

# CONCRETE

Journal of the African Cement and Concrete Industry

# trends

VOL 22 No 3 August 2019

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Spotlight on local entrepreneurs

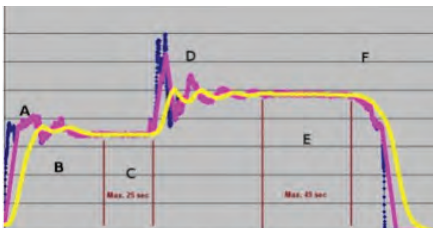
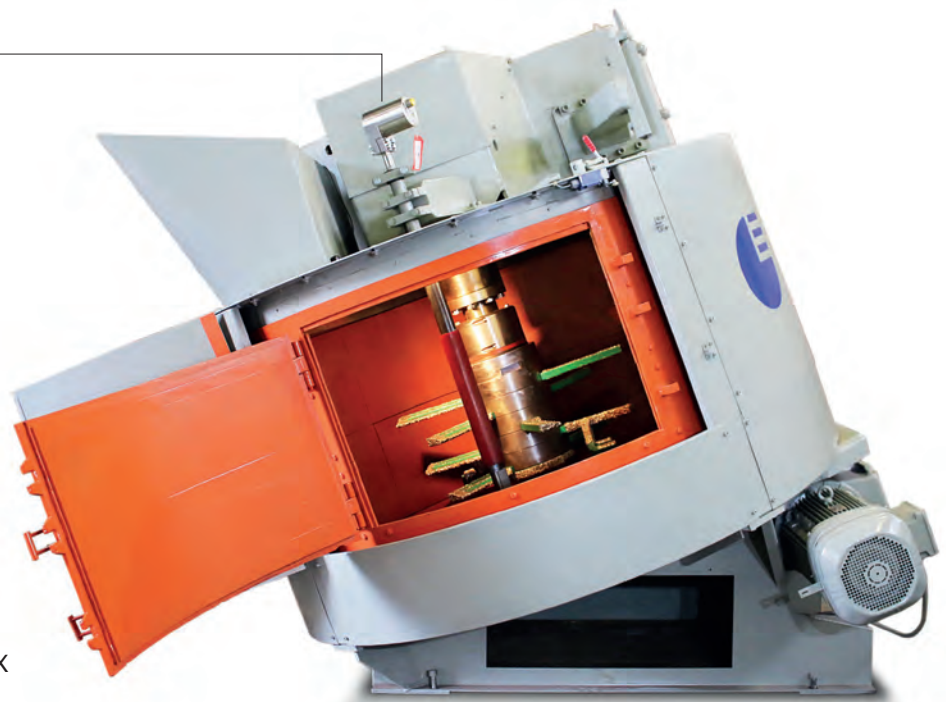
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# CONCRETE trends

Volume 22 No 3 August 2019

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REPRODUCTION & PRINT:  
RSA Litho Printers Cape Town

**dmg events** Published by dmgevents 31 Bell Crescent, Westlake Business Park, Tokai | PO Box 30875, Tokai, 7966, South Africa | Tel +27 (0) 21 700 5500 | Fax +27 (0) 21 700 5519

Concrete Trends is the official quarterly journal of the African Cement & Concrete Industry and is officially endorsed by



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ISSN 1560-2710

# An industry that's there – in good times and in bad

**A**t a time when the construction industry is battling its way through the worst slump the country has experienced in decades, it is extremely easy to languish in the 'slough of despond' and forget how much good and goodwill still exist in the midst of the retrenchments and the right-sizing.

I have always found it remarkable how the spirit of Ubuntu still manages to prevail despite these dark days for the industry.

With Madiba's birthday on the 18th of July, the press has been full of articles about the Mandela Day initiatives put into action by companies across the country – companies, who despite their own plight, are still able to consider the lot of those less fortunate.

However, the spotlight on Mandela Day puts the regular CSI commitments of our sector into the shade – a place that they patently do not deserve. Across the country crèches, clinics, schools, community feeding and housing schemes benefit on a regular basis from the support they receive from our industry.

And this generosity is nowhere more evident than in Growing up Africa's Devland Soweto Education Campus which is close to completion. Growing up Africa is a non-profit established in 2008 and led by the indefatigable Deborah Terhune who appears to be able to conjure miracles out of almost nothing.

What sets Growing up Africa apart is its spirit of collaboration – committed people working together to actively build change in South Africa. And it is the collaboration with the building industry, suppliers to that industry and students within the industry that has enabled Terhune to achieve the seemingly impossible.

From a rubbish dumpsite in Devland, the impressive educational and community facility has risen from the ground. Over 150 companies within the South African construction industry have contributed 93% of the R60 million that the project has so far cost. But it's not been about the money, it's been about the provision, in kind, of materials, equipment, labour and professional services that have achieved the transformation of the dumpsite.

In addition to Devland, the construction industry's support of Growing up Africa has helped create the Happy Home Preschool, in Justicia Mpumalanga and the Thingo Kids Early Childhood Development and Training Centre in Cosmo City.

These, and countless other projects, by their very existence, are a tribute to the generosity of our industry – in good times and bad. Thank you to you all for what you do for our country. ■

*Gill Owens, Editor*

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**TECHNICRETE**

# Cement industry seeks protection against crippling imports

**T**he Concrete Institute (TCI) has, on behalf of the South African cement producers, applied to the International Trade Administration Commission (ITAC) of South Africa to investigate the surge of imports of low-priced cement.

TCI has lodged the application on behalf of AfriSam, Dangote Cement SA, Lafarge Industries South Africa, Natal Portland Cement Company, and PPC.

Bryan Perrie, TCI managing director, says imported cement is undercutting the industry by at least 45%. When this is combined with unprecedented low levels of demand due to slowed economic growth, the industry is facing a survival crisis which threatens to undermine the industrial capacity of the country. "The cement industry has no option but to request ITAC to conduct a safeguard investigation to determine whether the cement industry requires protection from the surge in imports."

Perrie says that South Africa has become a net importer of cement with total imports increasing by 139% since 2016 which makes trade remedy protection vital to ensure the viability of the cement industry. "Local producers have the capacity to meet the Southern African Customs Union's industrial demand and must protect employment, Broad Based Black Economic Empowerment (B-BBEE) investments and Environmental Social and Governance (ESG) requirements. The SA cement industry needs to compete on a level playing field and not against a surge of low-priced imports," Perrie asserts.

"The South African cement industry is very competitive. The cement, concrete and affiliated industries employ thousands of South Africans whose jobs would be on the line if local cement production is not protected. Importantly, several producers have significant B-BBEE investments that are at stake."

In addition to the surge in low-priced imports, a 'carbon tax' was introduced in June 2019 on the South African cement industry's activities that has increased the industry's production cost. The effect of this tax translates into a 2% increase in selling prices, putting the local cement industry at a further disadvantage against imports.

Local pricing reflects the standards (technical, social and environmental) that have been determined by South Africa as necessary for local manufacturing. South African cement manufacturing processes are regulated, from environmental impact assessments to strict quality controls, and from labour and employment regulations to sustainability requirements and South Africa is a signatory of the Paris Accord on CO<sub>2</sub> emissions.

#### In support of the application, TCI has outlined that:

- A total of 350 441 tons of cement arrived in RSA during the second quarter of 2019 – the most since the third quarter of 2015.
- Most of the cement landed at Durban. The 260 909 tons that arrived there is an 85% increase on the first quarter of this year.

- Imports from Vietnam totalled 301 872 tons.
- Imports have exceeded exports by over 50 000 tons during the past year.
- Total imports have increased by 139% since 2016.
- Employment in the industry increased by less than 0.5%.
- South Africa represents roughly 1% of total exports from Vietnam, for example, where exports have increased by 50% in the first half of 2018 to 15 million tons according to information provided by *Global Cement*.

Perrie feels the South African economy is at a crossroad where trade policy determinations will play a critical role in determining the industrial direction of the country. "The key to future growth lies in achieving greater efficiencies within the country's relevant manufacturing sectors. The cement industry must compete on a level playing field and not be scrambling to survive against low priced imports. The sector needs space to grow, which a successful ITAC application would provide," he states. ■

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## Johan van Wyk joins dmg events



**J**ohan van Wyk has been appointed to the position of Commercial Director: Construction at dmg events and will operate out of the Cape Town office.

Van Wyk matriculated from Grey College, Bloemfontein in 1989 and subsequently served for three years in the South African Defence Force, as a junior leaders' instructor.

He then completed his Civil Engineering studies at the Central University of Technology, Bloemfontein, studied sustainable construction at the École nationale supérieure d'architecture de Grenoble in France and is currently completing his project for the internationally renowned Institute of Concrete Technology's Advanced Concrete Technology (ACT) diploma. His project title is: *An Investigation into the effect of the pH of the curing bath water on the compressive strength of cubes*

Van Wyk spent 10 years lecturing subjects including structural concrete design and concrete technology, at the Central University of Technology, Bloemfontein. He has worked for Lafarge, W. R. Grace and BASF as well as having undertaken some contracting work. For the past six years he served as the Director of the Southern Africa Readymix Association (SARMA) based in Midrand. ■

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## Apology

**I**n the February 2019 issue of *Concrete Trends* the article entitled *!Khwa ttu: celebrating concrete in the natural landscape* by Daniel van der Merwe, inadvertently omitted the fact that the project was a finalist in the prestigious Concrete Society of Southern Africa 2019 Fulton Awards.

### The team for this project was:

- Principal Agent/Architect – KLG Architects
- Engineer – Henry Fagan
- Main Contractor – Bouhardi
- Concrete Contractor – Melt Wahl Concrete Services
- Concrete Supplier – Lafarge/Holcim
- Grinding Contractor – Imazamo

The editor apologises for any inconvenience the omission may have caused. ■

## New and Improved African Construction and Totally Concrete Expo

**N**ew and improved you ask? That's impossible, you might think. If it's new, it didn't exist before and thus couldn't be improved and if it's been improved, it existed before and cannot be new.

However, the new and the improved can co-exist. This is what African Construction and Totally Concrete Expo 2020 brings to the biggest employment sector in South Africa.

While there's no doubt that the construction market is currently under strain, there is no need to only focus on the negative. Reports are rife of SANRAL awarding billions of Rands worth of contracts – requiring millions of cubic metres of concrete to be designed, produced and cast. There are also reports of construction companies being sold and the new owners landing overseas contracts. A drive around Gauteng will show that there's lots of construction going on. This indicates that lot of money is still being spent in construction and we should focus on the fact that companies with foresight are buying up construction companies, because the construction sector is not contracting (excuse the pun), but are growing, albeit slowly.

Another fact to consider is that in a slow market, the companies that are increasing their marketing are the ones getting the work. It is best to be visible when those with a negative outlook are going quiet. The construction industry cannot wait

for government to get through the tough times – we will have to do it ourselves.

The African Construction and Totally Concrete Expo will give those who want the work, the visibility and networking opportunities to land the projects they seek.

dmg events will be showcasing new technologies and providing an improved customer experience to professionals from all over Africa. The construction industry will be uniting and sharing possibilities for a brighter future at this and the co-located events at Gallagher Convention Centre, Johannesburg on 9 – 11 June 2020.

Be part of focusing on and spreading the good news. Don't miss your chance to see how the new and the improved co-exist, whether exhibiting, visiting or attending our CPD-accredited conferences and workshops. ■

Expo details at: [www.africanconstructionexpo.com](http://www.africanconstructionexpo.com)

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# ASAQS appoints two exceptional women to leadership roles

In celebration of Women's Month, the Association of South African Quantity Surveyors (ASAQS) has appointed Christelle Bown as its President. She is the second-ever female president of the ASAQS, following Prof. Gaye le Roux, who was elected to this prestigious position in 2006.

Bown's appointment was announced at the successful 2019 ASAQS conference themed *Shift towards Opportunity*, held at the Century City Conference Centre in Cape Town on 1 August 2019 and attended by over 300 delegates.

Asked what legislation she would like to see relating to the profession, Bown said: "I would like to make it mandatory or at least very strongly advised, for the average person who wants to build and/or alter their own residence to appoint a QS. Just as they must appoint an architect to have the plans approved and an engineer to sign off on the structure, they need a quantity surveyor to protect their financial interests."

Another passionate young woman, Nthabiseng Motlatle, recently joined the ASAQS Wits Student Chapter as Chairperson. "I think that there couldn't be a better time for young women



Newly appointed ASAQS President, Christelle Bown.



Nthabiseng Motlatle with Larry Feinberg, ASAQS Executive Director.

to be entering the quantity surveying profession than right now. We have more women, like the incoming president of ASAQS, taking up leadership positions than ever before so I am very proud to be a young woman in a position of leadership today. I take this role very seriously as I must ensure that I leave things a little bit better than before, for the next generation/s to come," said Motlatle. ■

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# CONMESA reports equipment sales down



CONMESA Chairman Calvin Fennell.

Construction and mining equipment sales continued to decline for the third quarter in a row, with sales of new equipment slumping by just over 16% this quarter.

According to figures recently released by the Construction and Mining Equipment Suppliers' Association (CONMESA), just 1,292 machines were sold during the period, which is 1,541 units down from the same period last year. The downward movement marks an acceleration of declines beginning in the last quarter of 2018 when the downward

trend began with a drop of 4.65%. This was followed by a steep drop of 14.49% in the first quarter and a further drop this quarter.

While the market has remained mostly flat for the past four years, the latest drop in sales is the largest since 2016. CONMESA Chairman, Calvin Fennell, says the depressed state of the economy has a knock-on effect on the equipment industry.

"Although there are sectors and areas of demand, the construction industry is largely depressed and stagnant. While

the mining industry is faring slightly better, it is still far off its previous levels and as a result equipment suppliers are feeling the pinch of the prolonged downturn.

"There is no silver bullet for the economy to turn around and as a result we predict much of the same for the foreseeable future with only moderate swings towards either end of the scale," says Fennell.

He maintains that until such time as large infrastructure projects are awarded, the reducing market with increasing numbers of competitors will make it tough going for everyone in the industry. The same is true of the mining industry where lack of global demand continues to maintain resource prices at moderate levels. ■



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## Avoiding injuries caused by mobile machines

**W**hile some uncertainty still exists about the management of trackless mobile machines (TMM) on surface mines, mining association Aspasa, being proactive, is walking some of its members through the process to test and ensure compliance with legislation.

