a projected tractor life of 6 000 hours, and assuming a typical load cycle distribution, the unit was calculated to produce savings of around 10 000 litres of diesel. The variable pump achieves the greatest fuel savings in partial-load operations, such as holding the plough during transportation or working with the front loader.

The A1VO pump comes in two sizes, 18 and 35 cm<sup>3</sup>, both of which are housed

in a compact, flexible and reliable enclosure that allows a simple installation into existing hydraulic circuits without altering the underlying specifications. The A1VO can be easily combined with other pumps through a universal through-drive and interchangeable adapter.

By using a seven piston rotary group, and by integrating all ports and the controller into the port plate, increased leak tightness is achieved in a compact, robust enclosure.

As the official partner to Bosch Rexroth across sub-Saharan Africa, the Bosch Rexroth A1VO variable pump is distributed through Hytec, a Hytec Group company. [www.hytecgroupp.co.za](http://www.hytecgroupp.co.za)



The A1VO axial piston variable pump from Bosch Rexroth provides mobile equipment in agriculture and construction with an attractively priced alternative to a gear pump in the new size 18.

## New tool to precision-align rotating shafts

Comtest, local distributor of Fluke test and measurement tools, has announced the launch of the Fluke 830 Laser Shaft Alignment Tool, specifically engineered for precision-align rotating shafts.

The Fluke 830 offers simple functionality, fast, accurate and actionable answers. Unlike the straight-edge method or dial indicators, Fluke's 830 performs complicated alignment calculations automatically, which means users have the answers needed to quickly align the machine. An enhanced user interface provides easy format results that don't require extensive alignment knowledge. The 'all-in-one' result screen shows both coupling results and feet corrections (vertical and horizontal) in real terms, allowing for corrective alignment action.

The Fluke 830 features: single laser measurement technology; an intuitive guided user interface for easy alignment;

compass measurement mode using an activated electronic inclinometer; dynamic machine tolerance checks; an extend mode to handle gross misalignment; and data protection with auto save and resume capability.

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



## Test rig enables local bearing manufacturer to expand

GB Bearings, a local manufacturer, refurbisher and distributor of industrial and white metal bearings for the South African and export markets, has launched a new range of industrial bearings and further expanded its business by adding a new test rig – the only one of its kind in South Africa.

These successes were made possible through the implementation of a Firm Technology Assistance Package (FTAP), one of the solutions offered by the Technology Localisation Plan of the Department of Science and Technology (DST). GB Bearings, as a supplier to state-owned companies, was selected to form part of government's drive to improve the com-

petitiveness of local original equipment manufacturers.

The DST recognises that upgraded technologies and support are key requirements for competitiveness. Increasing local industrial activity requires bold intervention to raise the capability and status of local manufacturing companies to that of competitive global players.

Masande Dzulisa, project manager at the Technology Localisation Implementation Unit (TLIU), says, "In the gap analyses conducted as part of the FTAP, GB Bearings required a new test rig to expand its capability for manufacturing and testing the characteristics of a range of bearings. The

TLU is a DST-supported initiative hosted by the CSIR.

"We opted to work with the Durban University of Technology, for reasons of expertise and proximity, to design the new rig. Subsequently, we identified suitable companies to manufacture the test rig. We also had to find a suitable software supplier as the requirements highlighted the need for software to measure a range of bearings and technology specifications. A compatible product was found in the UK."

It took Dzulisa and his team only eight months to get the right partners on board, design, manufacture and implement the test rig, the only one of its kind in the country. [www.gbbearings.co.za](http://www.gbbearings.co.za)



## Pipe joining add-in for Revit MEP

Victaulic, the world's leading manufacturer of mechanical pipe-joining systems, has introduced Victaulic Tools for Revit, an innovative Autodesk® Revit® MEP add-in that increases drawing productivity, solves troublesome pipe-routing problems and enables the creation of construction and fabrication documentation from within Revit.

