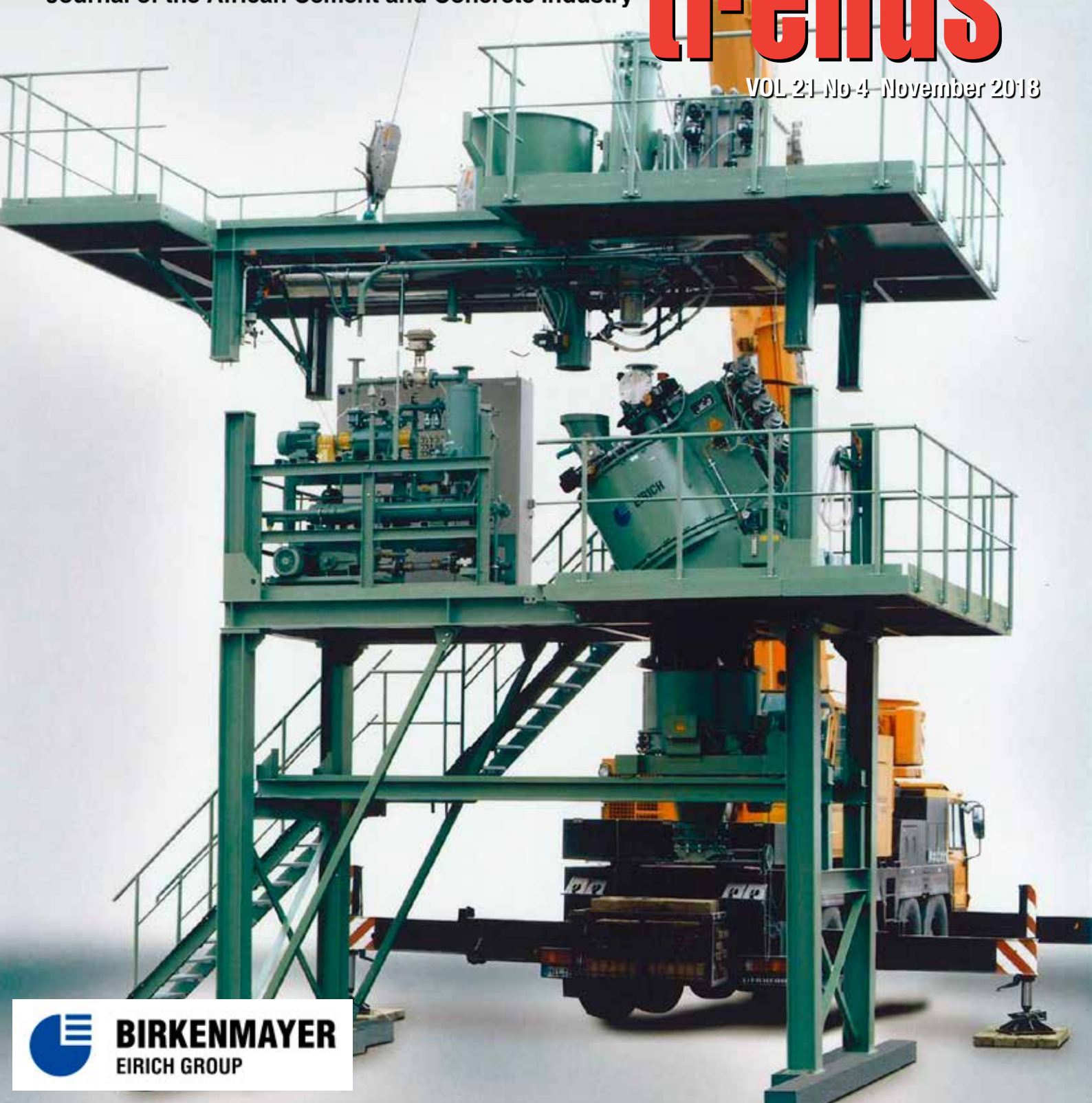


# CONCRETE

Journal of the African Cement and Concrete Industry

# trends

VOL 21 No 4 November 2018



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41 | COVER STORY



*Eirich Type R Intensive Concrete Mixer from Birkenmayer South Africa. Eirich tilted pan mixers are custom-built for high speed, reliability, energy efficiency and ensure truly homogenous results – batch after batch.*  
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# Here's hoping investment heralds a better 2019

We are drawing closer to the end of what must surely qualify as an *annus horribilis* for our struggling construction industry. Amid daily revelations about the extent of the corruption that characterised the 'Zuma Years', added to the news of prominent construction companies taking their businesses offshore, going into business rescue and even bankruptcy, it's hard to see the proverbial light at the end of the tunnel.

South African construction companies have borne the brunt of stagnant economic growth that has hobbled public infrastructure spending in recent years as well as policy uncertainty around property rights and the service delivery protests. All these have contributed to making South Africa (and many other countries in Africa) no-go destinations for investment.

However, there have been promising signs that change, albeit probably slow, may be in the offing. A renewed focus on infrastructure is forming the backbone of President Cyril Ramaphosa's economic stimulus package, which was announced in mid-September.

The stimulus package aims to reignite economic growth and create jobs, at a time when the country languishes in a technical recession and consumer and business confidence have hit all-time lows.

"Infrastructure expansion and maintenance has the potential to create jobs on a large scale, attract investment and lay a foundation for sustainable economic expansion," Ramaphosa told his audience.

As part of the package a South African Infrastructure Fund will be launched early in 2019 that will include a R400-billion contribution from the national fiscus over the coming three years of the medium-term expenditure framework.

This will be used to leverage additional resources from development finance institutions, multilateral development banks, and private lenders and investors. The fund's aim is to reduce the current fragmentation infrastructure spending and ensure more efficient and effective use of resources.

In addition, the Africa Investment Forum held in Johannesburg from 7–9 November has been advertised as a game changing event, aimed at attracting multi-billion-dollar deals across the continent, thereby transforming Africa's investment landscape.

Described by African Development Bank President Akinwumi Adesina as the "collective deal of the century for investment in and the development of Africa," the forum focussed on advancing projects to bankable stages, raising capital and accelerating the financial closure of deals.

At the time of writing, the results of the Forum had not been announced, but I devoutly hope that they bring much-needed projects to revive our flagging industry.

Finally, the publisher and the *Concrete Trends* team join me in wishing you and yours a happy, safe and peaceful festive season. May 2019 bring better times for us all.

*Gill Owens, Editor*



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## Revelstone launches new showroom and celebrates 25th year

**R**evelstone, one of the country's leading manufacturers of cast stone products, celebrated its 25th year by launching a new showroom in Lansdowne, Cape Town. Designed as a landscaping ideas hub for architects, landscapers, interior designers, building contractors and the homeowner, the showroom is a visual feast, showcasing a wide range of Revelstone paving, cladding and coping for both outdoor landscaping and various indoor applications. In addition to a double-volume exhibition space, the showroom boasts a boardroom for meetings and demonstrations, an outdoor garden area and a coffee bar.

At the launch held on September 13, Revelstone MD, Alex Cyprianos, said the facility is a forum aimed at inspiring design creativity in the built environment.

"We are encouraging all our clients, be they the homeowner or landscape architect, to use this space to meet and collaborate in a relaxed atmosphere."

Revelstone was founded by Andrew Cyprianos in 1993 and initially operated from an underground cellar in Muizenberg. A reputation for product development, innovation, quality personalised service spread rapidly catapulting the company to the pre-eminent position it commands today.

"Natural stone products are becoming more expensive and less environmentally friendly, and are generally imported," says Andrew. "By contrast our products are manufactured using 95% of raw materials located within 100 km from our factory. In addition all our moulds are 100% recyclable."



From left: Adrien Desmarais, Progressive Paving; Revelstone founder and director Andrew Cyprianos; Mike Reynolds, Cape Flora Landscaping, and Revelstone MD, Alex Cyprianos, at the launch of Revelstone's new showroom.

"Our products are almost indistinguishable from natural stone and we use traditional masonry skills combined with a modern moulding technique to painstakingly reproduce an original master which is then used to create a mould." ■

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## CHRYSO acquires EUROMODAL



Thierry Bernard,  
CEO of CHRYSO.

**T**he CHRYSO Group, which has its head office in France and represented locally by the CHRYSO Southern Africa Group, has announced another acquisition. A world leader in construction chemicals for concrete and cement, the CHRYSO Group has announced its acquisition of EUROMODAL, a company manufacturing a broad range of construction chemicals and offering services such as technical support, the formulation of mix designs, and onsite support.

CHRYSO has been present in Portugal since 1993 and has serviced infrastructure projects through its extensive customer portfolio of cement manufacturers, producers of both readymix and precast concrete, and construction companies. These companies benefit from the Group's extensive experience in the chemical sector and the formulation of quality admixtures and construction materials.

EUROMODAL was established in Portugal in 1986 and operates from a new automated plant, located near Porto.

"We are delighted to integrate EUROMODAL in our Group and look forward to working with the talented people who will become part of the CHRYSO business," said Thierry Bernard, President and CEO of CHRYSO. "The combination of our operating business in Portugal will increase the product mix and strengthen our presence as a market leader. The local production, the world-class local concrete laboratory, and strong technical service will benefit our customers. After our recent

acquisitions in Italy and in Ireland, this move demonstrates our willingness to enhance our positions in geographies where customers see benefits in value-added solutions and differentiated offerings, to meet their specific needs."

"We see great potential ahead being part of the CHRYSO Group, with a high level of commitment to assist our customers on the most challenging jobsites," said Francisco Araujo, CEO of EUROMODAL. Araujo will become General Manager of CHRYSO in Portugal.

The CHRYSO Group – which employs over 1,200 staff worldwide – has built its success on innovation, customer service, expertise and technical know-how. CHRYSO products and solutions have been applied on some most prestigious construction sites throughout the world thanks to the group's extensive network, which includes 21 foreign subsidiaries and covers over 100 countries.

The company's South African operations started 22 years ago. Locally, the CHRYSO Southern Africa Group includes a.b.e. Construction Chemicals, a leading supplier of specialist construction products that complement the CHRYSO range of admixtures and ancillary products. ■

Source: <https://goo.gl/Zse4Ra>

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**TECHNICRETE**

## turns 50 this year

**T**echnicrete, one of South Africa's leading manufacturers of precast concrete products turns 50 this year. Originally part of the Concor Group launched in 1948 by Jurgen Schultz who, in 1968, saw a gap in the market for the manufacture and application of precast concrete products. The group launched Concor Technicrete as a new division that would focus totally on this new range of precast offerings.

So strong was Schultz's belief in the precast market that he obtained exclusive rights to manufacture Deckwerk blocks in South Africa. These were used in the successful construction of the Magoebaskloof, Fanie Botha and Bloemhof Dams – all of which were lined with these purpose-designed blocks from Technicrete. The success of Concor Technicrete products on these projects is what established the division as the major industry player it is today.

Following this success they received a contract to line a canal from the Kukane River in the then Ovamboland (now Northern Namibia) to Oshakati. Fifty years and thousands of projects later, the rest is, as they say, Technicrete history.

### Past and Present

In 2006, Concor was acquired by Murray & Roberts and Concor Technicrete became an independent company within the group. This resulted in the name change to simply Technicrete, an iconic brand that has stood the test of time.

In 2013, The Infrastructure Specialist Group (ISG) was formed after Murray & Roberts unbundled Technicrete, Rocla and Ocon Brick who joined the ISG Group. A new executive team for ISG was established, led by Albert Weber the current Chief Executive Officer (CEO).

Weber commented: "The Technicrete brand is iconic in South and Southern Africa. It is known for quality products that have been manufactured using the latest available technologies backed by a superior plant workforce and sales team. To celebrate Technicrete's 50th birthday is a major milestone in our history and in my role as its CEO. I am extremely proud of how Technicrete is still considered a preferred supplier to most commercial and residential projects of all sizes, and how it has grown to meet the often-stringent requirements of our ever-changing times."

Over the last 50 years, Technicrete has grown operationally as well as product wise. From small beginnings to the construction of Technicrete's first major plant at Randfontein, the establishment of nine other country-wide manufacturing facilities followed. The product range too has expanded from Deckwerk to a catalogue that offers a complete range of precast concrete pavers, kerbs, erosion protection systems, drainage, retaining walls and concrete masonry solutions, which has applications for both commercial and residential developments.

### Technicrete Values

"Our people are at the core of our success. Without their commitment to our brand and customers we would not be here 50 years on. It is our people who live our core values: care, respect, integrity, accountability and commitment to the delivery of quality products and services," said Weber.

"We are committed not only to continued upskilling of our own staff, but also to uplifting local workforces through knowledge transfer in areas where we supply or manufacture our products. We wish to make a meaningful contribution to the infrastructure and people of this country," said Weber.

Technicrete has supported various educational and community support-based organisations over the years through its Corporate Social Investment Programme.

Technicrete operates a STOP.THINK philosophy and commits itself to providing a safe and healthy environment for its employees with an objective of 'Zero Harm' at all its sites.

### Certified Standards

Technicrete is a dedicated member of the Concrete Manufacturers Association (CMA) in South Africa and adheres to the ISO 9001:2015 Quality Management System.