Aspasa's visit to PPC's Dwaalboom quarry assessed measures already in place to achieve the highest levels of compliance with current and future legislation. This enabled quarry management to evaluate their compliance and gave Aspasa's technical experts an opportunity to share insights and put measures to the test.

Aspasa director, Nico Pienaar said the overview highlighted the importance of thorough TMM Risk Assessment on every mining site. While new legislation requires establishment of physical and technological measures to prevent machine-on-machine and machine-on-man accidents, these measures can only be identified by compiling a true and extensive risk assessment to determine appropriate preventative measures.

"Much has been said about the compilation of TMM Risk Assessments to determine every possible risk wherever TMMs are used in an operation. The PPC Dwaalboom visit gave us the opportunity to evaluate its accuracy and experience the difficulties of implementing risk averting measures in a real-world operational mine.

"Having taken PPC through the steps of transforming the generic Aspasa group-level TMM Risk Evaluation into a PPC site-specific evaluation, we also had the opportunity to measure the effectiveness of their controls and see how the evaluation actually feeds into the site's official TMM Risk Assessment," noted Pienaar.

The results were encouraging and points of interest were identified for further analysis. Tips were presented to further decrease interactions between vehicles and people. Aspasa regarded PPC Dwaalboom's application of one-way traffic as being particularly effective and could serve as a basis for other mines to follow in future.

"Our input on Mining Industry Occupational Safety and Health (MOSH) practices to improve the safe movement of people and machines will be incorporated into the overall plan. We must keep improving health and safety measures and share them with the industry. These are not competitive advantages, so what we learn here should be pooled and shared to everyone's advantage," concluded Pienaar. ■

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# Alaro City's master plan wins international award

By Kingsley Adegboye



**A**laro City, the inclusive mixed-use city-scale development in the Lekki Free Zone, Lagos, Nigeria, was the winner of the recently-held international Architizer A+ Popular Choice Award in the Master Plan category.

The city's master plan was short listed from a range of large-scale international projects and was the only entrant from the African region.

"We were honoured to be nominated alongside complex projects such as the Amazon HQ2 supersite in Dallas and the 5M project in San Francisco," said Odunayo Ojo, CEO of Alaro City. "The award is a testament to the fact that we are building a city that Nigeria will be proud of, in a vibrant and unparalleled metropolis like Lagos."

Launched in January 2019, Alaro City is planned as a 2,000-hectare mixed-use city that will include industrial and logistics locations, complemented by offices, homes, schools, healthcare facilities, hotels, entertainment and 150 hectares for parks and open spaces.

The project is a joint venture between the Lagos State Government and Rendeavour, which is the largest new city developer in Africa.

The Architizer A+Awards, in its seventh year, is an internationally acclaimed programme focussed on promoting and

celebrating the year's best architecture. The Popular Choice winners were selected through public online voting after a 10-day campaign. More than 400,000 votes from over 100 countries were submitted.

The Alaro City master plan was designed by Skidmore, Owings & Merrill (SOM), one of the largest architecture and urban planning organisations in the world.

Reacting to the award, Daniel Ringelstein, director at SOM City Design Practice, said that the Alaro City master plan was designed in a way that protects and enhances the unique conditions of the site while enabling long-term resilience for the future city.

"Alaro City helps strengthen Lagos' position as the economic and cultural hub for West Africa by creating a new mixed-use model sustainable community – a place for people to work, make, live, and learn," said Ringelstein. "The plan is structured around six greenways, aligned north-to-south with the prevailing winds and existing topography, and spaced 800 metres apart to ensure that all residents and workers are not more than a five-minute walk from open space." ■

Source: <http://Innk.in/hRM>



# Dandaji's daily market reflects confidence and aspirations



In rural Niger, markets run on a weekly basis, meaning that individual villages never really develop a local economy. The demographic growth of Dandaji has led it to attempt a turn around by commissioning a permanent daily market. Because the current market is organised around an ancestral tree that has long been an important public space on Market Day, the new project stays on the same site, amplifying an experience the population has come to count on.

The objective was to create an infrastructure that would be visually striking, instil pride in its users, and attract more commerce to the area. Ultimately, an important goal of the project is to create a space that triggers greater confidence and aspirations for the future in the users themselves by offering a dramatic upgrade for this public infrastructure.

The design of the project is kept very simple, using a colourful metal canopy produced by a succession of individual shading structures. It provides solar and thermal protection to the vending spaces underneath. The result is a whimsical world that complements the colourful goods on display while protecting patrons from the scorching sun.

The market is laid out to progressively step down to the old tree, the surroundings of which are formalised to become a real public space with seating and rest spaces for all to gather around. Walking along the shaded lanes, one experiences the simplicity of the compressed-earth brick stalls that contribute to the cooling of the space, while the alternating heights of the shading structures help the airflow throughout. ■



#### Project team

Architects: atelier masomi

Location: Dandaji, Tahoua, Niger

Category: Market

Lead Architect: Mariam Kamara

Area: 7,530 m<sup>2</sup>

Photographs: Maurice Ascani

Design Team: Mariam Kamara, Harouna Diallo

Contractor: Entreprise Salou Alpha & Fils

Metal Fabrication: Atelier de Technologie Métallique

Client: Village of Dandaji

Source: <http://lnnk.in/bjba>

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## Quality and progress in cement, in good times and bad

**A**n 85-year heritage has equipped AfriSam not only to weather economic cycles but to raise the bar even in hard times.

As South Africa's construction sector – a key market – endures some of its worst times ever, AfriSam continues to improve. It does this in its service to customers, its contributions to stakeholders and its commitment to the environment.

According to acting chief executive officer Rob Wessels, not even the recent right-sizing has changed the fundamentals and focus of the business.

"We are very people-focused with regards to our employees and their communities, customers, investors and other key stakeholders, and we uphold a positive approach to Africa's future," says Wessels. "That's what we have concentrated on in the past 85 years, and that is what we'll focus on in future."

He also highlights AfriSam's reputation for quality products and expertise, and for "getting things right". The business is determined to maintain this, he says.

### Looking back, looking forward

It is certainly the country's urban landscape that bears the most obvious testimony to AfriSam's remarkable contribution. Its cement and other construction materials have formed the heart of many iconic projects. Among these are Johannesburg's Carlton Centre and the Nelson Mandela Bridge. Further afield has been the momentous Lesotho Highlands Water Project. More recently, it has supplied Africa's tallest building – The Leonardo in Sandton – and the inspiring Zeitz MOCAA art museum at Cape Town's V&A Waterfront.

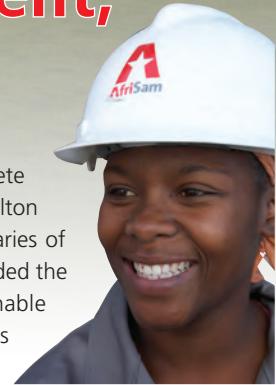
Richard Tomes, AfriSam's sales and marketing executive, emphasises the vital mission of growing the infrastructure in the country and continent.

"Our continent is in dire need of growth," says Tomes. "We hope that by continuing to succeed as a business, we will contribute to this growth by providing products and support that improve the lives of people."

This also means making a direct and sustainable difference in the communities where it operates, he says – an approach which has had a long history and significant impact. AfriSam has undertaken several community upliftment activities, for instance, including the upgrading of schools. Other projects include partnerships with cricket and soccer organisations, to provide coaching or to raise funds for worthy causes.

The company also plays a vital role within the industry by encouraging sustainability and technical performance. As

the anchor sponsor of the Concrete Society of Southern Africa's Fulton Awards, it helps push the boundaries of concrete products. It also co-founded the AfriSam-SAIA Award for Sustainable Architecture + Innovation. This accolade recognises new 'green' building and also acknowledges industry players committed to sustainable innovation in human living environments.



*AfriSam attributes the success of its business for over eight decades to its 'people-focused' approach.*

### Attracting, keeping expertise

AfriSam can do all this because it attracts and retains the best skills available, says Tomes. "A number of our employees have been with the company for four decades," he states. "This is despite the modern trend for people to move around more rapidly than in the past."

He attributes this to the power of the 'AfriSam Way' – an inclusive culture that fosters participation from everyone from the shop floor to leadership.

"We encourage all our employees to offer ideas on anything that matters to the business," he says. "This may relate to strategy, cost saving or being more productive and effective. The result is that people share our positive vision for Africa and play a more active role."

Ongoing training interventions build capacity from below, so that most senior management positions are filled from within the business. Empowering everyone to work more effectively further ensures that the business survives and grows.

### Commitment to planet

AfriSam's people-centric approach also considers the generations that will follow, and the environment which they will inherit.

According to AfriSam's cementitious executive Hannes Meyer, the company has been consciously pursuing an environmental responsibility programme since before the 1990s. This includes putting in place mine rehabilitation plans for all of the company's quarries. There is also a dedicated Rehabilitation Trust to provide funding for the closure of its mining operations.

"Emissions is one of the most pressing environmental issues facing the cement manufacturing sector," says Meyer. "By the nature of its production process, the cement industry is responsible for about 5% of all greenhouse gases released into the atmosphere globally."

He highlights that AfriSam was the first cement producer in southern African to install sophisticated plant to reduce dust emissions. The company's particulate emissions are now less than a tenth of their 2003 levels.

"We are still the only producer in southern Africa to annually measure metals and dioxins in kiln emissions," he says. "Our levels comply with stringent European Community limits."

Speaking recently to media at the company's Dudfield cement plant near Lichtenburg in the North-West province, Meyer said AfriSam was the first in the industry to install bag-house filter technology for kiln emissions. This complies with global best practice for dust emissions.

Addressing the same event, the Dudfield general manager Vishal Aniruth said: "We were one of the first plants in the country to convert from old technology in terms of air emissions. This allowed us to achieve compliance with the latest emissions standards."

Beginning life as a limestone mining operation in 1949, Dudfield's first cement manufacturing facilities were commissioned in 1965. The innovative move towards bag filters was made in 2006, when they were installed during the rehabilitation of the Kiln 2 line. This kiln had been in place since 1972.

Overall, the progress achieved in controlling its plant emissions and making production facilities more energy efficient has had considerable impact on AfriSam's environmental performance. Between 1990 and the present, its CO<sub>2</sub> emissions per ton of cementitious material have been reduced by 35%.

### Greener cement

AfriSam's environmental focus has also included the evolution of cement with a lower CO<sub>2</sub> footprint. To achieve this, Project Green Cement was launched in 2000 to increase the use of extenders from other industries. As clinker is the most energy intensive ingredient, extenders help to reduce the overall carbon footprint.

This process led AfriSam to become the first in the industry to introduce a CO<sub>2</sub> rating system, in 2009. This rating allows the carbon footprint of each of its cement products – relative to Ordinary Portland Cement (OPC) – to be clearly indicated to the customer. In May 2010, it launched Eco Building Cement, the lowest carbon footprint product. Its integrated position in other construction materials also allows AfriSam to apply this approach across its other offerings.

"AfriSam has become arguably the world's first construction materials supplier to 'carbon footprint' all its production operations, including cement, aggregate and readymix concrete," explains Meyer.

He notes that ongoing infrastructure construction is vital, and cement production – despite its carbon implications – is key to this effort. As a company, however, AfriSam continues working to better its energy performance in making cement.

"The next phase of reducing our carbon intensity is to look at electricity offset and even more effective use of the clinker in the cement that we produce," he says.

### Carbon tax can change behaviour

Climate change is now a central focus of national and global industrial and environmental policy. South Africa's signing of the Paris Agreement in April 2016 committed the country to reduce

greenhouse gas emissions by up to 42% by 2025. Hence the carbon tax recently introduced into law by government.

The tax is essentially a levy based on the amount of carbon emitted in the manufacture of a product. As mentioned above, the different cement brands in AfriSam's range contain varying amounts of clinker. The carbon footprints of the brands therefore differ from each other. This has created yet another opportunity for AfriSam to encourage environmentally responsible choices among customers, in the way it displays its pricing.

"We are taking a transparent and responsible approach to the new tax," says Tomes. "By showing the amount of carbon tax payable on each specific bag of cement, our customers will still see the base price that we are charging. This avoids any confusion about exactly how much of the final price is going towards the tax."

This approach will also make it easier for customers to identify the AfriSam cement brands with lower carbon footprints.



▲ AfriSam believes in making a direct and sustainable difference in the communities where it operates.

◀ AfriSam was the first construction materials supplier to 'carbon footprint' all its production operations.

### Fostering innovation

With South Africa ranking among the largest emitters globally – when measured on a per capita basis – the carbon tax is no surprise. The way the tax is implemented, however, will be crucial to its effectiveness.

Meyer notes that the revenues from the carbon tax need to be directed towards promoting innovation that directly reduces carbon emissions.

"The carbon tax should support the efforts that industry is making to find ways of doing things differently," he says. "It should not just be a punitive measure on emitters. It should also incentivise companies to develop and apply new environmentally friendly technologies."

In conclusion, Wessels highlights the quality of AfriSam products and materials which communities can see in buildings, roads, bridges and other infrastructure.

"What we do, both for our own people and other stakeholders, is to look and see what kind of impact we can have through our products, and how we can work for a common good," he concludes. "It's an extension of AfriSam's values and purpose beyond the business." ■

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# Local company puts South Africa back on the international map of concrete repair

**S**outh Africa has a long history when it comes to mining. It is an industry that forms the backbone of the South African economy and Anglo American has, since 1917, been a key catalyst to help create a stronger and more sustainable South Africa. Anglo American is the world's largest producer of Platinum.

The Anglo American Goedehoop Colliery Block 7 mine ventilation downcast shaft is approximately 60m deep and was constructed in the 1980s. The shaft had experienced the ingress of water over the last 30+ years with a notable increase in the last couple of years through the joint interface.

The excessive leaks were being pumped out on a daily basis as part of a routine operation which was required for the normal running of the mine and exacerbating the potential for significant leakages and flooding of the mining levels.

Early in 2017, the underground build-up of water broke through the concrete ventilation shaft, allowing excessive water penetration of approximately 7 000 litres per minute into the mine.

The ingress pressure of the water was immense, shooting water torrents approximately 300mm wide across the 7m diameter shaft through numerous water ingress points along the full depth of the shaft, with the primary water ingress area located between 19m and 25m below ground level.

A solution to the ingress of water from the negative side was urgently required.

Even after extensive panel tests by various contractors, none were able to apply a product that could withstand the immense negative pressure exerted by the water in the mine shaft.