The productivity tools within Victaulic Tools for Revit allow users to design virtual, intelligent models with all mechanical or pump room details in half the time compared to current routing techniques within Revit. Features that increase routing efficiency include:

- Pipe splitting: Automatically splits pipe into predetermined minimum and maximum lengths and joins pipe sections with the specified coupling.
- Rotate selection: Rotates selected portions of the model at a specified angle within the 3D view.
- Resize selection: Changes the size of all components in a selected area with a single click.
- Delete pipe: Deletes a selected pipe, while ensuring proper connection points.
- Pipe/custom tagging: Automates tagging, placing custom tags on pipe and components within the model.
- Family lookup: Exports and imports lookup tables being used by the currently open family.



The productivity tools within Victaulic Tools for Revit allow users to quickly design virtual, intelligent models with all mechanical or pump room details.

- Directory lookup: Scans family directories and imports and exports all lookup tables within all families.

In addition, users can create construction details and fabrication drawings, including labour estimates and manufacturer information, without the need to switch software.

"Victaulic Tools for Revit features an intuitive, user-friendly interface that simplifies training and usage for both new and experienced Revit users," says Barry van Jaarsveld, Victaulic's regional manager for Africa. "The add-in works in all views, comes preloaded with more than 100 Victaulic product families and template designs, and allows users to route with Victaulic as well as other manufacturers piping products and joining technologies."

[www.victaulicsoftware.com](http://www.victaulicsoftware.com).

## A first-of-its-kind motor range

As of January 1, 2015 the European Economic Area officially prescribed that all asynchronous ac motors with squirrel-cage rotors be classed as IE3. SEW-Eurodrive has, therefore, proactively expanded its comprehensive portfolio of ac motors by adding new IE3-accredited



SEW-Eurodrive's DR modular motor system – shown here with an encoder – became IE3-compliant in 2014, after being optimised in dimensions, weight and performance.

units, says the company's general manager for engineering, Conrad Pilger.

"Although the SEW-Eurodrive DR modular motor system has been available since 2008, it became IE3-compliant in 2014, after being optimised in dimensions, weight and performance. The systems can be integrated easily into existing machines and systems to enable greater energy efficiency."

The DR series is now the only system of its kind worldwide that satisfies the requirements of all efficiency classes, from IE1 to IE3, in a single product range. Despite the recent optimisation, the IE3 motors are compatible with the same components, which simplifies the stocking of spare and wear parts.

"This represents a significant cost benefit for suppliers and end users. The new DR motors are as compact as an IE2 class motor of the same power

## PDS ensures safe and productive mining

Booyco Electronics has been and remains at the forefront of pedestrian detection system (PDS) technology in the South African mining industry since 2006. "Our fit-for-purpose, ISO and legislation-compliant PDS technology, which we continuously improve and upgrade, offers world-class overall equipment effectiveness which, in turn, ensures pedestrian safety," says Martin Vermaak, operations manager at Booyco Electronics.

He believes that the mining sector's lack of education on legislated compliance requirements for PDS technology is contributing towards their uninformed decisions when choosing a system. "Once informed, the purchase of a reliable PDS from a reputable original equipment manufacturer such as Booyco Electronics will become a natural choice, ultimately ensuring overall, world-class equipment effectiveness and the reduction in potential pedestrian and vehicle collisions," Vermaak says.

The Booyco PDS equips miners with two-way RFID tags and vehicles or other static danger zones with VLF antennae. This creates stable fields of a predetermined size and shape in front of and behind the vehicle. Upon entering this danger zone, either a static danger zone or an approaching vehicle, the pedestrian's tag immediately triggers a warning signal and relays an audible and/or visual alarm to the equipment operator.

[www.booyco-electronics.co.za](http://www.booyco-electronics.co.za)



Booyco Electronics has been at the forefront of PDS technology in the mining industry since 2006, and has since grown to be the industry leader and innovator.

rating. The motors are available in the power range between 0,75 kW and 200 kW, and can be combined with SEW-Eurodrive gear units using direct mounting, or as stand-alone motors," Pilger continues.

While IE1 and IE2 motors are still commonplace in South Africa, Pilger suggests that rising electricity costs and continued load shedding are factors prompting local industries to invest more money upfront in energy-efficient motors, in order to ensure long-term savings.

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

## World's first top mount with polyurethane bearing and polyamide housing

**B**ASF has expanded its expertise in top mounts to provide car manufacturers with an optimum combination of weight saving, pleasant acoustics and vibration damping. A motor vehicle's top mount links the shock absorber to the chassis and has a decisive influence on driving comfort and dynamics. The interplay between the materials of the individual components is therefore of crucial importance.