Despite congestion within the precast concrete product market, Technicrete has, based on its history, always had the edge. Unique attributes of the company include:

- A strong historical foundation which enables building on our trust marks of heritage and credibility



- Delivery on key promises of quality and product service, for which we are highly respected
- A depth of knowledge based on the experience we bring to the business and customer base

**Products to suit all requirements**

From major civils projects to medical facilities and universities; residential upgrades to upmarket residential estates; motor vehicle dealerships to large commercial buildings and shopping complexes; infrastructural projects to health clubs, Technicrete has been involved for 50 years in these types of projects around South and Southern Africa.

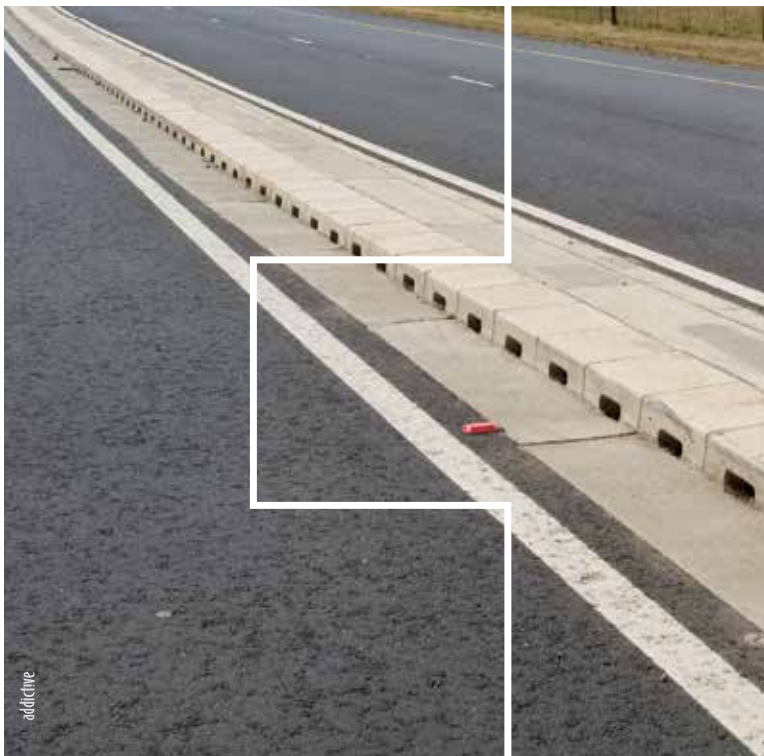
Weber said: "In 1978, the Aggeneys mining township was established in the Northern Cape. The Technicrete Zig Zag Block Pavers used there are still in good working order nearly 40 years later – that's a good quality product for you."

**The Future**

"Technicrete will continue to play a major role in the supply of precast concrete products as infrastructure around the country continues to be upgraded. Private-sector commercial and residential property developments are still a growth industry and I believe our service, competitive pricing and product quality will continue to give us the edge making us a preferred supplier for at least the next 50 years," concluded Weber. ■

Technicrete is part of the IS Group of companies including Rocla.

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**email: Malebusa.Sebatane@isgroup.co.za**



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## BBF Safety Group wins at KZN top business awards

**B**BF Safety Group is proud to have been recognised in multiple categories at the recent Durban Chamber of Commerce KZN Exporter of the Year Awards held at the Durban International Convention Centre.

The workplace safety solutions provider – who now exports to over 20 countries globally – was named the winner in the Emerging Markets category. With entries having been open to all exporters in KwaZulu-Natal, this was unmistakably a top achievement for the company.

In addition to this, the BBF Safety Group was also named a finalist in the following categories:

- Manufacturers – all companies operating in the manufacturing sector in KZN
- Africa – companies who export into Africa

The awards, now in their 18th year, are a showcase and celebration of emerging and established KwaZulu-Natal-based exporters of a wide range of goods and services, with the aim of stimulating the growth of the province's economy.

"We are honoured to have been recognised in these categories and want to express our gratitude to our clients in both export and domestic markets for their ongoing support and continued business. As a trusted partner to hundreds of businesses across Africa and beyond, we remain deeply committed to keeping people safe at work and continue to maintain excellence and innovation in all we do", said Tven Heyer BBF Group export manager.



*BBF Safety Group won the Emerging Markets category at KZN Exporter of the Year Awards.*

In addition to being the largest manufacturer of safety footwear in Africa, BBF Safety Group is an integrated workplace safety solutions provider offering a full portfolio of head-to-toe personal protective equipment (PPE) and expert SHEQ services. Operating out of five ISO 9001-accredited manufacturing facilities across the South Africa, the company offers more than four thousand PPE products and produces over three million pairs of safety footwear and gumboots annually. ■

**For more information, visit [www.bbfsafety.co.za](http://www.bbfsafety.co.za)**

## Property Point founder receives a global award from ANDE

**S**hawn Theunissen of South African small business developer Property Point, a Growthpoint Properties initiative, has been named 2018 Aspen Network of Development Entrepreneurs (ANDE) Global Member of the Year.

The announcement was made at the ANDE Global Conference this October in New York, as members from around the world gathered to propel entrepreneurship in emerging markets.

ANDE has 291 members operating in over 150 countries and supporting tens of thousands of small business entrepreneurs. Its members provide critical finance, education and business support services to small and growing businesses, which help to improve national business environments.

Theunissen, the Head of Corporate Social Responsibility at Growthpoint Properties, Founder of Property Point and ANDE's South Africa Chapter steering committee member, accepted the award which is given to individuals who go above and beyond in support of ANDE in the collaborative spirit that serves the bigger picture of the network.

Jenny Everett, ANDE's MD, says, "Theunissen has proved invaluable to the effectiveness and growth of the ANDE South Africa chapter. He has mobilised the entire Property Point team to help ANDE achieve its goals of building thriving regional chapters and effective entrepreneurial ecosystems."

ANDE helps entrepreneurs working to drive prosperity in developing countries. A neutral, global organisation, ANDE

**PROPERTY**<sup>POINT</sup>  
A GROWTHPOINT INITIATIVE

supports locally-driven solutions that help entrepreneurs build self-sustaining businesses that create jobs and a better, cleaner, healthier and more inclusive world. ANDE believes that small businesses have the power to help lift families, and entire nations, out of poverty.

Property Point has successfully developed sustainable small businesses for the property sector for over a decade with Theunissen at its helm. Over the past 10 years it has facilitated market opportunities worth R1.14bn for the 168 SMEs that have taken part in its two-year enterprise and supplier development programmes. It has also created more than 2,405 full-time jobs. Its SMEs report an average 44% growth in revenue.

Pioneering collaboration across the property industry and beyond, Property Point works with the public and the private sector. Its partners include Attacq Limited and the South African Department of Small Business Development (DSBD). ■

**More information from +27(0)11 833 0340  
[www.ettp.co.za](http://www.ettp.co.za) or ANDE at [www.andeglobal.co.za](http://www.andeglobal.co.za)**





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## Aspasa's Nico Pienaar recognised at H&S Summit

At the 2018 Mine Occupational Health & Safety Summit hosted by the Minister of Mineral Resources, the Honourable Gwede Mantashe, and held in Benoni on 18 and 19 October 2018, Aspasa director, Nico Pienaar, was presented with a Mine Health and Safety Council Certificate of Recognition.

The award's citation reads: 'In appreciation of exceptional commitment and contribution to the Mine Health and Safety Council's (MHSC) journey to zero harm in the South African mining industry.'

The summit's participants from government, business and organised labour had gathered to assess progress towards 'Every mineworker returning from work unharmed every day: Striving for zero harm', and to derive solutions that will assist the industry improve the current situation.

"Our aim is zero fatalities, and we can only do that if we – government, mining companies and labour unions – work together. It is important for all stakeholders to appreciate that mining is not only about the minerals being mined, it is about human beings," the Minister added. ■

**More information from Aspasa at [www.aspasa.co.za](http://www.aspasa.co.za)**



**ASPASA  
AT WORK**

## Engaging with communities is critical, says Aspasa

During the Mining Charter discussions, it became very clear that the issue of Communities would play an important role in the future focus of all Aspasa members. Aspasa has therefore been requested to devote time and attention to the issue.

In response to these requests from members a Committee for Engagement with Communities has been established. This will focus on the specific issues of communicating and consulting with communities to ensure a positive result for all parties.

This will add to the already extensive range of Aspasa committees, which range from H&S, Environment, Technical, Engineering, Government Liaison, Training/Skills Development and Transport.

Nico Pienaar, director of Aspasa said: "After Marikana and the very poor handling of the communities, it has become apparent that there is a need for far greater community engagement. At the recent Mining Charter weekend, there were two bodies representing the communities and the DMR have consulted them for input into the Charter. These bodies appear to be backed by the unions.

"Aspasa has drawn up some guidelines to assist in dealing with community issues affecting the surface mining industries. This material is available on request," he explains.

"It is important to understand that economic growth is guided in conjunction with strong and healthy communities, the wellbeing of the community and an environmentally sustainable industry.

"Aspasa therefore underpins the fact that good community engagement also makes sense on a practical and at grass-roots level as decisions are improved, risks are reduced, and relationships are built.

"Being involved with communities and working with the people of host communities can serve to enhance a company's reputation and also to facilitate future acquisitions," Pienaar concludes. ■

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## ASAQS launches Guide to Life Cycle Costing 2018



Larry Feinberg,  
ASAQS Executive  
director.

There is a growing need among both public and private sector building owners and property developers to gain greater insight into what their buildings will actually cost them over their lifespan. The Association of South African Quantity Surveyors (ASAQS) has launched a new publication that will guide built environment professionals in calculating the Life Cycle Costs of a building.

"Producing this document is part of the ASAQS mandate to provide value to our members by equipping them with resources that will enhance their service offerings to their clients," explains Larry Feinberg, ASAQS executive director.

Life Cycle Costing (LCC) is the total cost of an asset over its entire operating life, including initial acquisition costs and subsequent running costs. ASAQS EduTech Director, Karl Trusler, says that traditionally, the initial capital costs are the most important factor taken into account when considering the development of a project.

The running costs of a building over the long term, however, far outweigh initial capital costs, so everyone from quantity surveyors and other professionals to building owners and developers should reconsider their approach to the materials and

equipment they choose and the design decisions and construction methods they opt for.

"Instead of presenting clients with a cost report indicating only the initial cost of erecting a building, what is needed is a way to show clients the type of costs they are likely to incur to maintain a building over an extended period. The new LCC document will equip people with the 'why' and 'how' to go about doing this," says Trusler.

The LCC publication is the product of years of research and work. The three main contributors are Dr HOFFIE Cruywagen of the University of Pretoria's Department of Construction Economics, Dr Deen Letchmiah, Chairperson of the Board of Directors of LDM Consulting and President of the SACQSP, and Danie Hoffman, a Board Member of ASAQS.

Internationally, LCC is being seen as a means to promote green and sustainable infrastructure procurement for the public sector, and for good reason.

"When you consider the long-term use of public buildings and infrastructure, it makes sense for a complete Life Cycle Cost analysis to be undertaken on proposed developments." ■

**More information from Tel: +27(0)11 315 4140  
www.asaqs.co.za**

## SAPMA helping Ghana move towards lead-free paint

The South African coatings industry will be assisting a major building material manufacturer in Ghana to produce the country's first lead-free paints.

South Africa is the only country on the African continent with legislation in place prohibiting the use of high levels of hazardous lead in decorative paints, and legislation pending to also drastically restrict use of lead in industrial paints.

The draft amendment for the South African Hazardous Substances Act stipulates that the level of lead in paint produced locally, previously legislated at 600 ppm, will in future be only 90 ppm to fall in line with international standards. The amendment affecting both the levels of lead in paints – and methanol in lacquer thinners – is likely to be promulgated next year, or early 2020, after completion of a socio-economic impact assessment study (SEIAS) being conducted by the government. Offenders will face prison sentences of up to 10 years or heavy fines.

The South African Paint Manufacturing Association (SAPMA) has been asked to advise Ghana's Dakmak Group, a leading construction industry producer based in Accra, on the steps required to move towards lead-free paint production. The US Environmental Protection Agency (EPA) is engaged in an international outreach and anti-lead education programme on behalf of the United Nations and, following the request from Dakmak, asked the International Paint and Printing Ink Council (IPPIC) to offer assistance to the Ghanaian group.