After an in-depth site evaluation, it was noted that the mine was under approximately 20 metres of water and the repair of a water penetration point at this level posed many difficulties and risks.

The scope of work focused on the main water ingress points which were in urgent need of concrete repair and jointing detail as well as surface waterproofing applications.

Sanika Waterproofing and Engineering Specialists found it to be critical that the entire structure be correctly rejuvenated, repaired and waterproofed using Kryton Crystalline Technology, which has a proven success record in similar case studies worldwide over the past 40 years.

The inspection and preparation of the site was imperative for this project. A borehole was sunk to the depth of the major water ingress and camera equipment sunk into the borehole to accurately investigate the ingress from the positive side.

A scan of the concrete in the affected areas was conducted to ensure the safety and integrity of the structure was still intact.

With the information gathered by the visuals, a Krytonite™ Swelling Waterstop had to be introduced to the positive side to reduce the water flow to a manageable condition.

In order to prepare the site for the application of Kryton products, the damaged sections of concrete had to be correctly



*Major Water penetration through holes in the shaft wall.*



*Major water ingress contained to a single point using Kryton plug.*

*View from top of shaft showing the major water penetration.*

cleaned and prepared. Concrete cutting machines and chisels were used to chip chases along the entire length of all water ingress points, construction joints and cracks.

Running water was stopped by the use of Kryton's Krystol Plug (sets in 30 seconds) and Kryton's Krytonite™ Swelling Waterstop that expands up to 1 000% on contact with water.

The chased cold joints were filled with Kryton Krystol Repair Grout. Kryton's Krystol T1 and T2 waterproofing compounds were applied to the surface in a slurry form.



*First time standing in a dry shaft in 35 years.*



*View from bottom of shaft once project was complete.*

The Kryton Krystol™ application over the entire surface of the concrete structure resulted in the growth of crystals throughout the concrete mass preventing any further water or air ingress into the concrete, thus transforming the concrete itself into a waterproof barrier.

The growth of these crystals into the concrete and subsequent waterproofing of the concrete will retard any further deterioration of the concrete structure from water ingress and will therefore substantially lengthen the lifespan of this structure. The overall result is a safe, dry and useable structure.

For successfully completing a project of this magnitude, Sanika Waterproofing Specialists were invited to the International Concrete Repair Institute (ICRI) Awards, which took place in Omaha, Nebraska, USA in November 2018, and ultimately won the Award of Excellence for repair of an exceptional project.

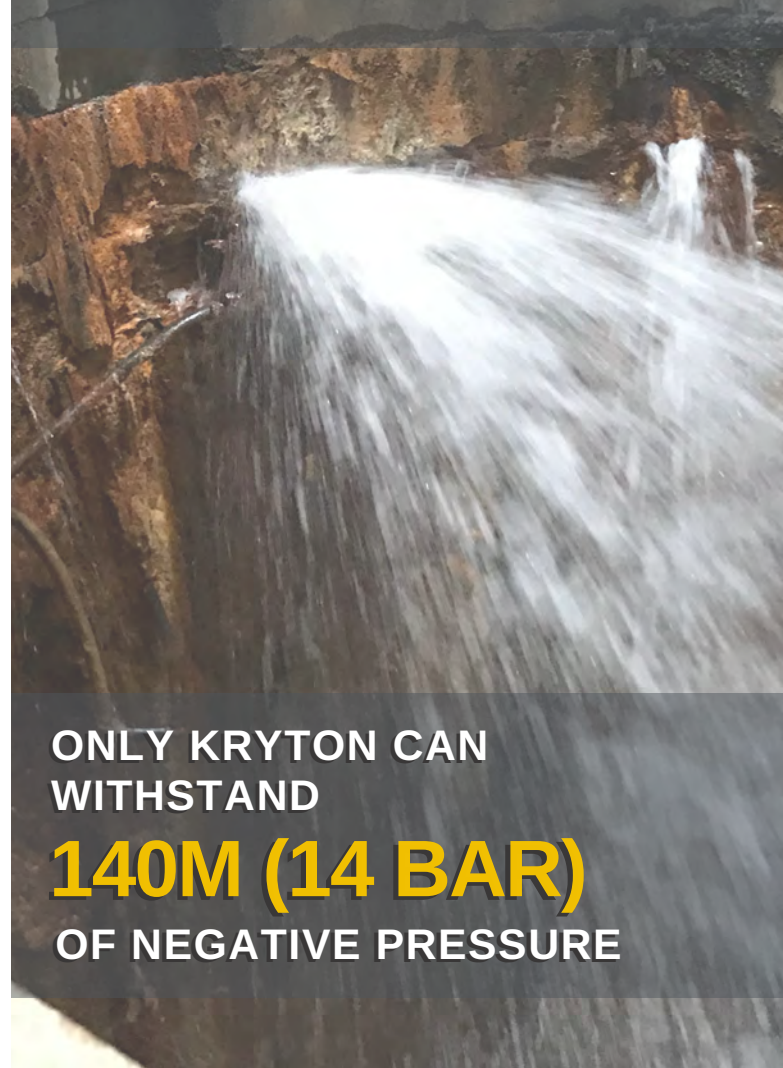
This is the first time in 21 years that a South African company has won an award at this prestigious international event. The ICRI is an industry body comprising of world-renowned engineers, architects, manufacturers and contractors who host an annual awards ceremony to honour and recognise outstanding projects in the concrete repair industry. The awards attract over 50 project entries per year.

Congratulations! Sanika, your expertise and professionalism in concrete repair and waterproofing has put South Africa back on the map of excellence. ■

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# The Norval Foundation: a world-class art and cultural centre in Cape Town

The Norval Foundation, winner of the Innovation in Concrete category in the 2019 CSSA Fulton Awards, is located in the Steenberg area on the slopes of the Constantiaberg Mountain in Cape Town, South Africa, and is surrounded by vineyards. The project provided a unique opportunity for architecture studio dhk – a client brief with the aspiration to create a world-class art and cultural centre in an exceptional location that is open to the public.

Norval Foundation was envisioned as a modern pavilion for art, set against a dramatic mountain and vineyard landscape. It is a pure expression of form; a bold rectangular mass, delineating its heavy-walled enclosure and light over-sailing roof.



© Dave Southwood

The building is constrained by the linear site, between a busy road and an existing wetland; turning its back to a neighbouring embassy compound. The linear circulation spine is positioned along this edge, with the galleries and public spaces facing the natural landscape, capturing framed views of the wetland, vineyards and mountains beyond.

The building sits in an elevated position, and shields the wetland, creating a private space for the sculpture park and forms an inhabited threshold between public and private zones. A triple-volume atrium establishes a deliberate visual connection between these zones; one urban, the other natural, and provides a physical transition between these contrasting environments.



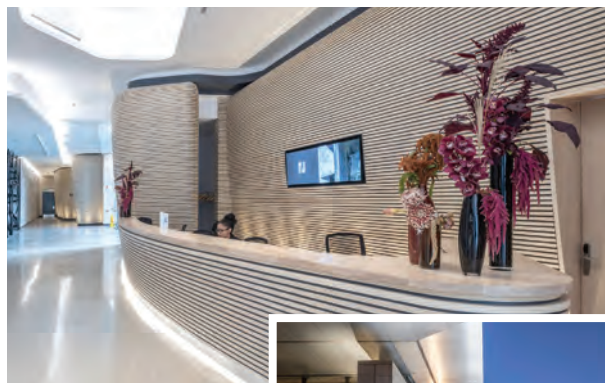
© Wieland Gleich

Norval Foundation is experienced in a linear sequence. A curved wall that extends into the entrance court, draws visitors past the double-volume restaurant, gallery shop and into the generous reception which calmly directs guests to the central atrium that introduces the main galleries.



© Dave Southwood

A terrace along the length of the building incorporates a timber deck serving the restaurant, and connects to walkways on either side that lead to the sculpture park. The grounds also include an amphitheatre, children's playground, and picnic area.



© Dave Southwood

The gallery spaces comprise a large environmentally-controlled special exhibition space, and also a series of six small galleries, culminating in a triple-volume sculpture gallery, a dramatic setting for large-scale pieces with Table Mountain as a backdrop. All the gallery spaces are column free, allowing maximum flexibility for display of all forms of art and they can be treated as separate experiences or to create a sequential journey as required.

The very specific technical requirements for the gallery spaces in terms of environment control take into account careful control of light, temperature and humidity, acoustics, and fire prevention. To create the minimal spaces required for the display of art, all services are concealed in the wall and ceiling cavities to create a seamless appearance.

The programme further dictates the building form, which is split vertically between the ground floor galleries and public spaces, and the first floor where the more private spaces are found; offices, library, bar, a further gallery space and artist's residence. Art storage vaults are positioned below ground level, with the highest level of security as well as state of the art







© Dave Southwood

temperature and humidity control. In addition to 32 parking bays at grade, minibus drop off and a tour bus embayment, there are 124 parking bays below ground, with eight bays set aside for electric car charging stations.

The site incorporates an incredibly sensitive existing wetland ecosystem that had been historically neglected. The wetland was completely rehabilitated, with alien species removed and its surrounding buffer zones have been revived and replanted with locally indigenous fynbos, enhanced by other indigenous plants and naturalised species, already attracting a multitude of insects and birds onto the site. The wetland is also one of the last known breeding sites of the Western Leopard Toad, an endangered species. In order to allow the toads' safe passage, concrete culverts were constructed underneath the road, and the embankments and earth ramps were carefully designed to enable the toads to move easily across the site.



© Dave Southwood

In addition to the rehabilitated wetland and indigenous landscaped sculpture park, sustainability features include solar photovoltaic panels on the roof, a building management system to optimise performance, water-saving measures, grey water purification system, return of storm water to the wetland system, and energy efficient glazing and solar shading on the façade. Wherever possible, natural light to the internal spaces has been maximised, with large full-height and clerestory windows throughout, except for certain galleries.

The materials palette is raw and honest, primarily precast concrete, natural timber, granite and glass, providing contrast with the natural landscape. Clerestory windows allow the roof to float above the heavy walls, like the lid of a box concealing treasures within and allowing soft indirect natural light to penetrate the interior spaces. Externally, the precast concrete is finished with a chamfered tartan grid, which draws the eye upwards and lengthways, and emphasises the scale of the building. Internally timber panelling is used to bring warmth to the spaces.

The architectural design strikes a balance between two motivations: to protect the artwork within, and maximise views to the natural landscape outside. ■

**Architects** dhk Architects

**Location** 4 Steenberg Rd, Steenberg Estate, Cape Town, 7945, South Africa

**Category** Museum

**Interior Designer / Restaurant and Bar** Reddeco

**Interior Designer / Store and Gallery** SpaceLIFT & Black Canvas

**Project Year** 2018

**Photographs** Dave Southwood, Wieland Gleich

**Manufacturers** World of Decorative Concrete

**Main contractor** WBHO

**Electrical Engineers** Converge Consulting

**Civil, Mechanical, Structural Engineers** Ekcon Engineering

**Client** Village Trust

**Source:** <http://lnnk.in/oSq>



L13, L18, L22, M10, M15



Terrafix



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L11, L12, L15, L16

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# Bringing water to the people of Lesotho: Lafarge proud of its role in the Metolong Dam

The spectacular mountains of the Kingdom of Lesotho are typically associated with an unceasingly bountiful supply of water – and yet the communities in Lesotho's Lowland areas have historically suffered from water shortages. The Metolong Dam is the major structure in the Metolong Dam and Water Supply Programme (MDWSP) designed to address this disparity and provide potable water to Lesotho's rapidly growing population, as well as remove the water constraints on the country's key textile industry.

First commissioned in 2016, the Dam has been delivering raw water to the water treatment works built to supply around two-thirds of the country's two million people, largely located in Lesotho's capital, Maseru, and the neighbouring towns.

With Lafarge South Africa's long association with many of the world-class water projects in the Mountain Kingdom, it was a special occasion in August 2018 for all parties involved with the project, when the Metolong Dam reached full capacity and began overflowing its spillway for the first time. The last test in the commissioning of any dam, Metolong had proven its integrity!

Lafarge South Africa is a member of the international LafargeHolcim Group, a world leader in building materials. The Group is committed to addressing the challenges presented by urbanisation and uses its technical strength to contribute innovative solutions for sustainable infrastructure.

## A major RCC dam

Metolong Dam is an 83-m-high roller-compacted concrete (RCC) dam with a crest length of 280 m, constructed on the Phuthiatsana River. The main contractor established an on-site batch facility to provide approximately 330,000 m<sup>3</sup> of RCC and 40,000 m<sup>3</sup> of conventional vibrated concrete (CVC). The contractor was a global top-ranking construction and hydropower group, which was involved in a range of projects on the African continent, and had worked on major international projects such as China's Three Gorges Dam, the world's largest dam.

## Lafarge's holistic approach

Ash Resources, Lafarge South Africa's fly ash company had been supplying its quality DuraPozz® classified siliceous fly ash for the construction of water pipelines and other water infrastructure, and was well-placed to supply the Dam project. In keeping with its 'One Lafarge' holistic partnership approach with main contractors on major infrastructure projects, Lafarge South Africa focused on contributing innovative technical, commercial and logistical solutions to help ensure the successful construction of the project rather than merely being a commodity building material supplier. Realising that heat of hydration would be a significant concern for mass concrete pours, Lafarge proposed their premium technical cement, Powercrete CEM II 42,5R.

## Innovation in cement

Cement for water infrastructure projects in Southern Africa had traditionally been dominated by CEM I products, whereas Lafarge's innovative CEM II product was a Low Heat cement and also had the capability of being enhanced further on site with additional fly ash, enabling the contractor to customise cost-effective mixes as required. However, the engineers and the contractor for the Metolong Dam were not familiar with this versatile, high-performance product. It took a two-year determined motivation campaign, with strong technical support from Lafarge's highly regarded accredited civil engineering testing facility, Quality Department Southern Africa (now renamed Integrated Solutions and Innovation Centre), to achieve a change in the technical mindset and a commercial breakthrough. A significant benefit for the contractor was that the same quality and source of fly ash would be incorporated in the cement as would be used for on-site concrete batching.