A unique NVH (noise, vibration, harshness) top mount solution has been made possible by combining two of BASF's speciality plastics: the micro-cellular polyurethane elastomer Cellasto®; and the highly reinforced glass-fibre polyamide Ultramid® A3WG10 CR (crash resistant). The new BASF top mount

with its Cellasto bearing elements and Ultramid housing is around 25% lighter than conventional aluminium die-cast versions with rubber. In addition, the solution was developed and optimised for serial production using BASF's simulation tool Ultrasim.

Cellasto shows very good static and dynamic behaviour, has a long usage life and takes up only a small amount of installation space. Components made of Cellasto have been used in cars for more than 50 years. The PA66 grade Ultramid A3WG10 CR is 50% reinforced with glass-fibre and is, therefore, exceptionally rigid and solid, even at high temperatures. The engineering plastic is particularly suitable for dynamic loads and is generally, therefore, a good alternative to metal.

Combined to form the top mount, the actual bearing, the jounce bumper and the dust tube for the shock absorber can be functionally integrated to achieve good damping and acoustics. With a manufacturing technique especially developed by BASF, housing and bearing are joined to each other permanently. The CAE tool Ultrasim was used to calculate the load situations relevant for top mounts, the lifespan and to optimise the injection-moulding process, taking into account the reaction forces of the Cellasto core.

Like other automotive components made of Cellasto, BASF's globally active Cellasto business team offers the top mount as a complete solution to car manufacturers. "By combining Cellasto with an Ultramid housing in a top mount, we are making use of our expertise in the best materials, customised designs and meticulous quality management to provide customers with rapid component development and implementation, shorter process chains and global suitability," says Wolfgang Micklitz, head of the global business management at Cellasto. "This new and complex component offers a sustainable innovation that contributes to further CO<sub>2</sub> savings along with improved safety and maximum comfort."

Under the Cellasto brand name, BASF develops, produces and distributes components made from micro-cellular polyurethane elastomers for parts in chassis, power trains and interiors, such as spring aids, top mounts, spring isolators and transmission mounts. BASF is

the global market leader in this segment: Today, Cellasto jounce bumpers can be found in most vehicles manufactured in the world.

Ultramid A3WG10 CR is a special polyamide that is used mainly in crash-relevant chassis components like front ends, cross beams and engine mounts.

BASF's Performance Materials division encompasses the entire materials' know-how of BASF regarding innovative, customised plastics under one roof. Globally active in four major industry sectors – transportation, construction, industrial applications and consumer goods – the division has a strong portfolio of products and services combined with a deep understanding of application-oriented system solutions. Key drivers of profitability and growth are its close collaboration with customers and a clear focus on solutions. Strong capabilities in R&D provide the basis to develop innovative products and applications. In 2014, the Performance Materials division achieved global sales of € 6.5-billion.

[www.performance-materials.basf.com](http://www.performance-materials.basf.com)



BASF has developed a top mount bearing and housing solution by combining the micro-cellular polyurethane elastomer Cellasto®, and the highly reinforced glass-fibre polyamide Ultramid®.

### Rockwell hosts 24<sup>th</sup> Automation Fair

Hosted by Rockwell Automation and members of its Partner Network programme on November 18 and 19 in Chicago, the 2015 Automation Fair will showcase the latest advancements in tools, technologies, services and solutions to help drive changes across the automation investment lifecycle.

"Helping our customers realise greater productivity and increased global competitiveness through the Connected Enterprise is our passion and a top priority," says Keith D. Nosbusch, chairman and CEO of Rockwell Automation. "The 2015 Automation Fair will help attendees learn and apply the most contemporary industrial automation and information solutions to machines, plants and production, and fully leverage the power of IT/OT convergence."

At this year's event, more than 100 exhibitors will fill the west building of Chicago's McCormick Place along with attendees of user-group meetings, hands-on labs, technical sessions and demonstrations. [mjunius@ra.rockwell.com](mailto:mjunius@ra.rockwell.com)

### Industry diary

#### October 2015

##### Carbon Tax 101

30 October, Johannesburg

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