Deryck Spence, executive director of SAPMA – the South African representative of IPPIC – says SAPMA will offer all assistance and advice possible to help the Ghanaian producer

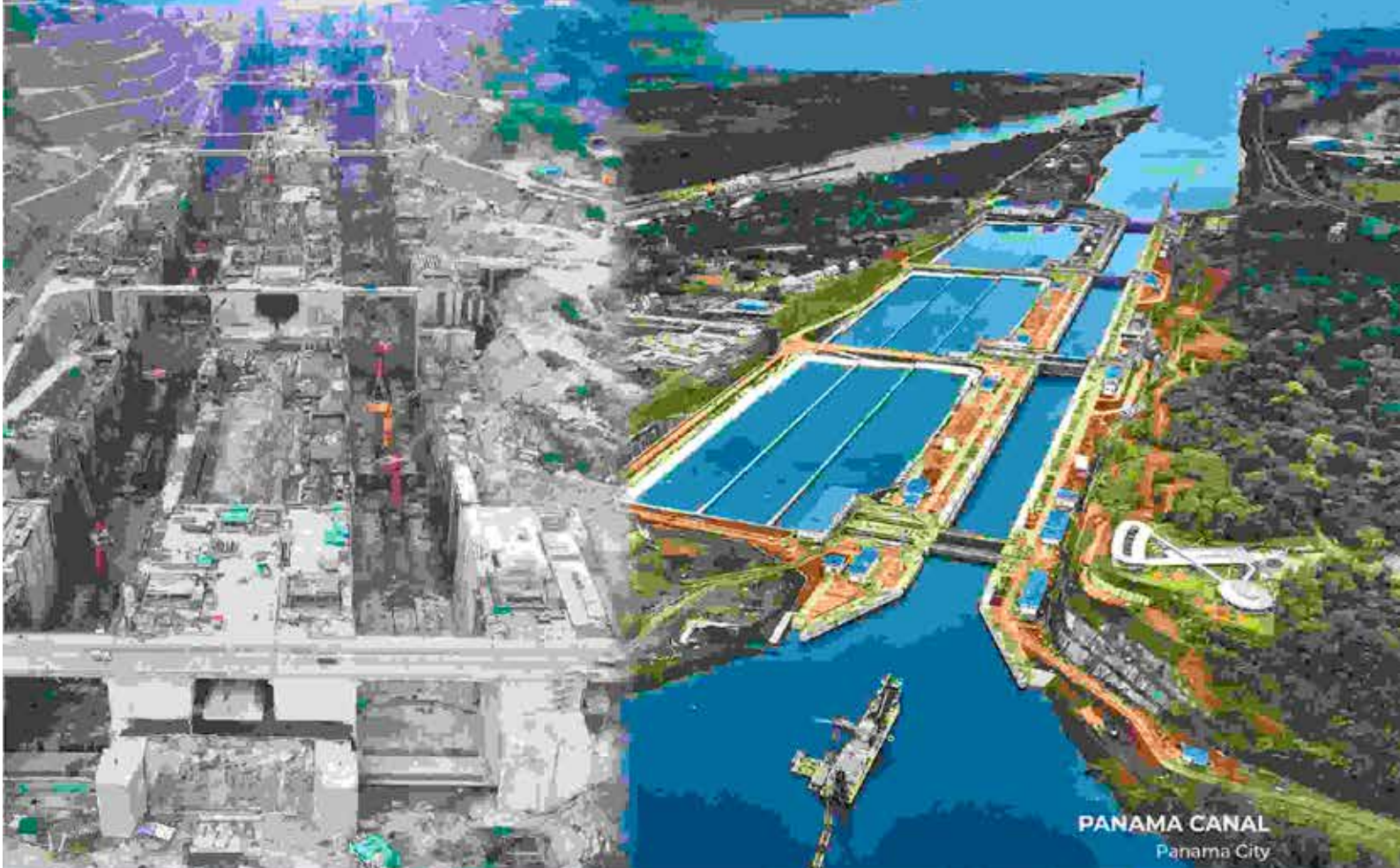


and will liaise directly with the Dakmak Group as Ghana has no official body representing its coatings sector.

"The South African government's decision to outlaw all lead in paints follows years of crusading for this cause by SAPMA as the use of lead in paint and methanol in thinners has been proven to be harmful to health – particularly in children – and pollutes the environment and all forms of life in it.

"It is commendable that the Dakmak Group has decided to remove lead from its paint ranges as it will set an example to other sub-Saharan countries. It is already virtually impossible to export leaded paint to Europe and America so national economies face potential harm if their coatings sectors do not produce internationally acceptable products. It may well be cheaper to produce paint with lead than safer alternative compounds but globally such leaded imports are totally banned," Spence states. ■

**More information from Deryck Spence,  
Cell: +27(0)82 894 6402 / www.sapma.org.za**



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# AfriSam-SAIA Award for Sustainable Architecture + Innovation 2017/18 awarded projects announced



*House Burnett Prinsloo by Robert de Jager, Architect.*



*Fulham Heights by Local Studio (Pty) Ltd.*



*House Gardiner by Simply Sustainable.*



*RBIDZ Entrance Gate by Jeremy Steere Architect.*

From a landmark development that is both environmentally sensitive and architecturally bold, to a house re-inventing traditional building materials and constructed with less than 300 litres of waste, the awarded projects for this round of the AfriSam-SAIA Award for Sustainable Architecture + Innovation 2017/18 point to the future of environmentally conscious design.

The Richard's Bay Industrial Development Zone (RBIDZ) Entrance Gate in KwaZulu-Natal and House Gardiner, a residential home in Monaghan Farm in Gauteng, were two of nine recipients of the seminal sustainable design award which formed part of a gala event at the Zeitz Museum of Contemporary Art Africa (MOCAA) in Cape Town on 26 October.

House Burnett Prinsloo in Cape Town in the Western Cape and the mixed-use development Fulham Heights in Brixton, Johannesburg, in Gauteng, joined the RBIDZ Entrance Gate and House Gardiner to close off the awarded projects in the Sustainable Architecture category.

In the Research in Sustainability category, the awarded project was the report titled 'A framework for a green infrastructure planning approach in the Gauteng City-Region'; the cost-effective building solution Rambrick and digital hearing health innovation hearScreen were recipients in the Sustainable Products & Technology category; and finally under the category of Sustainable Social Programmes, the revitalisation of public space The Wilds in Johannesburg, Gauteng, and Silindokuhle Preschool, a crèche designed and built with the community of Joe Slovo in the Eastern Cape, were awarded.

In addition, James Delaney and Thulani Nkomo, who led the revitalisation project at The Wilds in Johannesburg, received praise for showing stellar leadership in spearheading the revitalisation of the urban nature reserve. They, along with Simply Sustainable, the architectural practice responsible for House Gardiner, inspired the adjudicators to announce a new criterion for the award: Leadership in Sustainability.

"The recipients of the various awards have demonstrated that if we each take responsibility in shifting our own behaviour, we can trigger the type of change that is necessary to achieve sustainability for humans and other organisms on our planet. They have taught us that we can change our planet, our environment and our humanity every day, every year, every decade, and every millennium," said Niraksha Singh, AfriSam Raw Materials and Sustainability Manager.

Singh formed part of the distinguished adjudicator panel for the Awards. She was joined by Maryke Cronje, 2018 President of the South African Institute of Architecture (SAIA), Dr Sechaba Maape, sustainability architecture academic and architect; Philippa Tumubweinee, academic and co-founder of IZUBA INAfrica Architects; Dr Emmanuel Nkambule, academic with a particular interest in the social environment and Richard Stretton, founder of architecture and furniture design studio, Koop Design.

The adjudicators selected the nine awarded projects from a shortlist of 14 entrants whittled down through a rigorous adjudication process which included assessments as well as on-site inspections.

Entries were required to demonstrate sound sustainable practices that respond to innovative architectural and design thinking in the field of sustainability, that complied with the



*A framework for a green infrastructure planning approach in the Gauteng City-Region by Gauteng City-Region Observatory.*

criteria of harmonisation, upliftment of people, evolutionary paradigm and place-making performance.

“We live in a very rapidly transforming world, and this has become evident through the evolution of entries received in the AfriSam-SAIA Award for Sustainable Architecture + Innovation over the past decade. In 2009 when the award program was conceived, sustainability still seemed like an architectural style. Today, no development can happen without it,” said Cronje, who was also the convenor of the 2017/18 Award.

The biennial award reflects AfriSam’s drive towards reducing the carbon footprint of building and manufacturing of concrete materials and providing innovative solutions in architectural design that are less harmful to the environment, and which help conserve natural resources for future generations.

“We, as AfriSam, are extremely proud of the award recipients. They have had to meet very strict criteria, and their actions and passion for sustainability set them apart. There’s always further to go, and these winners are paving the way for the benefit of us all. To quote Aristotle: ‘We are what we repeatedly do. Excellence then, is not an act, but a habit.’ So, sustainability needs to become not just an act but a habit!” explained Singh. ■

## The awarded projects in each of the categories are as follows:

### Category A – Sustainable Architecture:

- House Burnett Prinsloo by Robert de Jager, Architect;
- Fulham Heights by Local Studio (Pty) Ltd;
- House Gardiner by Simply Sustainable; and
- RBDIZ Entrance Gate by Jeremy Steere Architect

### Category B – Research in Sustainability:

- A framework for a green infrastructure planning approach in the Gauteng City-Region by Gauteng City-Region Observatory

### Category C – Sustainable Products & Technology:

- Rambrick by Use It Waste Beneficiation (RF) NPC; and
- hearScreen by hearX Group

### Category D – Sustainable Social Programmes:

- Silindokuhle Preschool by Collectif saga; and
- The Wilds – revitalising a forgotten public space by James Delaney

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*Rambrick by Use It Waste Beneficiation (RF) NPC.*



*hearScreen by hearX Group.*



*Silindokuhle Preschool by Collectif saga.*



*The Wilds – revitalising a forgotten public space by James Delaney.*

# The Constellation at The Founder's Memorial, UAE



*Sheikh Zayed bin Sultan Al Nahyan, the founding father of the United Arab Emirates.*

In Abu Dhabi, Aurecon engineered an unconventional public artwork to celebrate the life, legacy and values of the late Sheikh Zayed bin Sultan Al Nahyan, the founding father of the United Arab Emirates.

To commemorate Sheikh Zayed's 100<sup>th</sup> birthday, the UAE unveiled The Founder's Memorial to honour the founding father in 2018, thus creating a space where future generations can gain a deeper understanding of his legacy.

Global engineering and infrastructure advisory company, Aurecon, was appointed to help bring the Memorial and the monumental centrepiece, the Constellation, to life.

Designed by American renowned artist Ralph Helmick, the Constellation is a 3-D portrait of Sheikh Zayed, framed within a 30-metre-tall prism-like pavilion that is open on two sides. The Sheikh's well-known likeness was respectfully recreated with a pointillist array of 1,327 'floating' geometric elements anchored to 1,110 strands of 30-m-long cables. These elements

comprise varying sizes of the five complex polyhedrons known as 'Platonic solids'. As Sheikh Zayed is much beloved, every single solid had to be placed perfectly.

The Pavilion's base, walls, core and column were designed as reinforced concrete. The roof was designed as steel – to resist the cable loads and allow for assembly on the ground and lifting into place in one piece to greatly minimise working at height risks.

This is the first time Helmick has designed a public art sculpture of this scale. In fact, this icon counts among one of the world's largest public art installations. Aurecon's design goal was to design a buildable solution and engineer the structure, cables and materials to allow Helmick to articulate his masterpiece.

According to Steve Daniels, Aurecon's global facades leader, the challenge was in creating an overall design solution which could continue in parallel with the artist's sculpture work. This resulted in a set of rules allowing structural design of the Constellation's 'frame' and cables to continue while still providing the artist with a 'blank canvas' upon which to work.

## Star gazing

In Abu Dhabi, daytime temperatures can rise to above 50°C during summer and the region is subjected to high wind speeds throughout the year.

Imagine the prevailing winds blowing across an array of thin cables placed closely together in a structure that is located near to the sea. Under normal circumstances, the wind might funnel across the cables and create a humming sound (known as 'aeolian tones'). The challenge was to design to minimise the potential of this sound occurring, so as not to disrupt the visitor experience.

Another challenge was the potential for these weighted cables to become entangled, thus ruining the likeness being portrayed.







To overcome these challenges, Aurecon's engineers studied how the complex interaction of wind, moisture, salinity, and heat would affect the performance of the cables and spheres. The objective was to minimise sound, vibration, corrosion, wire fatigue and stresses on the roof structure and foundations. Solutions were also found for the pre-tensioning required for the cables to counteract thermal changes.

Aurecon's engineers also conducted numerous wind studies for the optimum cable material and diameter for design wind speeds up to 40 m/s (about 140 km/h). More work was put into researching the ideal material for the solids to ensure the Constellation would continue to maintain its appearance while transforming the Sheikh's portrait into a celestial display.

In the end, stainless steel was selected for the platonic solids – for its strength, corrosion resistance, and ability to achieve the desired daytime and night-time finishes. These were suspended on 4-mm Duplex grade stainless-steel wire ropes.

Despite the many challenges, the whole team from Aurecon enjoyed the research, model building and analysis to ensure the design would assimilate into Abu Dhabi's hot, windy, and hazy environment – resulting in an outstanding piece of art reflecting the people's reverential feelings for Sheikh Zayed.

#### Celestial celebration

The Constellation is one of the largest art installations of its kind in the world and is unique in its use of abstract portraiture on this scale. To accommodate evening viewing, 753 downlights and 1,203 uplights were custom made to illuminate the sculpture from above and below.

The Constellation is the centrepiece of the 3.3-hectare development called The Founder's Memorial, which includes a Welcome Centre, Sanctuary Garden, Heritage Garden and an elevated walkway. Through art, nature, words, stories and multimedia experiences, The Founder's Memorial offers visitors the chance to learn about Sheikh Zayed's life, values, and accomplishments.