The outcome of extensive laboratory evaluations of the proposed RCC (Roller Compacted Concrete) and the CVC (Conventional Vibrated Concrete) mixes for the Dam was the selection of Powercrete cement from the Lafarge Lichtenburg



Cement Works, and DuraPozz® fly ash from Ash Resources' Lethabo Plant as binder materials. The Lafarge products had performed exceptionally well, exceeding the contractor's expectations. The longer term impact was the significant technical breakthrough achieved by Lafarge in the choice of a CEM II cement for RCC dam construction in Southern Africa.

**Pride in delivery service**

Delivering to the remote mountain site of the Dam was a continual logistical challenge, but the Lafarge logistics teams have a recognised track record for ensuring product is always available on a customer's project site, no matter what delivery challenges may be encountered. For Metolong, Lafarge complied fully with the contractor's requirement of an eight-day estimated usage stock on site to avoid the project running short of materials.

**Safety the No. 1 priority**

Another facet of Lafarge's culture that impacted positively on the Dam project was the company's non-negotiable priority concern for safety. In an impressive performance, over a two-year supply period to the challenging remote project site, there were not any Lost Time Injuries at the Lafarge Cement Works, Ash Resources' Lethabo production plant, or among their transport contractors.

**Performance praised**

"The highly-experienced international main contractor was extremely complimentary about Lafarge South Africa's service



*The innovative Lafarge products provided the solution for the RCC and CVC concrete.*

on the project saying we gave them outstanding support and, in particular, achieved a hundred per cent on-time delivery record to site," says Andrew McKeen, Infrastructure Civil Development Manager – Lafarge South Africa. "It is rewarding to see Metolong Dam successfully complete its full capacity test, and to witness the people in the Lesotho Lowlands starting to benefit from a quality, reliable water supply." ■

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# A contemporary green concrete building

By Daniel van der Merwe, Leaf Architects

*Concrete has given this cutting edge building its distinctive features proving that concrete is not only the contemporary aesthetic but the preferred material when it comes to issues of sustainability.*

The environmental, social and political climate is changing, and society can no longer consider the environment as a free resource. In recent years, we have identified the importance of the 'embodied' impacts of the materials used in our built environment and have developed methods for quantifying them. A harder task now faces us in assessing the 'whole-life' impacts from the way we live our lives; the 'in-use' effects of our built environment and use of the associated infrastructure.

## GLPS Offices, Middelburg

Middelburg is an agricultural and mining town in Mpumalanga known more for its industrial buildings than architectural landmarks. It is unexpected to find this iconic concrete building which is off the grid and earmarked for a green star rating.

The client, GLPS Projects and Services, specialises in mining engineering with a focus on furnaces. They have a passion for conserving the environment which has set the tone for their new offices with sustainability in mind.

According to the MD, Freddie Greyling, the professionals were chosen for their understanding of first principles and worked as an integrated team from the outset.

"Our intention was never to produce 'green bling' or 'cut and paste' solutions but to conclude with a resource-efficient building using workable technology which would also extract maximum operational savings," says Derek Lubbe from Living Planet Architects who was responsible for the design. The client explained that they wanted a building which would unpack 'sustainability' in terms of its reputational, financial, environmental and maintenance benefits".

Green Buildings make absolute financial sense in the long run. According to calculations for a standard premium grade office building, the extra costs for a resource-efficient design (RED) building would be paid back through operational savings within 11 years. And, the intangible benefits over and above moral obligations are increased productivity and health benefits.

The unusual shape of the building was dictated by the wedge-shaped site. However, it also generated an unusual and dynamic building plan and form-making opportunity through using a trapezoidal grid. The harsh climate and heavily polluted and dusty air from nearby factories presented another challenge. The architects chose a palette of materials to minimise



▲ View over the GLPS building looking East showing PV cells and roof services. Photographer: Frederik Botha



◀ Bird's eye view looking West. Waterwise garden using only plants indigenous to the region. The property has been designed to function as a retention pond. Photographer: Frederik Botha

maintenance costs. The materials included fair-face concrete, as well as face brick, timber and glass.

Solar study exercises were conducted to ensure maximum light penetration in winter and to minimise solar gain in summer. To maximise natural light and reduce artificial lighting, additional light wells were allowed for in deep office spaces. Large overhangs in combination with sealed-off double-glazing ensured additional thermal control and dust pollution.

To further combat glare, external intelligent automatic rotating screens were installed. The embodied energy of construction materials pales into insignificance when compared to the energy used by a building during its life. Around 90% of the total energy used in buildings is for heating, cooling and lighting, and it is here that concrete comes into its own. By utilising concrete's high thermal capacity, the architects had the opportunity to significantly reduce the in-use energy of the building.

The excellent thermal capacity (often referred to as thermal mass) of concrete enables it to absorb, store and later radiate heat, stabilising the internal temperature of the building. In all buildings, heat is generated by people,

*The northern façade of the building makes a bold statement with its crisp, concrete envelope complemented by timber, face brick and glass.*  
Photographer: Andrew Dry





Trapezoidal concrete forms of the north-eastern corner are complemented by a curved timber screen around the braai area  
Photographer: Andrew Dry



Reception and entrance foyer.  
Photographer: Andrew Dry



Covered patio leading onto the garden and braai area.  
Photographer: Andrew Dry

electrical equipment, computers, lighting and solar gain which means that buildings can overheat during the summer. Exposed concrete absorbs much of this heat and can reduce daytime temperatures by up to 40°C or 50°C. Night-time ventilation is then used to cool the building, to prepare for the coming day.

To ensure optimal occupants' comfort-levels, special air-lifters were installed to air-condition and control air quality considering Middelburg's polluted air environment. Water filters ensure the highest quality drinking water. All lights and electrical equipment are powered by PVC cells which were placed on the roof space for aesthetic reasons and to optimise sun energy. Energy consumption is further reduced by using motion-sensitive switches. This makes the building completely self-reliant in terms of energy supplies.

Rainwater is cached and channelled to the landscape and natural retention ponds to further reduce reliance on the municipal system and to add to the aesthetics of the working environment.

A further sustainable benefit of using fair-face concrete is its inherent fire resistance and long-term performance. It requires no additional fire protective coverings, chemical preservatives or paint systems that may release Volatile Organic Compounds (VOCs), affecting internal air quality, and which can require ongoing maintenance. Using accents of natural timber added a sense of warmth and contrast to the concrete and act as acoustical elements to open workspaces.

The concrete work was all done in situ using a nearby local ready-mixed concrete company and stone quarry. Different recipes were used for the various elements to ensure optimal strength and cost-effectiveness. The concrete performance for walls and columns were enhanced by using superplasticisers and fly-ash in the mix. This in combination with a new generation of non-staining release agent and steel formwork allowed for a superior and smooth finish.

The client and staff members love the building and the fact that it provides high comfort levels and provides them with an uplifting and contemporary work environment. Entertainment and socialising is part of the office culture. The 'family' culture is further enhanced by having cooked meals provided and everybody sharing lunch together.

Fully glazed private office spaces and meeting rooms ensure visual transparency and create a sense of connectedness between everybody. The architects had to carefully consider the design to incorporate social interactive spaces, and to avoid dead spaces and minimise circulation patterns in the building. The large window openings continue the sense of connectedness into the external surrounds and maximise views of the city. As a result of the interactive work environment, productivity has increased, and staff morale is at an all-time high.

As for concrete itself, we need to ask ourselves "where would we be without it?" It has been with us since Roman times and is used in almost every type of construction project, be it civil, residential or commercial. Its flexibility and durability are credentials that alone make it the sustainable construction material of choice. ■

#### Professional team

Architects: Living Planet Architects

Structural Engineers: Egmont Furstenburg Consulting Engineers

Mechanical and Electrical Engineers: GLPS

QS: Seome Quality Surveyors

Green Beam solar and Execu-Air Airconditioning and Ventilation.

**More information from Daniel van der Merwe,**

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**cell: 083 284 4451 / email:leafarch@worldonline.co.za**



Carport canopies designed to complement the main structure.



## Stefano Boeri unveils vertical forest apartment blocks for Egypt's new capital

Italian architect Stefano Boeri has designed three cube-shaped vertical forest apartment blocks for Egypt's New Administrative Capital, which is being built to the east of Cairo.

Boeri collaborated with Egyptian designer Shima Shalash and Italian landscape architect Laura Gatti on the three seven-storey apartment buildings.

The New Administrative Capital is being built in the desert 30 miles from Cairo at the request of Egypt's president Abdel Fattah El Sisi, who took power in 2013. It is planned to be the administrative capital of the country and will contain the main government departments and foreign embassies.

Boeri has unveiled designs for three buildings covered in planted terraces, which will be the first time his practice – Stefano Boeri Architetti – has brought its vertical forest concept to the African continent.

The three apartment blocks have been designed for Egyptian property developer MISR Italia Properties.

Each cube-shaped building will be 30 metres tall and 30 metres wide. Stefano Boeri Architetti estimates that between



them the three buildings will be planted with 350 trees and 14,000 shrubs from more than 100 species.

Every apartment will have its own balcony planted with species appropriate to the local climate, planted to ensure a variety of heights and blooming seasons so they are interesting to look at all year round.

Plants at every level will provide natural shading and improve the surrounding air quality. The studio estimates that the plants will absorb seven tons of carbon dioxide and produce eight tons of oxygen per year.

Construction on the Egyptian vertical forests is due to begin in 2020 and complete by 2022. The New Administrative Capital is a joint venture between Egypt's military and its housing department that seeks to boost the country's economy and alleviate Cairo's housing crisis, where 70% of the population live in informal dwellings.

Stefano Boeri Architetti has designed vertical forest buildings in Albania, the Netherlands, and even conceptual vertical forests for the planet Mars. ■

Source: <http://lnnk.in/fp4>



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# Unbeatable casting speed, quality and versatility unveiled at Bauma 2019

**E**lematic, a global leader in precast concrete production technologies, has introduced an all-new flagship model to their best-in-the-industry Extruder family, the Extruder E9, for hollow-core slab production. This new machine will offer high casting speed, second-generation automatic compaction control and sophisticated bouncing prevention. In addition to the standard hollow-core slab production, the new design of the machine will also enable casting of a variety of precast slabs.

## Fast casting offers high ROI

In the past, casting speed was not considered an issue in hollow-core production. In today's construction market, fast casting is desired because of the demands of tight project scheduling. With the industry's highest casting speed of up to 2.7 metres per minute – 30% to 70% faster than its predecessors – the new Extruder E9 perfectly responds to the requirements for fast slab production.

"The high casting speed of our new Extruder translates into eight to 10 casted beds in the same amount of time that previously produced only six casted beds. This means even as many as 18 casted beds per day which of course brings extremely high return on the investment and naturally is a very profitable business for the precast producer," says Jani Eilola, product director Floor Technologies at Elematic.

The E9's remarkable speed is achieved with a new design of the extruding screws, optimised casting parameters and independent screw drives.

Similar to its predecessors, the new Extruder E9 is based on shear compaction technology. Efficient compaction allows for minimum cement content in slabs, because the high density of concrete has an exponential effect on the slab strength.

## Multi-product casting made easy

Independent screw driving not only increases casting speed but also enhances the versatility of the product range for the Extruder E9. For years there has been a growing demand for casting different products fast with one machine and the new Extruder is designed to do just that.

"A common example is casting narrow or split slabs. With the new Extruder, it is possible to choose from six different widths on a basic 1.2-metre-wide bed. It brings considerable savings when narrow filler slabs can be casted instead of sawing them to correct measurements," says Jani Eilola.

The product range also covers, for example, solid slabs, wing slabs, piles and poles, and stadium slabs

## Slab quality in focus

The new Extruder E9 also features a second generation automatic compaction control system with the resistance of levelling beam as a new additional input parameter. Together with the independent use of the casting screws it guarantees a balanced casting process as concrete is fed more evenly throughout the whole slab cross section. The casting process is monitored and controlled better which leads to further increased slab quality.

The machine also features an intelligent bouncing prevention system for stopping the pressure fluctuation during



*The all-new, best-in-the-industry Elematic E9 extruder, the company's flagship extruder, was launched at Bauma 2019.*

Precast concrete offers a faster and a financially more competitive production time with cost savings carried through to site installation. The blending of digital and machinery in precast concrete production technology, thereby offering faster production savings, is where Elematic excels, placing it at the forefront of industry as a result of its continuing investment into research and development. This investment has resulted in the continued evolution of innovative and hi-tech precast manufacturing machinery.

The all-new Elematic Extruder E9 is the flagship of best-in-the-industry extruders. Representing the fifth generation of Elematic Extruders, the machine sets a new benchmark for high-speed casting in hollow-core slab production with low production costs.

Equipped with an advanced touch screen user interface, added intelligence and a smart concrete recycling option, the new Extruder will also offer a new kind of modern user experience and significant material savings. The Elematic Extruder family now consists of three different models. These are the S5, P7 and the new E9.



compaction from causing waves to the slab surface. Thus, the slab surface will remain smooth and even.

The Extruder E9 also offers a slow speed casting mode. Slow speed reduces the need to stop casting when concrete supply to the machine is restricted. Fewer stops in the process means better slab quality.

### Modern user experience

The Extruder E9 features a modern, intuitive and graphically pleasing 15.6" touch screen user interface. The touch screen is easy to use; you can zoom and drag and drop items similar to any other smart device.

The user interface is designed to meet the everyday casting tasks in precast concrete plants. The operator can, for example, change casting modes directly on the machine.



*The Extruder E9 has features that bring benefits in time, efficiency and flexibility.*

### Recycling concrete automatically

Extruder E9 also comes with an option for a smart, environmentally-friendly recycling system. The system significantly decreases concrete consumption and lowers production costs.

Once the recycled concrete is transported back into the Extruder, the system slowly mixes it with the fresh concrete to ensure that the mix quality remains on the defined high level.

Extruder E9 forms an efficient working couple with another new machine from Elematic, the Modifier E9, for digging and placing cuttings, recessions and other openings. When combined, they make a perfect match for increasing efficiency and sustainability of hollow-core slab production. ■

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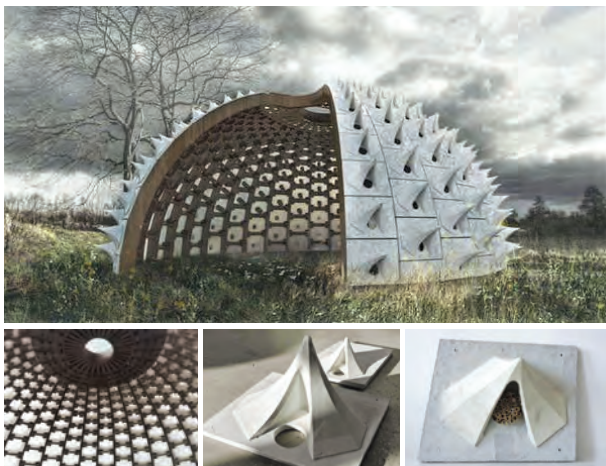
## A concrete home for solitary bees

**D**uctal ultra-high-performance concrete has been used in the USA to build a pavilion designed both as a visitor centre and as a base for solitary bees.