After more than six years of design, planning and construction, The Founder's Memorial opened to the public on 22 April 2018, in time to celebrate the centennial of the late Sheikh Zayed's birth. ■

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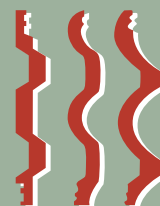
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# V&A Dundee's new design method to be used for Tokyo stadium

By India Block

Japanese architect Kengo Kuma says the new engineering techniques developed to meet the technical challenges of the V&A Dundee are being used to build his Tokyo 2020 Olympic stadium.

At a launch event for the V&A Dundee, Kuma explained that new 3D modelling tools were developed to create the unique shape and facade of the Scottish museum, which is intended to look like a jagged sea cliff.

"To achieve this kind of intimacy, the newest technologies are very necessary," he explained. "We invented a new joints system to adjust the precast concrete as well as the concrete behind it."

Kengo Kuma says the Tokyo 2020 Olympic stadium, currently under construction, will make use of technology developed for the V&A Dundee.

He said the same tools will make it possible to create the curving geometries of the new Japanese National Stadium, which is being built for the Tokyo 2020 Olympics.

"The goal of design of our period is to combine nature and new technology," the architect told Dezeen.

"For the new Tokyo Olympic stadium we also tried to combine natural material and new technology. I want to show that even for a big building we can use natural materials," he added. "It can show a new way of designing big buildings."

The stadium, which is currently under construction, will comprise a large oval formed from layers of latticed larch wood, with trees planted on each level. A steel canopy will extend over the stalls, forming a central oculus.

The new 3D modelling tools were developed to create the unique shape and facade of the V&A Dundee.

The lead engineer for Tokyo 2020 is British firm Arup, which also worked with Kuma to build the £80 million V&A Dundee.

Arup's engineers wrote new computer scripts to create, test and analyse a 3D model of the V&A Dundee, which served as the single source for all the design and construction work.

Functioning as one continuous structure, the museum is shaped like two inverted pyramids conjoining at the top level to form gallery spaces. Its twisted and folded geometry features double curved walls, no two of which are alike.

Concrete planks are fixed to the twisting facade of the building, to make it look like a jagged cliff



Contractor BAM delivered all the construction work for the museum – a project so technically complicated it reduced at least one of its engineers to tears.

In order to create a building that looked as though it was a naturally weathered cliff face, the engineers devised a system of differently sized concrete planks hooked onto the main concrete facade.

"There are ten kilometres of [concrete] planks that are wrapped round the building," Gavin Kerr, associate at Arup

Facade Engineering, told Dezeen.

"They all had to be arranged to look random, like a cliff face. We had to deal with how the human eye looks for patterns in objects. There was a lot of work done with scripting, working between ourselves and Kengo Kuma's office to come up with the final shape on the outside of the building."

Hundreds of concrete samples were produced to find the right colour for the concrete facade, with its dark face and lighter rows of planks.

Natural pigments including pulverised fuel ash were used to achieve the desired shades, making the building more environmentally friendly. The concrete panels shouldn't discolour as they age, and in wet conditions they give the building a slick dark sheen.

Arup's engineers wrote new computer scripts to create, test and analyse a 3D model of the structure

The museum also had to be designed to be robust enough to withstand the extreme weather conditions of its exposed site on the Firth of Tay as well as a natural cliff could.

A triangular window jutting out over the Tay has thick glass and reinforced mullions that could withstand the eight foot waves maritime engineers estimate could batter the building in a 200-year storm.

Inside, the central atrium is clad in overlapping panels of oak wood around windows looking out over the water.

"Natural materials and new technology should be friends. If we can combine both we can bring nature to big cities," said Kuma. "Without that kind of collaboration, we humans cannot survive." ■

Photography is by Ste Murray.

<https://goo.gl/xpdJ2Q>

# Zaha Hadid Architects to design concert hall for Ural Philharmonic Orchestra

By Tom Ravenscroft

**Z**aha Hadid Architects has won a competition to design the Sverdlovsk Philharmonic Concert Hall in Yekaterinburg, the fourth-largest city in Russia.

Designed as a new home for the Ural Philharmonic Orchestra, the venue will contain a 1,600-seat concert hall and a smaller 400-seat chamber-music hall.

The two concert halls will be suspended within the steel structure of the building's roof, which takes its form from the shape of sound waves.

"Echoing the physical aspects of sound waves, the design of the new philharmonic concert hall is based on the properties of musical sound resonance creating wave vibrations in a continuous smooth surface," said Zaha Hadid Architects.

"The design re-interprets these physical acoustic properties to define spaces for the auditoria that are suspended within the canopy, appearing to float above the new civic plaza that is both the lobby of the Philharmonic Concert Hall and an enclosed urban square."

Below the concert halls, a publicly accessible lobby and atrium space will be shaped by the forms of the venues above.

"The main features in this lobby are the volumes of the two auditoria," says Christos Passas, project director at Zaha Hadid Architects in a video released by the practice.

***"The design of the new philharmonic hall echoes the physical aspects of sound waves"***

"The grand auditorium and the smaller auditorium come together to create an inverted topography that signals and signifies the movement of visitors and other guests alike through the public spaces."

The new venue will be built alongside the existing Sverdlovsk Philharmonic building, which it will replace, and the Weiner Gardens. It has been designed to tie the buildings and green spaces on the block together.

"The key idea underlying our proposal for the Sverdlovsk Philharmonic is that the new building is not just a mere extension of the cluster, but actually the connective tissue that brings all of those buildings together," continues Passas in the video.

The smaller of the two concert halls will have a glass wall behind the stage that will give views out from the venue over the Weiner Gardens. This green space will be landscaped as part of the project.

A terrace on the rooftop of the building will also have views across the city.

"Russia has been a formative influence on Zaha Hadid Architects' creative work," said Passas in a release from the practice.

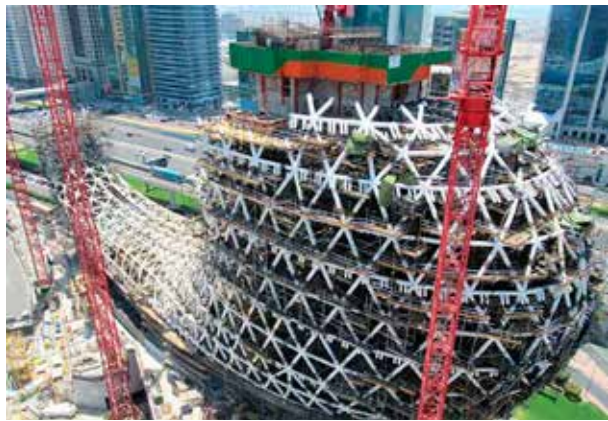
"From very early in her career, Zaha was attracted to the Russian avant-garde, who conceived civic spaces as urban condensers that catalyse a public realm of activity to enrich creativity and community; allowing space itself to enhance our understanding and wellbeing. These principles are embedded within the design of the new Sverdlovsk Philharmonic Concert Hall." ■

Source: <https://goo.gl/3fzRni>



# Dubai's Museum of the Future on track for delivery

By Oscar Rousseau



The construction of Dubai's Museum of the Future is at an advanced stage and the technically complex project is on track for completion.

Steelwork is expected to be substantially complete in the next three months, allowing plenty of time for mechanical, electrical and plumbing (MEP) fit-outs, the internal lining, and the architectural finishes, which have already commenced, to gather momentum very soon, a representative from the project's contractor BAM International explained.

"We are nearly there, with approximately 90% of the concrete work done," said Denis McNelis, engineering manager at BAM International, which is constructing one of the region's most intricately designed developments.

"All the podium levels [and] the core are done, and volume-wise, approximately 95% of the volume is poured.

"Structural steelwork is more than 90% complete; we've just got to finish off the bit over the bridge, and [...] because it is one of the most complicated elements, it's due to be completed in the next couple of months."

"Because of the construction sequencing, we have to finish the steel before we can [implement] concrete work on the higher levels, because we can't put the weight on the building until we have a finished, closed structure," McNelis said.

***"The Museum of the Future is a unique initiative, exploring the future of science, technology and innovation."***

"We are only able to pour concrete up to level four, and we still have levels five, six, and seven to [work on]," he explained.

McNelis described the Museum of the Future as an "engineering marvel" and reiterated that BAM is on track to complete its scope for the project on time. Buro Happold is engaged as the project's lead consultant.

Designed by architectural firm Killa Design, the oval-shaped superstructure features an impressive steel and glass façade and has an Arabic poem about innovation woven into the exterior of the building. The calligraphy on the building is a major design feature.

BAM International, in collaboration with other project stakeholders, has employed advanced building information modelling (BIM) and 3D modelling technologies to support the delivery of the project.

The Museum of the Future is a unique initiative by HH Sheikh Mohammed bin Rashid Al Maktoum that explores the future of science, technology and innovation and is located near the Burj Khalifa.

In addition to becoming a most important tourist destination, the Museum will offer advanced courses and specialised workshops, as well as public talks and events. It is intended to offer a platform to demonstrate and test the latest inventions and prototypes from up and coming start-ups and the world's technology giants. It will also host innovation facilities and design studios with universities, companies and research partners. ■

Sources: <https://goo.gl/wzU1RG> / <https://goo.gl/J8pRTx>



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# Innovative piling solution selected for Saldanha Bay

The old adage that building roads and bridges is fundamental to the growth of an economy has certainly been heeded by the Saldanha IDZ (Industrial Development Zone), which, in contrast to many areas in South Africa, has been undertaking significant infrastructural development with the funds they have received from the South African government.

This infrastructure includes roads and bridges such as the Greenfields Link Interchange project, awarded to WBHO Construction in late 2017 and who subsequently awarded the geotechnical piling contract to Keller's Franki Africa.

The project, initiated by the Western Cape Government: Department of Roads and Public Works, is situated in the Saldanha Bay municipal area 125 km north of Cape Town.

Franki senior contracts manager, Anton Stoll, explains that at tender stage the pile founding solution was stipulated as 'pre-drilled, based temporary cased auger piles' for all three bridges, founding in the greenish, grey mottled orange and brown dense sand, by means of basing out an enlarged base below the temporary installed casings. These piles were expected to be around 14 m in length from underside of pile cap.

"From the outset we were not quite sure that the tender solution was the correct one for the circumstances," says Stoll. "The fact is the West Coast area around Saldanha Bay is known for its difficult geology and founding conditions for many structures, including, of course, this bridge interchange.

He adds that the geology of the site consists of windblown sands for around 0.5 to 1.0 m below natural ground level, followed by up to 3-4 m of strongly cemented hardpan calcrete (pedogenic), then varying layers of loose, silty, clayey sand and calcrete lenses, followed by a greenish, grey mottled orange and brown dense sand. This varying profile continued to depth and a high water table was present.

The Interchange has three bridge structures and, while the largest structure was clear of any obstructions, the other two had a water main in close proximity to the piles and pile cap, raising a concern over vibration during pile installation further complicating things from a geotechnical perspective.

The ultimate outcome was that Franki decided that the site conditions suited a different pile type and installation methodology with the varying soils, the very high water pressure and an aquifer which became evident in close proximity to where the piling would be.

"The water had further softened the dense sand layer in places, making the formation of the enlarged base difficult due to large volumes of basing material required to improve the silty sands," says Stoll. "As more skips were added, the basing appeared to soften rather than densify the layer. At times, plumbs were added without effect ultimately resulting in the plug suddenly being expelled by the 6-ton hammer from the temporary casings allowing water into the casing. After a number of attempts, it was proposed that an alternative piling solution would be more suitable to the site conditions, geology and pipeline obstructions."

After discussion with the engineers and the main contractor, Franki proposed that the two bridges with the existing water pipeline obstruction would be more suitable to CFA (Continuous flight auger) piles while the main bridge could be found on DCIS (driven cast-in-situ) Franki piles founded at a dense layer, higher up in the soil profile. This required a variety of piling rigs, service cranes and technical skills, all available within the Franki group.

Stoll says that by this time, the programme had become critical and the merits of the alternatives were debated, approved and immediately implemented with non-working test piles at each structure. Predrilling remained in order to penetrate the hardpan calcrete layer prior to installing the piles.

The test pile results proved that the alternative methodology was correct and working piles were installed accordingly.

Franki has developed an excellent reputation for finding the right solution for the job at hand. "Our experience in South Africa and in many parts of Africa over the years gives us an unmatched understanding of the geology and what is required to ensure that we give our clients the most cost-effective solution," Stoll says. "The Greenfields Link Interchange is certainly not the first time that we have successfully offered a solution different from that of the tender proposal."

Of course, knowledge is one aspect but having the right hardware for the job is as important. In this case the CFA piles and the world-renowned Franki Pile, which has been used extensively throughout southern Africa for the past 70 years (and is still today one of the most popular pile types) has proved its worth in the solution.