Lafarge Holcim said that Pollinators Pavilion creates a habitat for solitary bees, which account for 70% of global non-agricultural pollination. Much of the habitat of these stingerless bees, which do not live in colonies, is under threat due to development or urbanisation and there is limited research on their habitats and nesting behaviour.

The Pollinators Pavilion has been designed to recall the ovoid bristling form of solitary bees' compound eyes. It provides a visitors' centre for Stone House Farm, a 2,500-acre organic farm in Livingston, New York. The wooden structure supports 300 cast concrete panels, where 5,000 solitary bees can make their home in nesting tubes in the panels.

The varied positions and orientations of panels allow the testing of diverse living conditions for solitary bees to optimise



future manmade habitats, previously a little-researched area. The panel system was achieved through partnership in material research with LafargeHolcim's Ductal UHPC team. ■

**Source: <http://lnnk.in/e75>**

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## Multi-purpose retaining walls at popular Cape wine estate

Sometimes Terraforce blocks are specified for some more exceptional purposes than the run-of-mill uses encountered by retaining wall contractors daily. One of these involved the creation of an underground space for a fat trap at the world renowned restaurant, Overture, at Hidden Valley Wines in Stellenbosch, South Africa.

Every restaurant serving any type of greasy food or baked goods is required to install a fat trap, designed to intercept most greases and solids before they enter a wastewater disposal system.

In this case, Overture restaurant is situated on a steep slope and the space for the fat trap needed to be dropped into the ground next to the kitchen area wall. Instead of building traditional brick walls, the estate owners chose to stabilise the resulting cut slopes with Terraforce interlocking and hollow-core blocks, a more affordable and better all-round solution.

The Terraforce L12 blocks were installed on site by the Terraforce recommended installer, Dassenberg Retaining Systems. Says Georg Brandt, estimator at Dassenberg: "The blocks were placed with their flat face outwards, with a 5 mm set-back, creating near vertical walls. For extra stability rebar and con-



*The fat trap constructed for the Overture restaurant.*

crete were inserted in the blocks all the way to the top. A metal staircase provides access to the fat trap, so the filters can be removed on regular basis."

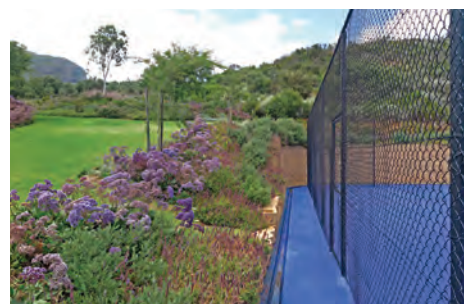
Brandt adds that Dassenberg has installed a variety of Terraforce walls at the wine farm over the years: "Johan (Grobbie) Grobbelaar, farm manager at Hidden Valley, has asked us to install many Terraforce walls; for their private tennis court, new parking area and roadside erosion control, as well as a weir for the municipal dam that provides water to the local farmers. Indigenous plants

were used throughout the farm and on the walls."

In addition to showcasing a more unusual application of Terraforce blocks (near vertical inclination, flat-face finish and replacing traditional brick and mortar walls), the walls for the fat trap recess also demonstrate the system's ability to cut neat corners, when skilful cutting is applied to the blocks.

Bottom line? As a retaining wall system, Terraforce proves over and over that a one block system can do it all! And do it well. ■

**More information from Terraforce, Tel: +27(0)21 465 1907  
email: [info@terraforce.com](mailto:info@terraforce.com) / [www.terraforce.com](http://www.terraforce.com)**



*Dassenberg Retaining Systems has, over the years, installed a variety of Terraforce walls at Hidden Valley Wines.*

# Boosting affordable innovation and job creation

**S**taying true to its 'Affordable Innovation' mantra, in the nine years since Revaro's decision to enter the construction machinery industry, the company has become a one-stop shop for the precast and concrete industries. It has also successfully bridged the gap for a valuable product in this market segment to cater for both small and established companies.

Revaro Started in 2000. The original start-up was an IT company which evolved into a business management consultancy, specialising in business turnarounds. It wasn't long before MD Reyno van Rooyen saw that there was a gap in the market for affordable equipment, to assist not only smaller start-up companies, but also established companies all the equipment they use as well as the consumables needed to run efficiently and successfully.

A huge part of Revaro Concrete Equipment is to be able to diversify its product range. Before long they had infiltrated the market and began collaborating with several local and international engineering companies that manufacture brick-making machinery. Today Revaro Engineering (a member of the Revaro Group) manufactures a wide range of brick-making machines as well as brick, block and paver moulds for all makes of machines.

Revaro has grown in many respects since then, and now sources machinery from various countries including India, China, Germany, Austria and Spain.

"Our mantra 'Affordable Innovation' has a very unique meaning for us, and we not only aim to give clients the best pricing, but also the best service and product," says Van Rooyen.

"The company has grown 8,000% since 2010 and it has now become a substantial player in the brick-making machinery supply chain in southern Africa. Nine years since our inception, we now export to over 20 countries.

"Our pricing, on average and for the same machine output, is 50% less than the prices charged by certain local manufacturers who have monopolised the market for far too long. These huge price differences are part of the reason for our exceptional growth since we started. We feel that the market was waiting for value-for-money products of this nature," explains Van Rooyen.

Revaro's product range has expanded to the point where over 100 individual products are on offer and, in addition, spare parts, training and aftersales support on each of these products form part of the company's service offering.

In order to service this diverse product range, Revaro has been divided into six independent companies namely:

- Revaro Equipment: Forklifts, Front-end Loaders, Diesel Generators, TLB's and UTV's
- Revaro Concrete Equipment: starting with only brick-making machinery and brick production pallets, the company now offers the complete solution for the brick-making process – from crushing plants, aggregate batchers, concrete mixers, block and paver-making machines as well as machines for producing lintels, hollow-core slabs, kerbs, roof tiles and concrete pipes.
- Revaro Brick Pallets: premium composite pallets, local plywood and imported pine. The company can supply any brick maker with brick pallets.
- Revaro Engineering: manufactures and supplies locally designed and manufactured brick machines from egg layers to static machines. Custom moulds are also manufactured for all brick makers, to their specifications.
- Revaro Logistics: committed to delivering goods in the most cost effective way to meet all the road freight needs of the company's clients.
- Revaro Plant Hire: all Revaro equipment is well maintained and the company's customer focus is on those companies who want to double their profits, and achieve a much better ROI.

"We have a very strong focus on our aftermarket support capabilities. As we expand our market, we are busy setting up a dealer base throughout southern Africa and we are extremely close to reaching our goal of 70 dealers across southern Africa, along with qualified service technicians in each province.

"Revaro has a proven track record of sticking to its mantra and continuing to provide outstanding service and pricing to all our valued Revaro customers," Van Rooyen concludes.

Please contact Hans Barrand at 062 716 4330 should you be interested in becoming a Revaro dealer. ■

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[www.revaro.co.za](http://www.revaro.co.za)**



## Precast concrete bus shelters and DZZ pavers for J B Marx Taxi Rank

The JB Marx Taxi Rank at Ikageng Extension 7, developed at a cost of just under R12 million, used precast concrete bus shelters from Rocla and interlocking pavers from Technicrete to make the rank convenient and user-friendly for local commuters.

The project, in the North West Province, was recently opened and comprises supporting infrastructure such as washing bays, hawkker stalls, ablution facilities, taxi/commuter shelters and a waste management building.

Chris Nel, project manager at ALS Civil Projects, said: "We used products from Rocla and Technicrete because we know the standard of their manufacturing processes. Their cost competitiveness is in the quality of their product. Having worked with both companies on a variety of projects since 2010 they know the standard expected of them by ALS Civil Projects, and have never let us down".

"The precast concrete bus shelters are a specialised product from Rocla. We required 148 units for the JB Marx Taxi Rank and due to the variety of dimensions required for the project, different moulds had to be used in the manufacturing process. This meant that the moulds had to be numbered at the Rocla factory and delivered in the correct order to site for installation. This was seamlessly executed by Rocla," said Nel.

"Some of the bus shelters were converted into hawkker stalls," commented Dillon Carter, sales consultant for Rocla in the North West. "The precast bus shelters and stalls are virtually indestructible and vandal proof. They offer shelter from heat and rain in addition to the comfort of providing seating for waiting commuters" said Carter.

The durability of the precast concrete products offers a relatively maintenance-free lifespan, an important factor for local municipalities wanting to ensure budgets for street furniture are well spent.



Some of the Rocla precast concrete bus shelters were converted into hawkker stalls.



The shelters are virtually indestructible, and offer seating and protection from heat and rain.

The Rocla bus shelter can be supplied in various configurations, and although supplied in a light grey colour, the surface is easily painted for advertising, roadside markings and community notice purposes.

Technicrete 60-mm Double Zig-Zag (DZZ) CL40/2.6 (40 MPa) interlocking pavers were selected for the entire road surface of the rank as well as for the walkways, in total an area of 7,000 m<sup>2</sup>. The DZZs are ideal for installation in taxi ranks and other such areas where a heavy traffic footprint is anticipated. The interlocking pavers form a continuous surface overlay while still providing a good quality and pleasing finish.

Technicrete civil technician, James Honibal said: "Space at site became one of the project challenges, but was overcome by fine tuning our delivery scheduling. The feedback on the product quality from ALS Civil Projects was very positive. Our efforts to ensure that the DZZs were cured appropriately – longer than usual due to the paver strength requirements – and that our production and delivery planning dovetailed with their deadlines was another factor to the successful installation on the taxi rank project," said Honibal.

"We knew that both Rocla and Technicrete were the only manufacturers in the area that could produce the required product quality and back it up with good service and logistical compliance in order that our project management ran on schedule. That is what we have come to expect from the two companies and we have not been disappointed," concluded Nel.

Technicrete and Rocla are part of the Infrastructure Specialist Group of companies (ISG). ■

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# Mpumalanga primary school receives 16 sanitation units

**"N**o school should be without proper functioning, clean sanitation units. It's called human dignity," said Albert Weber, CEO of the Infrastructure Specialist Group (ISG) when he handed over 16 Rocla precast concrete sanitation units to the Sifunindlela Primary School, based at Kabokweni in Mpumalanga Province. The school is a no-fee public school and has over 1,100 registered learners.

"ISG's Corporate Social Initiative focuses on early learning development. At Sifunindlela Primary School, we saw a need for safe, hygienic sanitation units and knew we could assist through Rocla's expertise in this sector. ISG and Rocla are proud to have supplied the 16 sanitation units," Weber said.

"We contracted Enviromould Product Solutions to install the toilets. The finished products comprise two sets of toilets for both girls and boys, fitted to accommodate pre-schoolers and children in primary school. The sanitation units replace dangerous pit toilet installations," commented Andre Labuschagne, Product Development manager at Rocla. "The sanitation unit is cost-efficient and every educational establishment should have units like these installed for their learners and staff."



*From Left: Members of the Mpumalanga Dept of Education; Rocla (ISG) CEO, Albert Weber shakes the hand of Sifunindlela Primary School Principal; Andre Labuschagne, Product Development Manager, Rocla; Malebusa Sebatane, Marketing & Communications Manager, Rocla (ISG).*

Enviromould supplied all associated sanitation unit fittings such as stop cocks, water connection fittings, infiltrator soak-away chambers, sewer pipes, water troughs and vent valves as well as conducting the excavation, installation and backfilling of the septic tank as well as the installation of a 5000-litre water tank on a raised platform to gravitationally feed the toilet cisterns.

Rocla's Precast Concrete Toilet unit is a cost-effective solution to an essential need in South Africa's high-density urban and rural communities. The stand-alone unit has been developed to be used as either a leach pit configuration or as a full water-borne system.

Rocla is part of the ISG which also includes Technicrete. ■

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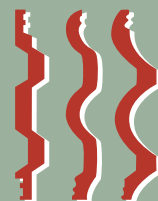
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## At last, good sense prevails

As we all know, the scourge of unemployment, poverty and homelessness in South Africa has never been worse with figures reaching unprecedented highs.

There is a system that enables jobless, unskilled South Africans to become entrepreneurs in the house building sector and build homes in their communities, at a fraction of the cost of traditional methods, and in less than a week.

This is the moladi building system which has been described, by no less and organisation than the World Economic Forum (WEF), as “One of the world’s most scalable, affordable and socially accepted housing systems.” It has also been featured in the WEF article as “One of the 6 buildings that are revolutionising the construction industry.”

One of moladi’s greatest breaks was the construction of a 1,600-m<sup>2</sup> courthouse, funded by the World Bank in Tanzania. The Kibaha District Courthouse was built for half the cost of using conventional methods (about \$250/m<sup>2</sup>) and was completed in six months, rather than three years using traditional methods.

The system replaces cumbersome bricklaying with an approach similar to plastic injection moulding. Local unskilled labourers are trained to assemble reusable plastic injection moulded panels to create formwork for the structure. The formwork is erected on an engineer-designed raft foundation.

Doors, windows, electrical and water reticulation are mounted in the appropriate positions onto the formwork. Thereafter, the formwork is filled with a quick-setting aerated mortar, consisting of sand, cement and an admixture.

The house is left to set overnight and the formwork is removed the following day and re-erected on the next foundation. The superstructure is finished by fixing conventional roof, plumbing fixtures, ceiling, hanging doors, glazing and painting.



Hennie Botes inventor of the moladi plastic formwork.

However, despite the success of the moladi construction system in 21 countries across Africa and the world, Hennie Botes, founder of the system, has spent many years in fruitless attempts to gain Government support for the system in South Africa.

But finally good sense has prevailed and his efforts have been crowned with success. Since 2017 he has built 107 single- and double-storey schools for the Education Departments of the Western Cape, 62 classrooms for Gauteng Education Department at 24 different schools, 4 classrooms and ablution blocks for the Northern Cape Education Department to showcase the moladi technology and the huge reduction in time to construct. In addition housing projects have been completed and are on-going in Trinidad and Tobago, Botswana, Namibia and Ghana. The new additions to the range of products moladi has produced in the past, are the 16 hospitals for Cameroon.

Most recently Botes presented the system successfully to the Councillors of the Worcester Municipality for a project that will see the construction of 800 houses. And there will certainly be more now that the benefits of the system are being recognised in South Africa at last.

However, not satisfied, Botes is now passionate about creating community cooperatives that will enable people to access state funding more readily.

He says: “The reality is that contractors build for profit, developers develop for profit and architects design structures for the top of the pyramid – beautiful buildings that most dream of but cannot afford.

“So a new ‘disruptive’ process has to be developed to allow the other 90% – the shack dwellers, the poor, the unemployed or the neglected market to help themselves. The built environment status quo does not see this as a market as their currency is dollars and this ‘client’s’ currency is sweat equity.

“Many big construction companies have gone insolvent. Overheads are too high for low-cost affordable housing. The new construction company (the cooperative) would be made up of newly skilled workers within the community. This ‘new’ entity is free from high overhead costs, generating an income by producing product for the neglected market and empowering people to help themselves.

“In this process people benefit from producing a home rather than simply appointing a contractor to build a house for government to hand over to an unemployed person,” he concludes.

With his persistence, passion and.... patience, if anyone can disrupt the affordable housing market, Hennie Botes is the man to do it. The future, as they say, is upon us. Watch this space! ■

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# Omega Mashaba: building for success



Omega Mashaba

**O**mega Mashaba, the founder of Mash n Go Renovations, shared details of her journey towards heading a well-established company with impressive projects to its credit.

"Mash n Go Renovations was established in 2015 in Johannesburg with the main purpose of creating employment and contribute to overcoming the current high levels of unemployment. We wanted to help disadvantaged individuals to acquire skills and experience so that they could develop to their full potential. Believing in equal opportunities, we assist both males and females in their development."

The company focusses primarily on repairing leakages and roofs, painting and home décor, wall and floor tiling as well as in-house handyman work and plumbing. In addition, the company's portfolio includes road construction and surfacing.

The directors are Omega Mashaba and Musa Ngobeni. The company has Level 1 BEE Accreditation and is a member of MBA North.

**CSI Initiatives:** The year 2018 was the start of Mash n Go Renovations' CSI initiatives when it participated in Mandela Day activities which included feeding the hungry in the community and spending a day with the orphans at the Orlando Orphans Home.

**Project range:** The company's projects encompass demolishing buildings, undertaking general construction, plastering, painting, paving and plumbing.

**Challenges faced:** Omega Mashaba explained that, since construction is a male-dominated industry, she has found that people are reluctant to trust a woman in construction.

She explained: "For example, on one site the plumber installing the water supply and drainage systems went AWOL with work half done and prior to testing. Another plumber was employed, but the onsite (male) manager gave him instructions counter to my requirement that he ensure that all pipes installed had been soldered. Subsequently, after plastering and during testing, there were leakages in 50% of the walls.

"This shows clearly that the project manager did not want the new plumber to follow my instructions because his attitude has always been that I am a woman, so what do I know about construction.

"On another project where we were building shops, the work involved demolition, building, installing plumbing as well as completing the plastering and painting. However, on completion the owner refused to offer a completion letter without a valid reason. His reasoning is that, since payment had been made, his obligations had ceased.

"Finally, since 30% of male artisans do not take their work seriously because they believe that they are indispensable, their absenteeism and lack of productivity on site becomes a serious problem," Mashaba stated.

**Special Achievements:** These include Mash n Go Renovations having successfully managed a R250,000 project and being selected to join the FixFoward programme – an initiative that upskills contractors.

**Career development:** "Throughout my academic and career experience, I have been able to accumulate the type of skills that are essential to being a Finance and Admin Manager. Although my work experience involved management of accounts, subjects such as financial management have provided me with a thorough understanding of the business environment.

"As a person I am open to innovative ideas and enjoy taking on new challenges. In 2015 Mash n Go was established in Johannesburg with a primary focus on repairing leakages and roof, painting and home décor, wall and floor tiling, in-house handyman work and plumbing. I therefore started to teach myself about construction. However most of my time was taken by my job as I was still employed.

"Last year when I was retrenched I saw an opportunity to pursue my career in business. I was also selected to be in a construction program that upskills contractors. I am very eager to learn new skills that will enhance my productivity to the extent that I am planning to study construction management."



## What do you hold true to yourself, your company and your employees?

"Staying true to myself is a matter of personal integrity and self-respect. It involves standing up for my own values and not conceding to the expectations of others. I am a very open minded and fair person; I do not let others define me. My main goal is to strike a positive and productive balance, using my well-honed workplace instincts and an innate perception of self to become an effective and genuine employer – one that my employees appreciate having around."

## Advice for new entrants into SA construction sector?

"Always do things the right way there's no shortcut in life. Processes are there for a reason, do not fall onto venality it does not pay," Mashaba concluded. ■

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# Zone One Plumbing & Projects: dedicated, responsive and growing

**N**onhlanhla Masilela of Zone One Plumbing & Projects took the time to tell us about her company, established 18 months ago, but already tackling numerous projects with great success.

She explains: "We are a small company, but we are progressing and growing since we opened in February 2018. The company has done a number of substantial projects since then and made countless house calls. The Directors/Partners are Nonhlanhla Masilela and Kefilwe Keith Sathekge and we have Level 1 BEE status, and are MBA North members.

"Zone One Plumbing & Projects, is a dedicated team of qualified plumbers and builders situated in Zone One, Meadowlands, Soweto. We pride ourselves on quick responses. We are just a call away operating in Johannesburg. We offer the best plumbing, maintenance and building solutions at reasonable prices. From a clogged drain and broken water pipe to a leaky tap, we've got you covered!

**CSI Initiatives:** "We offer mentorship to young people who are considering a career in this field and seek to overcome the resistance to women in construction. We have students who are studying and construction and we offer them experience and introduce them to a future in maintenance work.

**Project range:** "Renovating houses, doing general plumbing, installing irrigation systems and undertaking commercial projects," Masilela noted.

**Challenges faced:** "The rising cost of raw materials and undercapitalisation are really the only challenges we have encountered so far, because we are always checking each other and double checking everything we do to make sure that is it perfect and that we are prepared for the task ahead.

"We also encounter new clients who may have seen our advertisement boards but are not sure we can deliver on the task. However, after seeing our work from our social media pages, they come around and are even more impressed and congratulate us on a job well done.

"As a woman in this industry when I show up on sites I get a lot of doubts but also at the same time I also get people who feel that, because I am a woman, I am more trustworthy. It is as if being a woman works against me and for me at times, but we live in different times now, good times, challenging times, exciting times."

**Special achievements:** "We are very happy that our business reached a one year mark, so we celebrated our one year anniversary this year on a good note because our company has shown growth and potential to go even further.

**Unique offerings:** Zone one is now specialising in luxurious flooring using coloured cement washes and plasters. This has become very popular since having started working with Cemcrete at the beginning of 2019.

Masilela says: "We immediately began training on Cemcrete's products and have received great feedback from customers when we began offering it to them as a service. I can safely say that it has brought a lot of attention to our business and people are very interested in what we have to offer."



**Career development:** "We first began by fixing taps and just doing general house plumbing, but now we build houses from the bottom and do renovations, paving, build pools and even boreholes. We also now plumbing for commercial projects and for house insurance claims."

### What do you hold true to yourself, your company and your employees?

"We employ young people and are in the fight to eliminate the rising unemployment rate amongst the youth today. We are very proud to be playing a part in our country's economic growth."

### Advice for new entrants to the SA construction sector?

"Well, you know it's not easy. However anything you set your mind to you can certainly do, also never stop learning. There are always new skills and new ways of doing things in this business. To women who think that this business is not for them I say you will be surprised what you can do here, your instinctive ideas and creativity will add so much value." ■

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# Precautions to reduce health risks in concrete work

*As with many other materials, there are potential risks involved in handling or working with portland cement or mixes made using portland cement. Bryan Perrie, MD of The Concrete Institute, provides guidance on how to avoid the effects of unprotected exposure.*

The composition of portland cement is such that when dry cement is exposed to water a chemical reaction, called hydration takes place, releasing a very strongly alkaline (and caustic) fluid. This can cause alkali burns and safety measures should be observed. Appropriate precautions are advised to prevent tissue damage when handling fresh mixes containing water and portland cement.

Cement dust, dusts from handling aggregates and from cutting concrete are easily inhaled. Prolonged or regular exposure to these dusts should be avoided.

Portland cement is a complex combination of compounds that includes minute quantities of trace elements. Although South African cements typically contain less than two parts per million of Hexavalent Chrome (widely regarded as a safe level), it may serve as an aggravating factor in cases of exposure to alkaline fluids. There have been reports of allergic dermatitis after exposure to these fluids.



When fresh concrete or its bleed water comes into contact with human skin, the alkalis react with the oils and fats in the skin as well as the proteins in the skin itself causing tissue damage. Other organic tissue (e.g. mucous membrane) can also be attacked by strong alkalis leading to burns that can sometimes be severe, and users should try to avoid all unnecessary contact with these fluids. Where such contact is unavoidable, suitable precautions should be taken.

Roughness and dryness of the hands after working with concrete is a typical consequence of loss of these oils and fats. More prolonged exposure could result in irritant dermatitis. It is possible that the effects of trace elements may aggravate the condition and lead to an allergic dermatitis. To safeguard against accidental exposure, appropriate protective equipment is strongly recommended.

Impermeable gauntlet-type rubber gloves and high-length rubber boots should be worn to prevent direct contact with skin. Trousers should overlap the boots rather than be tucked into them. Hydrophobic alkali-resistant barrier creams should be applied to hands and any areas of skin likely to be in contact with fresh concrete. Ordinary barrier creams are generally inadequate.

These precautions may be ineffective if the skin itself is not clean and free of concrete residue. Even a tiny trace of cement dust remaining in contact with wet skin will raise the pH significantly. For this reason, some authorities recommend the use of disposable gloves and discourage reusable gloves.

Regularly wash (at least daily) protective clothing and keep it clean and free of concrete and wash any areas that have been accidentally splashed with wet concrete as soon as possible with large quantities of clean water. Ensure that normal and protective clothing does not become soaked with wet concrete or concrete fluids as this could result in exposure over an extended period, resulting in tissue damage.

Site workers should also not kneel on fresh concrete during placing, compacting and finishing operations. If kneeling is unavoidable, thick waterproof kneepads should be worn with a kneeling board to prevent the pads sinking into the fresh concrete. In severe cases of alkali burns, a medical practitioner should be consulted as soon as possible.

Cement is an abrasive fine powder, and when handled, some dust may become suspended in the air in the working area. Users should avoid inhaling cement dust as this may cause irritation of the nose and throat. Cement dust may also cause irritation of the eyes. This will occur because of the chemical reaction of the suspended dust with the moist mucous membranes. Airborne cement dust should be kept to a minimum to avoid these problems. Should this be impractical, then the use of goggles and dust masks is strongly recommended.

Many aggregates used in concrete have high silica contents. The fine silica dusts created when crushing or handling these aggregates could cause lung problems, and precautions should be observed to avoid breathing in such dusts.

Dust from demolishing or cutting hardened concrete may contain unhydrated cement and could cause respiratory problems. In addition, if the coarse or fine aggregate used in making the concrete contains crystalline silica, then inhalation of these fine silica particles could expose workers to the risk of developing silicosis. A concerted effort should be made to avoid generating such dusts. If this is not possible, the use of suitable respiratory protective equipment is recommended. ■

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# Opinion: Concrete creep, stress and strain

By Construction Thor

The action of creep in concrete structures has to do with the movement of water within the concrete under stress. Creep, in effect, 'relaxes' the concrete and lets the structure and the concrete get on with doing the job it was designed for.

There is a different kind of creep that gives any concrete technologist or engineer that knows what he is doing, more stress and strain than listening to someone who calls concrete, cement. Let's just get that one out of the way, if you were wondering, there is a difference between the two. Cement is a grey powder and only an ingredient in concrete. You don't mix or throw cement, you mix and cast concrete. Throwing cement in your driveway will result in a lot of hazardous dust, until the first rains.

Back to creep. The creep in our standards results in 30-year-old engineers looking like they have been working in the sun for 50 years, judging from the strain on their faces. This type of creep happens when, for example, 25 MPa concrete is specified and the test result is just a little bit low. It is true that the acceptance criteria have to be agreed well before the project starts, but in the absence of an agreement, the engineer is presented with a result of 24,5 MPa. As this result is very close to 25 and when you round up, the result might be accepted. Then on the next pour a result of 24 MPa is produced and because it is close to the previous result of 24,5 MPa, even this result is accepted.

Very soon the argument is made that if you accepted 24, you should be accepting 23. At this point we are well beyond

the specification and accepting a substandard product and/or workmanship. The creep in acceptance criteria and the standard of products accepted can have far reaching results, beyond the costly creams to diminish the wrinkles that stress and strain leave on engineers' faces (shout out to my wife!)

Just to clarify, the excuse for such behavior cannot be "but it shouldn't be". This is akin to someone driving 80 km/h in a 60 zone and, when pulled over by the cops, expecting not to be fined, because the speed limit is wrong. The fact remains that you are outside the specifications. Either get on to the committees which write the specifications and change the specifications, or adhere to the specifications. Get in the game with the rest of us, don't stand on the sideline and criticise the referee and the players.

Know your specifications, make sure they are measurable and don't be the engineer who sends a full load of 90-mm-slump readymix back, because he measured a 92 mm slump, having not spun the truck for 5 minutes, not testing the truck within 30 minutes from arrival on site (that's the truck, not the engineer) and not sampling according to SANS.

This is Construction Thor, reminding you to know the rules, agree before the pour and stay within the specifications. Put your hammer down, bring the lightning and make a difference! ■

**Questions or comments for Construction Thor can be addressed to the editor of Concrete Trends at email: [GillOwens@dmgevents.com](mailto:GillOwens@dmgevents.com)**



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# CHRYSO and a.b.e. products feature in many 2019 Fulton successes

**C**HRYSO Southern Africa and also its subsidiary, a.b.e. Construction Chemicals, provided admixtures and specialised construction products for five winning and virtually every other project entered for this year's Fulton Awards, the Concrete Society of Southern Africa's accolades for excellence in the use of concrete.