The main feature of the Franki Pile is the enlarged base formed at the toe of the pile. In forming this base, the end-bearing area is increased significantly and the displacement achieved when expelling the plug and forming the enlarged base



*The geology of the site consists of windblown sands for around 0.5 – 1.0 m below natural ground level*



*The test pile results proved the alternative methodology was correct and working piles were installed.*

compacts and preloads the soil surrounding the base. Thus, the end-bearing of a Franki Pile in sands develops at much lower base deflections than that of a bored pile.

Other important advantages of the Franki Pile include: it is often a very economical system; it has an extensive range of pile sizes; it has an exceptional load/deflection performance; noise levels are relatively low and it has an excellent tension load capacity.

The CFA piling system is also a fast and economical one, which has no vibration and limited noise levels. Some of its other attributes include: high production levels in suitable soil conditions and economical in suitable soil profiles.

"The fact is that there are some limiting considerations to be taken into account with the CFA system, reducing its popularity compared with driven piles. The conditions in the Greenfields Link Interchange, however, made the system a very successful choice," Stoll says.

The key to the great success of the piling project was the implementation of Franki's alternative piling plan. "It took teamwork to get this right," says Stoll, "and I would like to pay special tribute to Ross Dold, Nabeel Omar and Wilhelm Wessels on site for Aecom, together with Abie Newmark and Alexi Maraveilas from the Aecom office, while Stefan Herbst and Willie Broekman of WBHO Construction assisted us with the implementation. This was indeed a great team effort," he comments.

Stoll emphasised that no project is too big, or too small, or too complex for Franki. "In terms of South Africa and Africa in general we are geared up like no other geotechnical company in the world. We have permanent offices and yards in South Africa, Mauritius, Mozambique, Tanzania, Zambia, Kenya, Ghana and Angola. We are also registered in Uganda, Botswana, Swaziland, Lesotho, Seychelles and Namibia. Our French-speaking colleagues are present in Morocco, Cote d'Ivoire and Algeria and our Middle-Eastern colleagues are in Egypt.

"Add to this the depth of global experience that the Keller group has and it becomes clear that Franki's ability to provide a world-class service in this country and across the continent is second to none," he concluded. ■

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# Large bridges on the N2 showcase contractor's expertise

Concor Infrastructure has made substantial progress in constructing and extending more than eleven structures, including two large bridges and four overpass bridges, on the N2 highway upgrade between Mtunzini and Empangeni in KwaZulu-Natal.

This South African National Roads Agency SOC Limited (SANRAL) project includes the construction of a new northbound carriageway and the rehabilitation of the existing road to form the future southbound carriageway on a 34-km section of this national route.

The number of river crossings meant that ground conditions were often unpredictable. Proximity to the coastline also lent a

tidal element to the levels of one of the rivers – a factor which had to be accommodated.

Kyle McDonald, Concor Infrastructure engineer on the project, says the two large bridges are among the engineering highlights of the project, requiring construction and placement of 30-m precast, post-tensioned beams. A sub-contractor constructed the precast beams with concrete supplied from a batch plant established at the precast yard, approximately in the centre of the 34-km project.

The largest of the new bridges is a 240-metre, eight-span structure over the uMhlathuze River. It comprises eight simply supported 30-metre deck spans carried on solid reinforced concrete

wall-type piers on piled foundations with pier heads and closed-type abutments, also on piled foundations. The overall bridge width between parapets caters for a 14,4-m roadway and for future widening to an eight-lane configuration.

Supporting the deck are 48 precast post-tensioned I-beams, as well as the previously extended abutments and seven new wall-type internal pier supports. Each new pier rests on ten piled foundations of 900 mm diameter bored and augur piles ranging in depth from 48 to 60 metres. The piers were built in three lifts using specialised formwork, while the construction sequence enabled continuity in the placement of the precast beams and the construction of the deck spans.

After this the next-largest structure is the bridge over the uMlalazi River. At 120 m long, this fourspan bridge is also simply supported with three internal wall-type piers with pier heads and closed cantilever abutments with return walls and ear-wings. With 28 precast beams supporting the deck, the south abutment and pier 1 are founded on pad-type footings while piers 2 and 3 – as well as the north abutment – are built on piled footings.

Access to the piers was by platforms constructed from either bank and protected by an outer lining of over 2,600 geotextile sandbags, which minimised siltation flows into the rivers. These acted as geotextile traps on the edges of the platforms ensuring that fine material was not washed into the river during construction, thereby preserving water quality and river life. The platform on the south-west side of the river gave Concor Infrastructure access to pier 1, while the second platform from the north-east provided access to piers 2 and 3.

In addition to the two large river bridges, the project includes four overpass extension bridges, two road-over-rail bridges, a large box-culvert bridge, a road-over-provincial-road bridge and an interchange bridge.



Construction of side drains in progress.



Concrete pour in progress on the Empangeni T-junction overpass deck.



The overpass structures – Ridge Bridge, Windy Ridge, Port Dunford and Mzingwenya – were previously three-span bridges with articulated decks consisting of circular-voided post-tensioned deck sections. They were lengthened about 30 m into four-span structures, using similar articulation and a post-tensioned box-voided deck.

The new piers have been built as wall-type tapered columns on 600-mm-diameter Continuous Flight Auger (CFA) piled foundations, except for Ridge Bridge with conventional spread footing. Windy Ridge Bridge took six piles for its pier while the Port Dunford Bridge and Mzingwenya Overpass have four piles for each pier. The new abutments are short wall-type structures founded on perched spread footings.

Construction generally began with the removal of northern jack spans by crane, and the demolition of jack spans and abutments. Widened road prisms were excavated and piles were installed on which the piers were built.

New post-tensioned box decks were constructed, followed by new west abutments and new reinforced concrete jack spans. Parapets were then built, after which the asphalt was placed on the deck and the bridge completed.

The Port Durnford and Mzingwenya bridges were different. They had to be jacked vertically by approximately 500 mm to increase the clearance above the existing road and existing piers and abutment extended to accommodate the new higher levels. This had to be done over live traffic to ensure the N2 road was operating normally.

Both bridges' identical 380-ton decks were jacked using four hydraulic jacks, attached to a Concor Infrastructure in-house designed jacking structure fixed to the existing piers and bolted to the base and deck; this ensured a rigid structure to elevate. The deck was elevated by 1.2 metres to allow sufficient space to extend the existing piers, and then lowered into final position on new pot bearings.

Port Dunford Bridge II – which carries the N2 over the P537 provincial road – is a simply supported deck of 27 inverted precast T-beams with in-fill concrete. It is supported on mechanically stabilised earth wall abutments. With a span of some 16 m, it is 13,4 m wide to accommodate an additional two traffic lanes of 3,7 m wide, including shoulders and painted islands.

Providing access over the Stanger-Empangeni rail line is the UMhlatuze Rail Bridge, which is a single-span precast post-tensioned structure. It is a type-M beam and slab bridge with closed face abutments and asphaltic plug-type joints. Its abutments are mechanically stabilised earth walls with a reinforced concrete impact wall in front. Of similar construction is the Empangeni Rail Bridge over the Empangeni-Richards Bay railway, which has a central pier of three wall type columns supported on 18 friction-grip CFA piles 13 metres deep.

Crossing the R34 road between Empangeni and Richards Bay is the Empangeni Interchange Bridge – now a four-span, solid quad spine-beam structure with reinforced concrete deck. The wall-type piers are each founded on seven augured piles of 900 mm diameter, ended by closed abutments each on 10 augered end bearing piles of the same size.

These 11 main bridge structures – which have been constructed on a total of 161 piles – have required over 20,000 m<sup>3</sup> of concrete and 2,307 tonnes of steel reinforcing. Apart from these major structures, Concor Infrastructure has also constructed 21 major in-situ drainage culverts and access underpasses as part of this contract and more than 130 minor drainage precast portal and pipe culverts. ■

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## AT THE FOREFRONT OF PRE-CAST INGENUITY!

*Corestruc is a leader in the design, manufacture and construction of Precast Concrete Structures.*

*Our solutions have been deployed on a host of successful projects, including reservoirs, water-treatment works, stadia and bridges, as well as commercial, retail and industrial property developments.*



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# Earthform the perfect solution

**W**hen a couple in Thohoyandou, Limpopo, decided to build their dream retirement home they were faced with an unexpected challenge – soil erosion due to the high-lying area of their land. A Google search highlighted Technicrete’s Earthform retaining wall blocks as a solution. Meeting with Technicrete at their Polokwane office offered them the erosion solution they required.

“Our Earthform retaining wall blocks are ideal for the kind of challenges the couple was facing. The longevity of the product has stood the test of time on many projects where soil erosion has been vast due to flooding,” said Peter Hilton, sales consultant for Technicrete in Polokwane.

Due to the magnitude of the project, Hilton travelled to Thohoyandou to assess the site and take the required measurements. The house, large enough to accommodate four children and extended family, was built high up in the magnificent hilly area of the region affording the property exquisite views, but heavy rains were causing massive soil erosion on the chosen site.

Hilton added: “Earthform gives embankments a natural support while protecting the land from collapsing due to erosion. Additionally, it provides an attractive and practical finish in difficult to maintain steep areas through the creation of plantable and easy-to-maintain retaining walls.”

“I knew for sure that Manie Troskie from Engineered Interlock Solutions (EIS) was a specialised concrete block retaining wall contractor with many years of experience in the design and building of concrete block retaining walls as he is a regular customer of ours. Due to the massive size of the project and the challenging terrain, I referred the couple to Troskie for the retaining wall installation and design,” said Hilton.

Troskie explained: “EIS designed and also constructed the retaining wall in various stages. The critical area was in front of the house where 80-mm-wide tension cracks had already developed. There was a risk that this embankment could collapse. A total slip failure would have had a major impact on the structural integrity of the house. The in-situ embankment was cut back to the required design distance for the Geosynthetic reinforcement and drainage to be installed. The soil was stockpiled for reuse.”

“The fill wall was constructed in two terraces, each 3 m high. The terraces were a more economical design solution and provided a softer look for landscaping. There were various

smaller terraced walls constructed on both sides of the house. One wall was constructed as a 7-m-high continuous wall that flared out into three smaller terraces” said Troskie.

“The wall behind the house in the cut section was also designed as a two-terrace wall. The bottom section was 5 m high and the second wall 3 m high. There is an access road to the neighbour’s property on top of the wall. This required that embankment was cut back and the soil stockpiled to provide space for the geosynthetic reinforcement and drainage.”

Troskie added “This is the biggest residential retaining wall project that we have undertaken to date. We happily used the recommended Technicrete Earthform retaining wall blocks because we have used them in the past on other projects due to the quality of the block and its longevity.”

“Over 20,000 grey Earthform blocks were needed to complete the Thohoyandou project. The house was situated off the main tarred road, and this is where the expertise of the Technicrete drivers came to the fore as they battled dirt roads, at times in bad rainy weather, and still delivered on time as scheduled without breakages,” he said.

“The access to stock as required and competitive pricing are other factors that made working with Technicrete a win-win situation over the eight months it took to complete this project. The technical advice from Peter Hilton was spot on for this development and the couple involved was very happy with the end result in terms of erosion control and final appearance,” noted Troskie.

Earthform retaining wall blocks can be stacked up to 7 m high provided that sufficient geosynthetic reinforcement, erosion control layers and drainage are installed in the reinforced fill section directly behind the Earthform retaining wall blocks.

Plants or vegetation suited to the style of the Earthform retaining wall blocks should be planted facing outward of the front face of the wall and require little maintenance.

The blocks are available in Autumn, grey and plum.

Technicrete is part of the IS Group of companies which includes Ocon Brick and Rocla. ■

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# Precast concrete technology comes out tops on critical water projects

**M**&D Construction Group recently selected Corestruc to assist with the supply and installation of hollow-core slabs for the roof of the new Sondela Booster Pump Station in the North West Province.

This facility increases the conveyance capacity from Klipdrift Water Treatment Works to Bela-Bela and Modimolle Local Municipality to 24 ML/day, and M&D Construction Group's scope of work also includes constructing the 5,4-km-long cement-mortar-lined pipeline that extends from the pump station toward Bela-Bela.

The project is being undertaken on behalf of Magalies Water and the consulting engineer on this project is Endecon Ubuntu.

M&D Construction Group site manager, Mario Lawrence, says that his team suggested precast elements as an alternative to in-situ methods to build the roof right in the very early stages of the works programme.

"We agreed that hollow-core slabs proved to be the best solution, both in terms of improving our production rate on site and, importantly, saving costs for our client. Magalies Water and the consulting engineer accepted our proposal, and we then selected Corestruc to assist us based on our past experience working with the company," Lawrence says.

Installation of the slabs commenced once M&D Construction Group completed the structure, comprising in-situ columns and ring beams with a brick infill.

As the hollow-core slabs could be installed without any propping, it did not form part of the critical path of the works programme.

***Corestruc's hollow-core slabs, each being at least 60 MPa, contribute to creating a more robust structure.***

Corestruc's scope of work started with assisting the contractor in the design of the optimal layout of the roof structure.

The high-quality hollow-core slabs were then manufactured using state-of-the-art extrusion technologies at the company's precast concrete factory. Each element has a concrete strength of at least 60 MPa and, therefore, also contributes towards a more robust final structure, which houses the valuable mechanical equipment used to pump the fluids.

Corestruc also ensured the timely delivery of the items to avoid delaying the construction programme and, in this instance, used Corehire's 70-ton knuckle-boom mobile crane and operator to safely lift and place the elements onto the mortar bedding.

The company's installation team comprised one foreman and five workers, who are able to place an element every six minutes to ensure optimal production rates.

He says that this approach to building the roof of the structure shaved as much as three weeks off the booster pump station construction programme, which allowed the contractor sufficient time in which to complete the mechanical aspects ahead of the commissioning of the facility.

Lawrence says that the project was not without its challenges. "Most of the complexities arose during the very early phases of



*The high-quality hollow-core slabs were manufactured using state-of-the-art extrusion technologies at the company's precast concrete factory.*



the build. This includes having to blast to clear the hard rock that was encountered 1,5 m above the four metre-deep pump-well excavation level. However, the build proceeded effortlessly once we were out of the ground and we are, therefore, well ahead of schedule," he says.

Corestruc also worked alongside M&D Construction Group on the 50-ML Mafenyia reservoir in the North West province.

Excellence in in-situ construction combined with that of cutting-edge precast concrete skills and capabilities helped deliver a project that continues to receive much acclaim, including a showcase position at last year's Fulton Awards.

Willie de Jager, managing director of Corestruc, concludes that he is proud to have been associated with another M&D Construction Group project that has once again reaffirmed government's commitment to infrastructure development in South Africa. ■

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# Precast concrete façades bring buildings to life

**P**recast construction technology represents Finnish high-tech know-how at its best. The country's professionalism in precast technology originates from its extensive application of this construction method.

Testing innovative solutions and developing new products has been possible due to a solid home market. In addition to increasing the speed, cost effectiveness, and quality of construction, precast technology offers developers and contractors endless possibilities in terms of look and design.

Elematic, Finland's leading supplier of precast concrete production technology: plants, production lines and machinery has much to offer when it comes to precast concrete façade manufacture.

## Construction for harsh weather conditions

Precast sandwich panels enable the strict requirements for thermal insulation to be met. Concrete structures have great insulation qualities, keeping the building warm in cold weather and cool when it is hot, thereby stabilising the moisture and temperature levels inside.

For the precast façade, a calculated age can be defined. In real life, and in the conditions that the material is designed for; a precast façade can last up to 200 years. Precast façades tolerate harsh weather conditions, including sub-zero temperatures combined with salt strain, and long rainy seasons.

## Endless possibilities with different surface treatments

To complete the desired look on the four precast wall panel types – sandwich, plastered sandwich, inner layer, and cladding panels – there are virtually limitless possibilities for the surface.

The cement can be white or grey, and the colour and size of the aggregate certainly make a difference. Different colours, pigments, and paints can be added. The shape and surface of the precast concrete moulds have also an effect on the look – the mould can be made of timber, steel, plastic, rubber, or fiberglass with each material giving a unique finish.



*Residential building Espoon Tähystäjä in Espoo, Finland, has a decorative concrete façade – an artwork of underwater creatures and giant waves by Finnish artist Aimo Katjamäki. Photo: Graphic Concrete.*

Concrete facades allow for different surface treatments: wood or steel trowelling, rolling, brushing, and several types of washing can be carried out when the concrete is fresh. Precast walls with graphic concrete patterns (a Finnish innovation) can be manufactured by placing a printed membrane into the mould, before filling with concrete.

Polishing, hammering, acid etching, and sand blasting can be applied to hardened concrete. The precast wall panels can also be coated with plaster or paint, brick, ceramic tiles, as well as natural stone.

## Eye for Architectural Details

In addition to the surface finish, there are several ways to give the façade a unique look. In plastered sandwich walls, the façade seams are not visible. Joints can be hidden by designing the positions of windows, balconies, and doors so that they break the lines, utilising the discontinuities. The joint form and profile can bring the desired look, and horizontal or vertical lines give the façade character.

With no limitations to the shape of the moulds – even curved walls can be manufactured – an industrial building method such as precast concrete is superior to any other façade construction when it comes to freedom of design choice.

Elematic continuously shares knowledge in order to ensure that architects, designers, and the building industry around the world are aware of the effective ways to manufacture quality precast concrete facades with an outstanding look.

Some examples of successfully installed and functional façades include:

- A black precast wall inside with a surface shaped for an optimal acoustic experience in a music hall in Kristiansand, Norway
- Sandwich wall panels used as facades in wood drying plants with a relative humidity of 100% inside the building
- Massive wall panels used as acoustic barriers with a surface designed to absorb traffic noise

Elematic invests heavily into precast concrete research and new applications which enables the company to offer design software, machinery and automated solutions that can be tailor made to customer requirements. Technical and service support is offered via their 24-hour global online Help Centre. Customer support for South Africa and the rest of Africa is serviced from their Warehouse based in Dubai.

## About Elematic

Elematic Oyj is a world-leading manufacturer of precast concrete plants and production lines. In our more than 50 years of operation, we have supplied technology to over 100 countries and to every continent. Turnover is approximately €100 million, of which exports generate 95%, and the company employs roughly 230 people. ■

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*Premoulding oils, if used when casting concrete, will raise the quality of finishes and extend the life of formwork*



*Premoulding oils (release agents) permit easy removal of formwork*



## PRECAST CONCRETE

*High-quality release agents such as the CHRYSO Dem Range provide versatility.*

# Ensuring quality concrete facings with demoulding oils

The use of precast concrete in construction projects allows durable and aesthetic finishes to be achieved on concrete facings, especially when CHRYSO's demoulding oils are applied to formwork.

Both the physical and visual properties of facings are important to both the durability and aesthetic impact of the final construction. When well finished, concrete facings act as a tough skin on the concrete, withstanding the elements and other environmental attacks that the structure may sustain during its service life.

The appearance of facings is also enhanced when the precast surface is finished without defects such as tint variations, bubbling or dust formation and when staining and colour changes are eliminated.

Defects that will be reflected on a finished concrete surface also include marks caused by uneven water absorption, varying properties of the formwork surface and 'burns' caused by poker vibrators.

For these reasons, it is important that care is taken with the surface preparation of the mould. This is why release agents are used to assist in the clean and easy release of concrete from moulds, without damaging either the concrete or the moulds.

The CHRYSO Southern Africa general manager marketing, Hannes Engelbrecht, highlights that when removing concrete precast elements from a casting bed, there are forces applied due to suction or adhesion between the precast element and the mould.

"The most important function of release agents or demoulding oil is to permit easy removal of formwork," says Engelbrecht. "Choosing the appropriate release agent may be critical to the success of a project, as it affects both the quality and colour of the surface finish."

He emphasises that the cost of a release agent is low in proportion to the mould itself, so simply choosing the cheapest release agent available on the market is false economy.

"The high-quality release agents in the CHRYSO® Dem Range provide greater versatility, are easy to use, and facilitate consistent quality," he says. "This is important particularly in the precast industry, where high-temperature steam curing forms a formidable challenge in the production process."

The CHRYSO® Dem range, locally manufactured according to strict prescribed standards, includes a vegetable-based, environmentally-friendly release agent. The range provides for the specific requirements of a variety of industries and applications, so customers no longer have to settle for a one-size-fits-all solution.

The range includes CHRYSO® Dem Elio LSM which reduces blow holes due to its low viscosity (thin) oil. This creates less surface tension against the sides of the mould, allowing air bubbles to escape. The products cater for the heavy precast sector such as pipe manufacturing, light wet and dry precast demoulding operations and decorative concretes. A wax-based version, CHRYSO® Dem WB, is ideal for wooden moulds and slows down the delamination of the veneer on shutter boards, enabling increased repeat usage.

CHRYSO® Dem Elio SP can handle the high temperatures of steam curing and prevents rust, while CHRYSO® Dem Oleo FW is a mineral-based release agent suitable for all types of formwork and is ideal for formwork suppliers.

"Our range also includes CHRYSO® Dem Bio 10, a vegetable-based, bio-degradable and non-toxic release agent that will not pollute the environment," he notes. "It has low odour characteristics, which make it safe to use in confined spaces such as mining, tunnelling and any poorly ventilated area."

When applied correctly, the use of release agents has no effect on the hydration of concrete. Neither does it adversely affect the adhesion of finishes and coatings applied to the concrete, so plaster, paint and other coatings may be applied as usual after the mould is removed.

To reduce the possibility of errors during mixing, release agents are ready-to-use. In addition to helping produce high-quality concrete finishes, they protect and extend the life of the moulds and formwork, facilitating longer re-use. The release agents in the CHRYSO® Dem Range also have a long storage life of up to two years, for almost all products in the range. ■

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*The CHRYSO Dem Range of release agents delivers the desired surface finish for precast concrete elements.*



*The cost of a release agent is low in proportion to the mould itself, making this a viable option when casting precast products.*



*The CHRYSO Dem Range of release agents is easy to use and facilitates consistent quality.*



# How and why to protect our beaches

By Holger Rust, Founder, TERRAFORCE

The 'why' part is easy to answer. We want to protect our valuable possessions and infrastructure, such as houses, tourist destinations, pipelines and harbour entrances against the dynamic forces of wave action.

## Sea shore retaining wall options

For heavy-duty protection works, the best option is to mimic, as closely as possible, a natural solid rock beachfront, as this has previously stood the test of time. Many examples of this method, in the form of solid concrete walls, sloping or vertical, exist. These methods however, (often combined with extra-heavy rock rip-rap) are not always possible, due to their prohibitive cost or the lack of solid founding conditions, so alternative solutions must be found.



Swakopmund Mole retaining wall, with extra-heavy rock rip-rap. Pic supplied by Oliver Rust.

Where sandy conditions occur, it has often been shown that one could simply rely on Mother Nature to give back what was removed in a rage. Says Johnny Kuzlo, Owner, Retain-A-Wall, Umhlali: "Nature never steals from itself, until humans arrive on the scene". Alternatively, sheet piling, or piles of wood, glass-fibre or concrete may be considered, sometimes in combination with erosion control blocks on the upper reaches of the installation.

## The Dolos



A South African invention, the Dolos.

A South African invention, the Dolos, developed in 1963 by Aubrey Kruger and Eric Merrifield, to protect the East London

harbour entrance, has since been used with much success in many parts of the world. They weigh 80 tons each and around 10 000 are required to protect a kilometre of coastline. The Dolos is highly effective in dissipating, rather than blocking, wave energy. This advantage comes at a cost, as can be imagined, and they have been shown to be reduced to rubble under extreme weather conditions.

## L-shaped concrete elements



L-shaped concrete elements, by Concrete Units.

An installation of factory made, L-shaped concrete units is currently underway in Strand, Western Cape. Weighing up to 16 tonnes, they are placed by crane on mass concrete foundations that are mostly cast on bedrock, alternatively rock foundations with gabion scour protection. A heavy coping unit of 1,5 tonne weight is securely connected with galvanised reinforcing over the wall units. All concrete components were factory made by Concrete Units to achieve the high standard that is crucial for such applications.

## Geotextile Sand Bags



Large-format geotextile bags (EnviroRock R).

Another recent development in remedial protection measures to reinstate damaged parking areas and promenades, is the application of large-format geotextile bags (EnviroRock R) that are filled with beach sand. They weigh about 3,5 to 4 tons and are claimed to be abrasion resistant and vandal deterrent. This option is also referred to as the 'soft alternative' and some engineers include gabions with this option. For most of the time they will be buried below the beach, often serving as a foundation for CRB (Concrete Retaining Block) walls above.

**Segmented concrete retaining block shoreline protection**

Where good rock foundations occur or on sandy beaches that can accommodate foundations, installed below lowest scour profile, Segmental Concrete Retaining Blocks may be used, with limitations.

At Palm Jumeirah, Dubai, United Arab Emirates, over a million Terraforce CRB blocks were used to provide erosion control and beach access steps to the individual 'fronds' of the manmade island. The walls are exposed to minimum wave action and are in perfect condition more than ten years later. Plants have also flourished on the walls, even in the harsh conditions of the region.

Interlinked CRBs with an open-face configuration are not suited at all, whereas such designs with a closed surface structure have been used with mixed success. Their flexible nature has been shown to absorb wave energy to a point. Where failures did occur, in 2007 and 2011, it was mostly due to drainage issues caused by overtopping waves. If and how this was helped by the movement of the blocks, within the structure, is unclear.

**Terraforce beach wall, Laguna Beach, KZN, built in 1986**



*Umdloti beach failure.*

One of the oldest CRB beach protection measures in South Africa was installed in 1986 at Laguna beach near the Umgeni river mouth. Important implications, relevant to installations that are occasionally subjected to the force of wave action, were considered:

- Anticipated depth of scour and erosion protection at foundation level.
- Dissipation of hydrostatic pressure by means of effective backfill design and drainage measures.
- Providing a solid buffer with enough mass and rigidity to withstand occasional direct wave attack.

The beach has eroded down to foundation level on several occasions when big storms have hit this coastline, and the 6m high wall has been very effective in protecting the pools installed immediately behind it. Currently the wall is almost completely buried by sea sand, deposited there by waves and currents. This phenomenon, referred to as beach filling/nourishment has possibly been helped by groynes, hard structures of heavy rock at right angle to the beach, that were installed further west, since 1986.