CHRYSO and/or a.b.e. products were used to facilitate the construction of the following Fulton Awards category winners:

- **New arch bridge over the Olifants River.** The bridge is part of the works for the upgrading of the N7 from a single carriageway to a dual carriageway in the vicinity of the Olifants River about 280 km north of Cape Town. For this winning project in the 'Infrastructure project valued up to R100 million' category, CHRYSO Plast 500 water-reducing admixture and CHRYSO Optima 100 superplasticiser were part of the concrete mix.
- **Battery Park at the V&A Waterfront in Cape Town.** Situated at the entrance to the V&A Waterfront, the new Battery Park office park won the 'Buildings – more than three-storeys' Fulton Award. The concrete contained CHRYSO's Omega 122 admixture with CHRYSO curing compound and release agent also used on site. a.b.e. provided two Dowsil sealants for the glazing.
- **Norval Foundation, Steenberg.** For this new art and cultural centre in Cape Town, a.b.e. supplied a Dowsil glazing silicone sealant as well as durarep repair mortar and epidermix epoxy adhesive building products while CHRYSO provided its Omega 140 admixture for the concrete mix. CHRYSO curing compound was also used during the construction of this Fulton winner in the 'Innovation in concrete' category.



*The CHRYSO Southern Africa Group provided products for several winning projects in this year's Fulton Awards. Above: the new Olifants River arch bridge, and Battery Park at the V&A Waterfront. Below: 90a Bellamont.*

- **90a Bellamont residences, Umdloti, KZN:** The concrete for this winning project in the 'Buildings – up to three storeys' category included CHRYSO's Omega 162 multi-dose admixture.
- **House La Lucia, Durban.** Here, the concrete for the winning entry in the 'Architectural concrete' included CHRYSO Omega 162 and Optima 175 admixtures. The upmarket residence, with foundations on a primary dune, required continuous-flight auger reinforced concrete grout piles.

In addition to providing products to optimise construction performance and for the glazing of these winning entries, CHRYSO SA and a.b.e. Construction Chemicals also supplied products for eight projects that won Fulton Award Commendations as well as 14 other entries for this year's honours. ■

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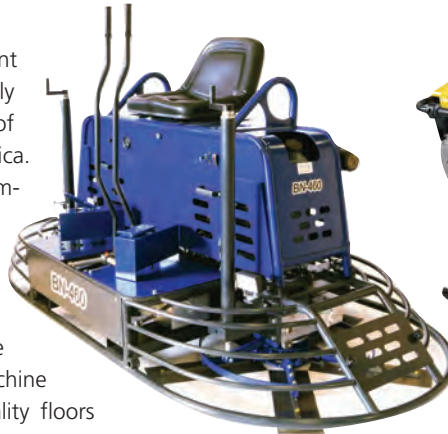
The Ligchine boom operated laser screed machine



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ASCE values the importance of its relationship with its customers and provides a full package in sales, service and technical know-how on job sites. ■

*For additional information feel free to contact Peter Paras, Tel: +61 450 585 212 email: pparas@ascequipment.com.au*


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# Opinion Piece: Five myths around alcohol in the workplace

By Rhys Evans, Director at ALCO-Safe

A recent article on Healthline includes five myths about alcohol, which apply equally to the workplace.

Let's take the myths one by one.

## 1. Myth: It's OK to get drunk once in a while.

It's not uncommon for binge drinking to be considered OK in the workplace. Sales people close deals and everyone celebrates with drinks after work. Suppliers often entertain customers by taking them out on a 'liquid lunch'. Weekly after-work team-building drinks become common practice.

Although it's nice to celebrate successes and build teams, encouraging binge drinking can fuel a drinking culture at the office and contribute to alcoholism. If these events become more frequent, businesses could find their employees getting drunk several times per week, affecting their health, ability to function properly and, ultimately, leading to dependency. Binge drink sessions typically lead to workers unable to concentrate or work properly the next day, decreasing productivity and increasing the risk of accidents in the workplace.

Since regular drinkers are good at hiding symptoms of alcoholism, regular testing becomes important and should not only be conducted upon suspicion of intoxication but should become part of company culture to discourage being drunk on duty.



## 2. Myth: Drinking is always safe in moderation.

The saying that 'anything is fine in moderation' can be misleading. Businesses should ensure they comply with industry best practice especially in high-risk environments. Moderate drinking should not be allowed at all in the workplace. Employers and employees must also be aware of the occupational health and safety act in the workplace as well as the company substance abuse policy,

## 3. Myth: Wine or beer won't make you as drunk as hard liquor.

Often, businesses provide wine and beer at events, assuming they won't make people as drunk as hard liquor. This is simply untrue. All alcoholic beverages contain the same type of alcohol, ethanol, so all alcoholic beverages can make you drunk.

Businesses would do better to limit the number of drinks employees may consume and provide self-test breathalysers at functions, so that employees can test whether they are over the legal drinking and driving limit before leaving a function.

## 4. Myth: Drinking isn't a problem as long as you can hold your liquor.

Everyone knows someone known to over-imbibe but can function seemingly fine at work every day, so it's assumed they aren't alcoholics.

Businesses should monitor and even offer help to these people. Usually, they are alcoholics and while problems may not be evident at work, there may be problems at home and their work is seldom as effective and perfect as it appears.

Almost every company has a zero tolerance policy in the workplace, meaning that even slight traces of alcohol would constitute being under the influence or over the limit.

## 5. Myth: You can sober up quickly with a cup of coffee.

Employees often gather around the coffee machine the morning after a night of drinking, trying to 'wake up', believing coffee will help them sober up, be more alert and productive. Unfortunately, coffee has no effect whatsoever on processing alcohol.

If businesses choose to host a function where alcohol is served during the week, they should hold it on a Friday, or give employees the following day off to process the alcohol in their systems.

Businesses can breathalyse employees before work the next day, sending anyone over the limit home. This protects them against health and safety risks that can endanger staff and their colleagues. ■

More information from Rhys Evans

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# Starlinger: new sack collection for woven plastic fabric



**A**s world market leader in machinery for woven plastic fabrics, Starlinger has been setting trends for decades with innovative packaging solutions for dry bulk goods. Now customers can choose from an even broader and more individual product range on Starlinger machinery: from an automatically inserted PE film liner and an easy-open feature up to ultra-light sacks.

**AD\*STAR \*easy:** With its patented easy-open feature, the AD\*STAR \*easy sparks a revolution in the field of woven plastic bags. This new feature allows for quick and easy emptying without the use of mechanical tools: To open the sack, a strip that is welded to the bottom patch is simply pulled off. The new easy-open feature is available on the Starlinger sack conversion line ad\*starKON HX, which, in addition, is equipped with intelligent features such as iMOVE, iSHAPE, and iPATCH as well as a dual stacking unit. The line covers a broad format range, from a sack capacity of only 5 litres up to 100 litres.

**IC\*STAR \*liner:** Welding instead of sewing: This is the concept behind the IC\*STAR. With the IC\*STAR \*liner, customers benefit from an additional innovation: during the production process, this new sack type is lined fully automatically with a polyethylene film that offers maximum product protection for sensitive applications such as packaging of food and hygroscopic products (e.g. commercial fertilizers). The fabric for the IC\*STAR \*liner is produced on a Starlinger circular loom, the FX 6.0 L, which has been specially adapted for this purpose.

**AD\*STAR \*ultra:** With only 62 grams, the AD\*STAR \*ultra is the lightweight among woven bags made of polypropylene fabric. With dry bulk goods such as cement, the so-called tensile energy absorption (TEA) plays an important role because under load, as during sack filling or a fall from a large height, the packaging is subjected to considerable forces. Starlinger tapes show a high elongation which is retained over the entire process chain; in combination with the high strength of the tapes, this results in a higher TEA than comparable products and thus in an optimal performance under stress.

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## World-class lab providing solutions

Upgrading its Jet Park laboratory has given CHRYSO Southern Africa the capacity to expand its solutions to customers in fields including aggregates, concrete aesthetics and cement.

Staffed by specialist engineers in interface physical chemistry, the CHRYSO Southern Africa laboratory conducts both research and development (R&D) and testing. It also designs its own molecules for industrial-scale production.

"There are a number of challenges that face our customers, including energy costs, environmental regulations and the recently introduced carbon tax," Mpume Mlalazi, R&D manager at CHRYSO Southern Africa, says. "By enhancing our world-class laboratory facility, CHRYSO can develop solutions that mitigate these challenges."

Among the capabilities of the laboratory is a recently launched sand and clay diagnosis tool (patent pending) for accurate quantification of deleterious clay minerals in aggregates, says Mlalazi. This helps customers address the growing issue of problematic aggregates in a cost-effective and environmentally responsible way.

"Our solutions, rheology robustness enhancers and clay enablers, use polymer science to allow customers to make use of readily available aggregates, without having to wash the material extensively with water," she says. "The environmental benefits are substantial, especially in water-scarce areas."

The facility has an extensive colour testing capability to support CHRYSO's new concrete aesthetic range. Accurate measurement of colour can be conducted, allowing customers to easily match the colours that are required for a particular

project. Expanded technology also allows the laboratory to scientifically test demoulding oils.

Mlalazi highlights that the laboratory has also expanded its expertise into cement testing.

"As part of our R&D function, we have acquired additional equipment to facilitate cement testing," she says. "This can now be done in a pure molecular chemistry environment."

In addition, micro-concrete evaluation is used to optimise admixture selection to cement performance.

This work has put our company 'ahead of the game' in finding energy saving solutions and meeting the impact of carbon tax legislation. The laboratory can assist with testing and R&D related to both extended cement and concrete.

"All work is conducted within stringent standards, which include ISO 9001, ISO 14001 and ISO 18000. We also test water quality to ensure we only discharge clean water and recycle water wherever possible," she says.

CHRYSO Southern Africa's commitment to R&D is enhanced by research collaborations with local universities and their graduates who are mentored by CHRYSO specialists as part of their professional development. ■

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▲ Polymer synthesis for rheology and clay enablers.

▲ Mpume Mlalazi, research & development manager at CHRYSO Southern Africa.

## Concrete technology portfolio from Wacker Neuson

Wacker Neuson South Africa, a global specialist in light and compact equipment design, manufacture and supply, offers a comprehensive concrete technology portfolio that is a perfect fit for Africa's tough construction industry.

This rugged and robust product suite includes walk-behind and ride-on concrete trowels, internal and external vibrators as well as frequency and voltage converters.

Built to last, this cutting-edge, world-class quality equipment boasts a range of features that deliver lowest total cost of ownership to customers and end-users.

Irrespective of how tough the site conditions, Wacker Neuson concrete products are capable of performing optimally and reliably over a long life cycle for maximum availability and prolonged uptime.

Wacker Neuson places operator comfort and safety top of mind during the design and development processes. The ergonomically designed equipment protects not only the operator but also other personnel on the job site.

Easy, hassle-free service and maintenance further drive up productivity while driving down operational costs.

Wacker Neuson's far-reaching southern and sub-Saharan African dealer network brings the extensive concrete product range, backed by superior after-sales service, to dealers, plant hire companies as well as end-users across the region.



*New walk-behind concrete trowel from Wacker Neuson for perfect concrete.*

In addition to the well-known Wacker Neuson High Frequency Internal Vibrators, the company, in line with the success of its battery driven products in the compaction sector, is now working on the development of a battery driven High Frequency Backpack Internal Vibrator.

This product will use the same battery and charger as the AS50e Rammer and the AP1850We Vibratory Plate. Customer benefits of this Backpack Vibrator include increased operator safety, comfort and mobility due to the low safety voltage as well as the fact that the machine is powered by a backpack.

With no cables having to be dragged around on site, it provides optimum mobility. Test units of this system for trials will be made available in South Africa in due course. ■

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# UK sand washing technology used to great effect in South Africa

By Tasneem Bulbulia

South African construction materials producer Ground Breakers is using UK-based CDE's Combo all-in-one wet processing and water recycling system to enhance the quality of its products, while lowering operating costs and ensuring greater return on investment.

The Combo has been in use at Ground Breaker's quarry in Lindley, Gauteng, for a few months now, and has already garnered positive results, and serves as a successful case study for other suppliers to emulate.

Ground Breakers is a supplier of materials for the local construction market.

At a site visit to the quarry on 1 August, Ground Breakers owner Johan Meintjes emphasised that far from the company wanting to have the monopoly on the product in South Africa, it was encouraging other suppliers to also pursue such technology, as it would raise the quality of construction materials available to the market.

CDE already has three Combo plants in the country. Ground Breakers began producing construction materials at the Lindley quarry in November 2016.

A bucket wheel was used to transform the quarry's raw feed of decomposed granite into construction sand and aggregates. The Combo is an upgrade of this system. Ground Breakers sought to replace the bucket and wheel to counteract the loss of valuable materials to ponds and excess moisture in the final products.

The quarry site faced several challenges – it had limited water sources and limited space to put up a proper wash plant. Moreover, any silt dams that were dug took away valuable mining area.

Ground Breakers also lost a lot of fines to the settling ponds, wasting material that it could not sell without dredging the ponds and reprocessing it through the bucket wheel.

Therefore, the Combo serves as a more sustainable and efficient washing solution and will meet market needs for a clean washed concrete sand.

After considering the site's footprint and Ground Breakers' requirements, CDE presented the Combo as the ideal solution. It has a capacity range of 50 t to 500 t and boasts a modular design to combine feeding, grading, washing, water recycling and stockpiling onto one compact chassis.

The Combo allows Ground Breakers to produce two high-quality sands simultaneously from the raw feed, including plaster sand and river sand, for a much faster return on investment.

Following a collaborative design process with Ground Breakers, CDE developed and built a Combo modular plant to transform 60 t/h of raw feed into washed 0 mm to 6 mm river sand and 0 mm to 1.5 mm plaster.

Previously, Ground Breakers had been producing only one sand product, therefore, the technology has also expanded its product offering, Meintjes indicated.



The Combo's high-frequency dewatering screen dewateres the material in one pass, removing the need for re-processing and double handling.

Once the sand slurry with the silt material is discharged from the hydrocyclones, it is delivered to the screen, which is sized according to the customers' specific capacity requirements.

This capacity for sizing means that Ground Breakers can provide a product above the two sand types earlier alluded to.