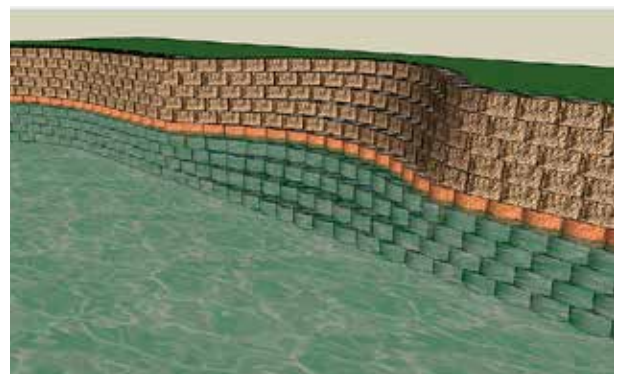
*CRB beach protection at Laguna beach near the Umgeni river mouth.*



*The 6-m-high wall has been very effective in protecting the pools installed immediately behind it.*

**How does concrete interact with sea water?**

Planners should also be cognisant of the durability of products used close to the sea. Concrete is not likely to be damaged by acts of vandalism, but like all other materials, is subject to abrasion and to the destructive forces of salt crystals. Mix designs should ensure that dense and non-porous concrete is used. Says Bryan Perrie, MD of The Concrete Institute: "Concrete is generally not affected chemically by sea water. The concrete deteriorates due to salt crystal growth and the abrasive effect of the waves, which often include sand in them. The only way to resist these forces is to ensure dense, well-compacted concrete to prevent ingress of the salt water into the concrete, and high strength to resist the abrasion."



*Where good rock foundations occur or on sandy beaches that can accommodate foundations, installed below lowest scour profile, Segmental Concrete Retaining Blocks may be used.*

Sam Nejad, Principal Engineer, Director, Engineering Online, Geraldton, Australia adds: "The concrete of the blocks can be made impermeable by adding fine polypropylene fibres (1.2 kg/ cubic metre), 1 litre of PVA (Bondcrete) per cubic metre, and a slump of just 60, brought up to 90 with superplasticiser ADVA 145, then fully machine compressed and vibrated. Concrete is sensitive to any salt in the water used for the mix. The salt reduces its strength. Ideally, rainwater would be used. (www.isomat.eu/company/the-isomat-brand/).

But if that's not possible, the absolutely freshest water that is available should be used. That is another reason for using superplasticiser, it reduces the amount of salt in the mix. Direct wave impact needs to be assessed on a case by case basis. The infill mix would be similar, but the configurations of the blocks will need careful design. I have seen massive walls designed by multinational experts and built at a cost of tens of millions of dollars, disintegrate within just a few months. Sometimes Nature has to be left alone to take its course".

### Important considerations

One could say in conclusion, that when faced with shoreline repair, concrete block density and near-impermeability, coupled with sufficiently rigid constructed mass to resist the dynamic forces of occasional wave attack, are to be considered first. Other important details to consider involve foundations that can pass the test of time, full block closure to prevent scour of backfill, rigid interlock (vertically and horizontally) and deep drainage behind the installation, possibly combined with geogrid reinforcing, securely tied to the wall. The project should also be environmentally compatible and provide support for marine life, as best as possible. The possibility for built-in plant pockets would also be an added advantage.

### Fairmont Hotel, Ajman, UAE

These photos were taken at a site where the wall under construction was designed to never endure wave attack, i.e. to be covered by beach sand all the time, and has a first line of defence installed, in the form of the aforementioned large-format geotextile bags that are likewise totally covered by sand, until a storm strikes.



Beach front protection with Terraforce, Fairmont Hotel, Ajman.

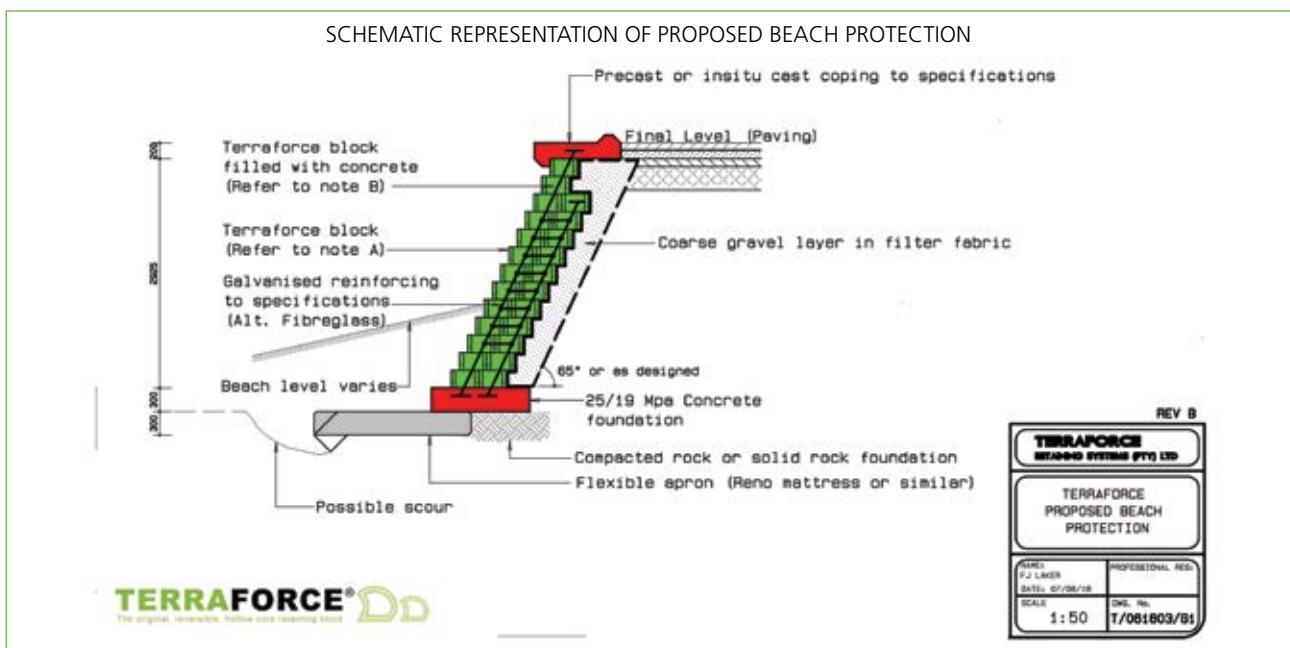


The Fairmont Hotel site, after the beach wall was filled in.

The cross section below shows a CRB wall proposal that will work under certain conditions.

Please note this design is a generic example, and specific site conditions will need to be considered for every new beach erosion protection site. ■

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Typical cross section of beach front protection with Terraforce blocks



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# Preventing damage and cracking in concrete pavements

**W**hen constructing concrete pavements – whether they are for roads, for commercial hardstanding areas, or for domestic driveways – it is essential to protect the concrete against environmental factors that could result in damage or cracking of the pavements.

Bryan Perrie, MD of The Concrete Institute, provides guidance and advice on the best methods to avoid such mishaps which can lead to substantial disputes for paving contractors and distress to property-owners and road authorities:

## 1. Plastic-shrinkage cracking

Plastic-shrinkage cracking occurs on the surface of fresh concrete shortly after placing and while the concrete is still in a 'plastic' state i.e. when it is still soft and workable.

The principal cause of plastic-shrinkage cracking is the rapid drying of the concrete at the surface and this is influenced by relative humidity, concrete and air temperatures, as well as wind velocity. Even relatively small changes in atmospheric conditions may have a pronounced effect on the rate of evaporation and hardening, especially if these changes occur simultaneously.

The rate of evaporation is highest when the relative humidity is low, when concrete and air temperatures are high, when the concrete temperature is higher than the air temperature,



Bryan Perrie, MD of The Concrete Institute,

and when wind is blowing over the concrete surface. The combination of hot and dry weather coupled with strong winds result in the removal of moisture at a faster rate than it can be replenished by bleeding (the process where free water in the mix is pushed upwards to the surface because of the settlement of heavier solid particles of cement below). This almost inevitably leads to cracking.

If the rate of water evaporation exceeds one kilogram per square metre per hour, precautions must be taken in order to prevent plastic-shrinkage cracking. Procedures for minimising the causes of this form of cracking are:

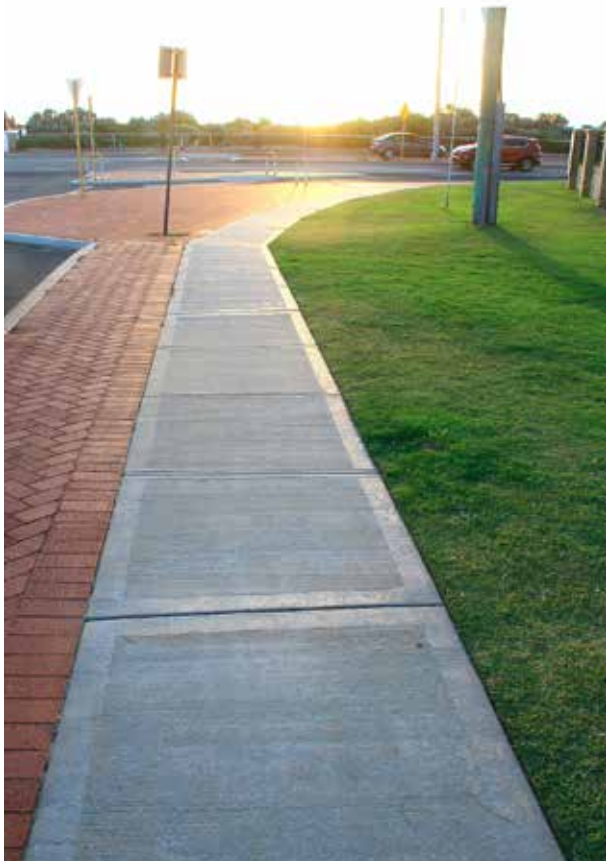
- Dampening subgrade/sub-base and formwork;
- Dampening the aggregates if they are dry and absorptive;
- Erecting windbreaks to reduce wind velocity over the concrete surface;
- Providing sunshades to control the surface temperature of the concrete;
- Avoiding excessive temperature differences between concrete and the air;
- Lowering concrete temperatures in hot weather;
- Avoiding overheating the concrete in cold weather;
- Protecting the concrete with temporary coverings during any appreciable delay between placing and finishing;
- Reducing the time between placing and the start of curing by improved construction procedures;
- Protecting the concrete during the first few hours of placing and finishing to minimise evaporation. The application of moisture to the concrete with a fog spray nozzle will help prevent evaporation of the concrete until effective curing procedures can be applied to the surface; and finally
- Using mono-molecular films to reduce evaporation between placing and finishing operations. This is particularly applicable to concrete road construction. The films protect fresh concrete from the effects of excessive moisture loss in rapid drying conditions, without increasing the bleed. The product is sprayed over fresh concrete surfaces to form a continuous barrier film over the entire surface.

## 2. Damage

To prevent damage to the concrete surface in rainy and hail conditions, frame-mounted waterproof plastic sheeting covers or other suitable materials should be used to protect unhardened concrete surfaces. In fact, whenever rain appears imminent, all concrete paving operations should stop and the emphasis should then shift to means of protecting the concrete.

## 3. Restrained drying shrinkage

The correct way to prevent restrained drying shrinkage cracking and ensure a hard-wearing concrete surface is effective and timeous application of the curing process.



A well-constructed suburban pathway.

Curing ensures that the concrete remains moist enough for cementing reactions to take place. This is best achieved by using a suitable atomising spray to apply an approved white-pigmented, resin-based membrane-forming compound. To ensure uniform consistence and dispersion of pigments in the curing materials, it should be agitated in the supply container immediately before transfer to the distributor and kept agitated during distribution. The vertical sides of the pavement should be coated within an hour after the removal of the side formwork. Any areas of the coating that show signs of damage within a week should immediately be repaired.

Other curing methods, such as placing white or light-coloured plastic sheeting over the concrete, may be considered where membrane curing is not possible. However, such coverings may mark the surface.

The plastic sheeting should be placed while the surface is still moist. If the surface looks too dry, it should be wetted with a fine spray before the sheeting is placed. Adjacent sheets should be lapped 500 mm and weighted so that they remain in contact with the concrete surface. The sheeting should extend beyond the pavement edges to completely cover the sides of the slab after the side forms have been removed. The sheeting should remain in place throughout the curing period.

Damp hessian covering or damp sand as a means of curing are not recommended. All methods of curing should be in place for at least seven days. ■

**More information from Tel: +27(0)11 315 0300**  
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BUILDING TRUST



# Beegin: an innovative hive design set to revitalise local beekeeping



Ivan Brown, creator of Beegin.

Local beekeeping is currently faced with a range of challenges, including adverse weather conditions and the rapid decline in bee numbers worldwide – a global concern as food crops depend on pollination by bees. The cheap price of low-quality imported honey is also a threat to South African honey farmers' livelihoods.