The Combo has advanced water management which ensures that the final products are dewatered to an average 12% moisture, making them ready for market straight from the belts.

As an added benefit, the fully integrated CDE AquaCycle thickener allows for up to 90% of the process water to be recycled directly into the system for near independence from freshwater supplies.

The more advanced Combo technology addresses the shortcomings of the bucket and wheel system, such as the difficulty to control the volumes of water required for accurate material classification, owing to the limited capacity at the feed point.

It will also engender considerable cost savings for Ground Breakers, as generally, it sells per tonne.

Her Majesty's Trade Commissioner for Africa at the UK Department for International Trade Emma Wade-Smith, OBE lauded the partnership between Ground Breakers and CDE.

The department provides strategic support for UK companies expanding into African countries.

She noted that it was encouraging to see CDE expanding its footprint into Africa and supporting producers with innovative technologies.

She indicated that this would allow South African producers to be aligned with the latest technologies – even if the construction industry was not ideal at present, it would have quality products once demand picked up, would be ready to serve capacity, and moreover, could export products to other countries where there was demand. ■

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## New fast-setting tile adhesive and smoothing compound

**L**eading chemical and adhesives manufacturer, Mapei, has released its new locally produced multifunctional cementitious tile adhesive, Adesilex P4, a C2F class adhesive which can also be used as a levelling compound.

Adesilex P4 is first and foremost an innovative, rapid-setting, semi-fluid, full-contact adhesive which has the added benefit of 100% tile coverage, eliminating the need for back-buttering on large format tiles. This results in cost savings in both time and consumption per square metre (subject to required thickness). It is ideal for use as an adhesive on ceramic, porcelain and natural stone (non-moisture sensitive) installations in internal and external environments. The product is easily trowelable and allows for light traffic within four hours.

As a smoothing compound, it can be used on interior and exterior surfaces generally found on site up to a maximum of 20 mm thick. Providing the substrate is clean with no loose debris, it can absorb deflections on the substrate and provides easy levelling and localised smoothing which sets within four hours.

This gives contractors the ability to use a single product to ensure both cost and time savings on projects. It can even be used as a mortar for brick and concrete block walls for building, wherever quick curing and high strengths are required.

"It is important to remember that if the easy-to-use product is used as both a smoothing compound and a tile adhesive,



Smoothing over existing flooring.



Application



Coverage

the smoothing layer needs to be hardened and prepared correctly before proceeding with the tile application," says Zamaswazi Ntobela, ceramics product manager for Mapei South Africa.

Adesilex P4 is suitable for heavy traffic zones, such as offices, shopping malls, hospitals and schools. Its wide temperature range means it can just as easily be used over underfloor heating installations or any other application where temperature extremes may occur.

"Although our product guarantees 100% coverage of surfaces with no need to 'back-butter' large-format tiles, it also provides the benefit of one multipurpose product with the obvious cost and time saving benefits!" adds Zamaswazi. ■

**More information on MAPEI South Africa's solutions and products, from Tel: +27(0)11 552 8476 / [www.mapei.co.za](http://www.mapei.co.za)**



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# Building a positive African future for 85 years



With evidence of the longevity and potential of its products on display in infrastructure across southern Africa, AfriSam's presence is widespread.



The Zeitz MOCAA in the V&A Waterfront in Cape Town during construction.

**W**ith evidence of the longevity and potential of its products on display in infrastructure across southern Africa, AfriSam's presence is widespread.

Notably with a legacy that goes back 85 years, this leading construction materials supplier has contributed to many iconic projects. These include the Carlton Centre in the Johannesburg CBD, the Nelson Mandela Bridge, the Lesotho Highlands Water Project, numerous new developments in Sandton (including the tallest building on the continent, The Leonardo) and the Zeitz MOCAA in the V&A Waterfront in Cape Town.

Although the company has undergone changes in shareholding and names during its 85 year existence, AfriSam has remained true to its formula according to Rob Wessels acting chief executive officer and Richard Tomes, sales and marketing executive.

This, they concur, has been pivotal to AfriSam's success, despite economic cycles experienced by the construction industry. The past five to six years have been particularly difficult for the construction industry (a key customer segment for AfriSam) and companies operating in the construction sector.

Wessels says AfriSam has had to "right-size the business" and adapt where necessary to remain competitive as well as continue to be the supplier of choice.



"Business performance in tough times comes through shifting and broadening our customer base, and by continuing to focus on the quality of our product, technical advice and the relationships we have with our customers," he says.

"AfriSam has a reputation for providing quality product and expertise, and getting things right, and we're determined to maintain this."

Among the initiatives AfriSam undertakes to promote quality within the industry is its anchor sponsor of the Concrete Society of Southern Africa's Fulton Awards. This, Tomes says, is in line with the company's mission of "creating concrete possibilities by pushing the boundaries of concrete products, both in terms of sustainability and technical performance".

AfriSam is also the co-founder of the AfriSam-SAIA Award for Sustainable Architecture + Innovation, which recognises the importance of 'green' building and acknowledges the contributions made by forward-thinking industry players towards bringing sustainable innovation to human living environments. ■

**More information from:** [www.afrisam.com/](http://www.afrisam.com/)

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# Quarry map profiles



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## AfriSam's success set in stone

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All AfriSam Aggregate operations, including the plant laboratories, have ISO 9001 certification, ensuring that our aggregates are fully compliant with the relevant specifications and with the customers' requirements.

As a member of the Aggregate and Sand Producers Association of Southern Africa (ASPASA), our plants are subject to regular inspections and our awards are on display in the relevant plant offices. We are also fully committed to complying with relevant statutory and regulatory requirements as well as our own AfriSam Environmental, Health and Safety, and B-BBEE policies.

Planning and foresight govern our surface mining, and the subsequent rehabilitation of mines is a land use transformation that not only contributes to current needs for construction materials, but also allows the return of the mined land to a new land use once mining operations end. A Trust Fund provides for rehabilitation on closure to a positively useful or self-sustaining landform.

**More information from Maxine Nel**

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**Web: www.afrisam.com**



## Booyco Electronics

**B**ooyco Electronics offers the quarrying industry a turnkey, fully integrated surface safety solution for machinery and personnel.

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**More information from Booyco Electronics,**

**Tel: 0861 266926**

**Email: info@booyco-electronics.co.za**

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Loadtech Load Cells has an accredited explosion protection rating on various locally manufactured load cells. The combination of own manufacture, and the extensive range of products from Vishay transducers, Vigia, Datum and Nobel allows Loadtech Load Cells an unequalled degree of flexibility in offering weighing solutions to its clients.

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**Web: [www.loadtech.co.za](http://www.loadtech.co.za)**



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Mission: "We enhance safety and productivity in mining and industrial markets through innovation and excellent services for the benefit of all our stakeholders."

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- Civil engineering
  - o Township infrastructure
  - o Pipelines
  - o Synthetic sports fields
- Surveying – Drone

The company is focussed on safety and reliability, and believes in value-add through efficiency.

SPH Kundalila is a full subsidiary of the Raubex Group Ltd, a JSE listed company.

**More information from Tel: +27(0)21 527 5200**

**Web: [www.sphkundalila.co.za](http://www.sphkundalila.co.za)**



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**We look forward to being of service to you.**



**P**ilot Crushtec International (Pty) Ltd is southern Africa's leading supplier of mobile and semi-mobile crushing, screening, recycling, sand washing, stockpiling, compacting and material handling solutions. Our product range includes genuine OEM jaw crushers, cone crushers, vertical shaft impact (VSI) crushers, impact crushers, screens, conveyors, lighting towers and dust suppression systems.

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**A**n example of Aury Africa's success in the readymix and aggregate sector is its involvement with the AfriSam Olifantsfontein quarry in Gauteng, which has been making use of its woven wire screens since 2014.

Wire screens from Aury Africa are more cost-effective than competitor products, and comply with all relevant quality standards. This not only minimises downtime, but ensures a substantial return on investment.

Changeout is also much quicker, meaning that proactive maintenance is both feasible and cost-effective. The fact that Aury Africa manufactures its wire screens locally gives customers peace of mind that sufficient stock is always on hand, with a quick turnaround time.

Aury Africa also offers aftersales consultation on the most suitable screens for specific applications, and how best to utilise the selected screens. Aury Africa recently concluded a Broad-Based Black Economic Empowerment agreement with 100% black-owned local services company Nkomose Consulting Engineers & Projects.

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email: [syd@auryafrica.co.za](mailto:syd@auryafrica.co.za) / [www.auryafrica.co.za](http://www.auryafrica.co.za)**



**A**frimat Limited is a leading black empowerment open-pit mining company providing construction materials and industrial minerals. The group's core subsidiaries have been in operation for more than 45 years and it is listed in the 'Construction and Building Materials' sector of the JSE Main Board.

The group supplies a broad range of materials ranging from aggregates, concrete products (bricks, blocks and pavers) to readymix as well as industrial minerals and iron ore. In addition, Afrimat has established a strong foothold in contracting services comprising mobile crushing, screening, drilling and blasting; and offering flexibility even beyond its fixed areas of operation.

Afrimat's flexibility extends further – to project scale – with the group servicing major infrastructure and construction projects for public sector and government owned enterprises through to small private sector contracts.

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**More information from Tel: +27(0)21 917 8840 /  
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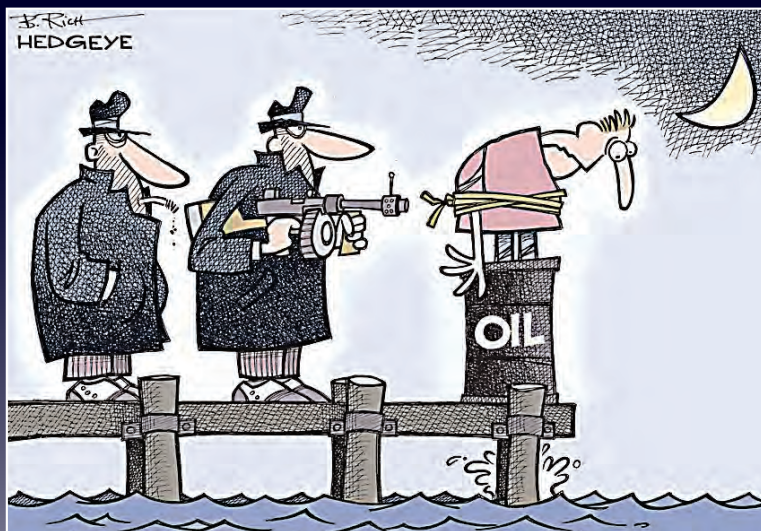
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# The darker side of the concrete world

*The world's most versatile building material has some notorious applications, Jan de Beer discovers.*



Concrete, the world's most beloved building materials, also has plenty of fans in the underworld, it would seem.

Just the other day there was a report on how a Centurion motorist had to contend with wet cement thrown on his car window from an overhead bridge on the N1 highway. Understandably, his wipers were not up to this cleaning task so the unsuspected driver had to pull off to the side of the road where five men suddenly appeared from the bushes. He managed to escape and drive off, leaning out the window.

Intrigued by another opportunistic application of what one assumes was just plain cement, I did some web research to see if the notorious mob in days of old also used wet cement as well as their legendary 'concrete shoes' and 'concrete overcoats' to send victims to sleep with the fishes. Not a word, so it looks as if our locally developed method of stopping highway motorists is another exceptional SA innovation. Let's face it: this kind of crime takes a fair amount of skill. Dropping cement onto the windscreen of a car speeding below at 120 or more kilometres an hour calls for timing of mathematical precision without, one would think, much opportunity to practice. Our crooks are definitely in a class of their own.

Further research showed that concrete shoes or concrete overcoats as methods of execution were mostly invented by crime writers or by Hollywood gangster movie writers – people who did not even know the difference between cement and concrete in the first place. But, as they say, never let the facts get in the way of a good story. It seemed that only one case of feet encased in hardened concrete has ever been recorded and that was in 1964 when a body of a gang member was found on a Brooklyn beach with two concrete blocks tied to his legs. The murderer, it would seem, was a bit out of his depth in the science of body disposal as "the concrete was filled with air bubbles that may have caused the body to come ashore", the BBC report stated.

So, Al Capone and his cronies probably did not use this method of execution on live victims. Not surprising, as readers of *Concrete Trends* would know. For a start, fitting concrete

shoes on a victim is just too time-consuming for any busy mobster. It takes several hours for concrete to harden sufficiently and then there's the challenge of persuading the hapless – and by then obviously shuddering – victim to sit still while the concrete hardens. "If you move a toe, I will shoot," seems a pointless threat at such a time.

In the early part of the 20th Century readymix was not so readily available nor would Capone & Co have had access to instructional leaflets on *Fitting Concrete Shoes* to get the mix right. Then the problem of logistics. How do you transport a man with his feet in a huge, heavy chunk of concrete? LDVs were not around yet and taking such a messy load in The Godfather's shiny new Cadillac could hurt both resale value and henchmen, so popping out for a quick machine gun massacre would have saved valuable time when so many banks were just waiting to be robbed.

On a more noble, albeit misguided, mission a teenaged UK environmental activist stepped into the limelight just a few years ago, after also having enlisted the aid of concrete for her passion. The 17-year-old known simply – but perhaps understandably – as 'Animal' was protesting the building of a new highway. She ended up suspended precariously 20 metres from the ground in a tree for days, attached by ropes to a huge lump of concrete inside an oil drum. Bailiffs eventually had to meticulously lower her down with a cherry picker crane, her arm still tied to the concrete drum. They later took three hours to break up the concrete drum – estimated to weigh more than a ton – with a pneumatic drill before Animal was finally cut free and taken away in a police van. Breaking the law proved easier than breaking concrete!

No wonder concrete is such an integral part of the urban dictionary. Readers no doubt are fed up about hearing the term 'concrete jungle' but there are more: concrete jungle bunnies are gangsters (again) primarily in New York and Los Angeles; a concrete kiss is when you are thrown face first into a wall; and concrete love-making is (wait for it....) hitting the ground at speed from a skateboard! ■

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A hand is shown from the bottom, palm up, holding a glowing, golden-yellow cloud of sand. The sand is illuminated from below, creating a bright, ethereal light. As the sand rises, it forms a dense, textured column that eventually dissolves into a city skyline of several skyscrapers, including one with a prominent spire. The background is a dark, almost black, space, making the glowing sand and the city skyline stand out prominently.

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