However, a new type of beehive could revitalise all honey production in this country. The concept sees traditional wooden hive structures replaced with an innovative concrete frame. Although a concrete hive is

not in itself a new idea, the new Beegin hive provides several design adjustments that have helped a test group of beekeepers increase their productivity.

The hive, aptly named Beegin, was created by Ivan Brown and aims to expand local beekeeping and contribute to both job creation and food security in South Africa. Brown is currently studying for a master's degree at the University of Johannesburg. His work on Beegin, which started as a research project, has been featured at several international design conferences. He has also co-authored several research papers.

Brown came up with the design when he entered the PPC Imaginarium Awards, the country's most supportive arts and design competition for emerging creatives that seeks to reward innovation in concrete. Brown was named runner-up in the industrial design category of the awards in 2015 and PPC then supplemented Brown's prize money with a seed grant to assist him with prototyping his initial concept. PPC has since assisted Brown with further funding to aid the nationwide rollout of the project after a successful testing phase.

The testing process took two years. In that time, all ten of the participants (five beekeepers and five urban farmers) were kept apprised of Brown's new beekeeping technology.

"The testing process was fantastic!" he adds. "We uncovered a range of issues with the original design and the production process. We refined the entire system."



Brown with an old wooden hive and the new Beegin concrete hive.

For the farmers involved, these tests served as a learning process, teaching them to introduce and keep bees on their farms. Since then, honey production has increased considerably.

Having learned the requisite skills, farmers and beekeepers are now able to serve as access points in the community. Marginalised farming communities may thus now participate in the processes surrounding the keeping and introduction of beehives.

In addition, the insulation properties of concrete proved to be beneficial. "In hot and cold weather, the bees expend a great deal of energy regulating the temperature of the hive to keep the larvae alive," says Brown. "The energy is made by consuming honey, and by insulating the bees from temperature variations, the hives become more productive and efficient."

Mike Shapland, a Johannesburg-based hobby beekeeper, participated in the testing process. A long-time user of traditional wooden hives, Shapland compares the old hives with the new concrete one. "There's a dramatic effect on productivity," he notes. "The bees don't have to work as hard. And fewer of them have to work!"

Low productivity is among the barriers to production in the South African honey-making industry. South Africa is short of several thousand tonnes of honey each year, according to commercial beekeeper Brett Falconer. Competition from cheap imports, of which 76% are Chinese, is an added challenge to beekeepers wanting to enter the local honey-making industry. Cheap, low-quality imports have been increasing since 2001, putting strain on local honey producers, who also have to contend with poor environmental conditions.

Free State-based Danie Peach found that the new concrete design helped to accommodate changes in weather. "The past few years were very dry," he says. "The wooden hives crack and you must repair the cracks. But with the concrete that is not necessary."

Now that Brown's design will be available nationwide, it could impact the economy positively on a larger scale. Case studies show that beekeeping has empowered small businesses in Limpopo and the Eastern Cape, introducing a new wave of local commercial beekeepers.

For example, Mokgadi Mabela founded Polokwane-based business The Native Nosi in 2015 to produce local, quality honey, as well as to alleviate poverty through job creation. Mabela's honey is currently in high demand, and she hopes to expand her business.

Thoko Njemla began beekeeping 16 years ago in response to a job shortage in the Eastern Cape. From early 2017, she has employed five people and harvested several tonnes of honey each year.

Many small honey-producers in South Africa could thrive and beekeeping has the potential to empower even more SMMEs. The new Beegin hive can contribute to that success. 2018 looks to be a most promising year for Brown's fledgling company of the same name. Since April 2018, Beegin has sold tools and beehives to businesses and individuals across South Africa, in the hope of seeing beekeepers become fully self-sufficient, and beekeeping in general become more sustainable. ■

**More information from [www.beegin.co.za](http://www.beegin.co.za) and [www.ppcimagarium.co.za](http://www.ppcimagarium.co.za)**

# Carrots could be key to stronger concrete

By Rima Sabina Aouf

Concrete mixtures could be strengthened by adding nanoparticles extracted from carrots and other root vegetables, research currently under way at England's Lancaster University suggests.

Preliminary tests by the university's engineers found that 'nano platelets' sourced from the fibres of these vegetables significantly improved the strength of concrete – and at a low cost.

The university has received £195,000 in funding from the European Union's Horizon 2020 programme to proceed with further research, in the hope that the results could help curb carbon emissions from the construction industry.

"These novel cement nanocomposites are made by combining ordinary portland cement with nano platelets extracted from waste root vegetables taken from the food industry," said engineering professor Mohamed Saafi, who is lead researcher on the project.

"The composites are not only superior to current cement products in terms of mechanical and microstructure properties but also use smaller amounts of cement. This significantly reduces both the energy consumption and CO<sub>2</sub> emissions associated with cement manufacturing."

The thinking is that with stronger concrete, less of the material will be required for a building of the same scale. Even



a small reduction in quantity could make a big impact, given that the production of cement could account for as much as 8% of the world's total carbon dioxide emissions, according to recent statistics.

This is because carbon dioxide is a by-product of the chemical conversion that takes place during cement production. The process also requires the cement to be heated to very high temperatures, often by burning fossil fuels.

In Lancaster University's early studies, the root vegetable nano platelets – which work by increasing the amount of calcium silicate hydrate, the primary substance that gives concrete its strength – outperformed all currently available cement additives. This includes other more costly sources such as graphene and carbon nanotubes.

The engineers were also able to use 40 kilograms less portland cement per cubic metre of concrete.

They are working with an industrial partner, sustainable materials company Cellucomp, on the research. Cellucomp already works with waste root vegetable fibres, with which it manufactures the additive Curran. ■

Source: <https://goo.gl/3zeB3J>

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# Sherwyn Esbend: building a sustainable construction company

Just over a year ago, Sherwyn Esbend's office in North Coast Road was an empty space. Today, it has been subdivided into separate offices and a smart reception area and he has just taken delivery of two brand new bakkies.

Over the past two years, he has built a vibrant construction business that undertakes repairs to insured properties on behalf of the insurance companies.

But it has been a challenging journey and one where his business philosophy of delivering quality results and ensuring top-notch service have stood him in good stead.

"I tell people who want to go into business that the more they grow, the bigger the challenges they will face and the larger the potential problems will be. In the school of life, before you go to the next grade, you have to pass the test. So, don't keep going around the same mountain like the Israelites. Keep your eye on that next level."

Esbend was born and grew up in Pietermaritzburg into a family of entrepreneurs. Both his grandfather and his father, who passed away when he was just 12, were in the construction industry and he admits that following them seemed the natural thing to do.

After completing his matric, however, he headed to the United States for a year and a half where he helped his sister who ran a laundromat and a construction business.

Back in South Africa, he joined Waltons Stationery and then moved to the Road Traffic Inspectorate. Five years later, when his second son was born, he decided that the dangers and shift

work weren't worth it and moved to eThekweni Municipality where he worked in the signage and advertising department.

On the side, he was doing a few small construction jobs.

"I wasn't satisfied. I knew I wanted to go into business and, specifically, into construction. I'd been trying to do some small jobs but things didn't always work out. I bumped my head and lost a lot of money but I persevered," he recalls.

Three to four years ago, Esbend remembers being so broke that he couldn't scrape together enough money to buy a loaf of bread. His wife Karen, who he says has been by his side throughout, dipped into her salary to help pay workers. Without a car, he relied on public transport and hired a bakkie to do jobs.

Having his wife by his side has been one of his biggest assets. "If we face a hurdle, we only give ourselves one day to mope. After that, together we look for solutions and get on with picking ourselves up," he says.

He resigned in November 2016, using his pension payout to set up Sbenz Construction. Now that 'everything was on the line', he no longer had the option of failing.

Because he believes that a good business needs to have a professional image, he invested in branding his company and building a professional image to give his business credibility. Quotes and invoices were delivered on smart letterheads. He registered a domain name rather than resort to a Gmail address.

While he was subcontracting for one particular construction company, Esbend realised that the future of his company lay in



Sherwyn Esbend, the CEO of Sbenz Construction and Karen Esbend, the Managing Director.

the insurance sector. Repairs in response to insurance claims provided a significant and steady volume of work as well as bringing in reliable payments.

But being accepted onto the service provider panels of large insurance companies and financial institutions proved difficult. Companies were looking for a track record and references from others in the sector.

He says the turning point came when he joined the Sekela Development Programme, which develops and supports small enterprises through workshops and mentorship.

This, in turn, resulted in Sbenz Construction being accepted on to the SA Home Loans (SAHL) panel of contractors who are called in to effect repairs in response to insurance claims.

“SAHL opened the door for me. Without being included on the SAHL panel, I would not have been able to get on to other panels. They have given us references. Now we are doing work for other major insurance brands and big banks and can grow our business,” he says.

Another game changer was the massive flash flood that hit Durban in October last year. As insurance companies scrambled to do the repairs, more contractors were needed and companies waiting in the wings were called in to assist with the excessive backlog of repairs that needed to be done.

“Through that storm, we made it on to one of our biggest client panels, we had been requesting for some time but had been rejected,” he recalls.

Sbenz Construction completed about 200 jobs and has only just finished all their storm-related work. Money earned was ploughed back into the business.

This enabled Esbend to move to his much larger current office and employ another 20 people. With more big clients in the pipeline, he expects to grow his staff even more.

His association with SAHL also influenced his decision to study further. Following a Sekela advisory board session with SAHL which covered self-development, he registered with MANCOSA for a Bachelor of Business Administration. He has on-the-ground experience of much of the study material but believes this qualification will give him a far broader overview of business and increase his credibility with clients.

He is also focusing on improving his company's Construction Industry Development Board (CIDB) grading which will open doors to other opportunities in the far broader construction industry sector.

“When we joined Sekela, we were on CIDB Grade 1, now we are in the process of applying for Grade 5. This is not something I even dreamed of. I thought if I could get to Grade 3, I would be fine!” he says.

At present, 95% of his work is for the insurance industry and this remains his primary focus.

Esbend's long-term plans include pitching for work from the petroleum industry and, in the medium term, he plans to partner with larger construction companies on major contracts as part of their Enterprise Development Programmes.

SA Home Loans, established in 1999, is South Africa's only independent, non-bank home loan provider, headquartered in Durban and with branches in most major centres throughout South Africa. ■

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# Working towards a zero-waste future

*Geocycle's leading waste management solutions for landfill diversion*

Communities worldwide increasingly have issues with the disposal of materials perceived as waste or no longer useful. The issues are complex and the most common solution is to 'turn-a-blind-eye', passing the problem to future generations by resorting to landfill. However, there is growing concern about its environmental impact and an awareness that win-win partnerships for waste disposal are not only desirable but can be viable. This has given momentum rejection of single-use plastic products; value-added recycling by adopting a circular economy approach to manufacturing; and, importantly, to view the waste 'byproducts' of our consumerism as a potential and valuable energy source.

Geocycle, which is the global waste management business of LafargeHolcim, the world leading building materials and solutions Company, treated 10 million tons of waste in 2017, almost twice the total annual household waste generation of Switzerland. Employing the high temperature environment in cement kilns, the company co-processes a wide variety of waste including solid shredded municipal and industrial waste, spent solvents, used tyres, waste oils, contaminated soils, industrial and sewage sludges, as well as demolition waste.

Co-processing leaves no ash residue requiring disposal, as the incinerated ash is incorporated in the clinker – the basis of cement. Thus processed waste products are used as direct substitutes for fossil fuels and other raw materials of traditional cement production. The waste therefore has made a valuable contribution to reducing CO<sub>2</sub> and energy costs, while the high temperature and residence time in the kiln ensures cleaner combustion, diversion of waste from landfill and uncontrolled dumping, reduces pollution and saves land. Co-processing can therefore play a critical role in solving the problem of waste disposal and also make an important contribution towards a sustainable circular economy.

## Realising the energy value in waste

In South Africa, the government has taken a pivotal regulatory step with the Waste Classification and Management Regulations, and supporting Norms & Standards Disposal Requirements for waste prohibited or restricted in terms of disposal compliance for hazardous waste with a calorific value greater than 25 MJ/kg (23 August 2017). This focuses everyone's mind on realising the value of waste products by defining their place in the energy chain.

"It marks the beginning of a new era for private/public cooperation on the disposal of used materials and landfill diversion," says Brent Mahoney, director of Geocycle South Africa. "It is an example of industrial ecology, where instead of South Africa being another throwaway society, the used material from one application is considered a potential raw material for another or an energy source."

## Lafarge's kilns: an ideal waste disposal solution

Lafarge South Africa, a member of the international Lafarge-Holcim group, and its subsidiary Geocycle South Africa, have the approval of the Department of Environmental Affairs to operate licensed facilities to produce alternative fuel resources (AFRs).

Geocycle has been providing a processed supply of various recycled, high calorific value materials, such as industrial oil



"At Geocycle, we have a passion for health, safety, the environment and landfill diversion at the heart of everything we do..."

*Brent Mahoney, Director, Geocycle South Africa.*

sludge and used tyres that are used as fuel in the cement kilns at Lafarge's Lichtenburg Cement Works, North West Province.

The international Geocycle company has now evolved into a leading provider of municipal, industrial and agricultural environmental management services with a presence in 61 countries and over 10,000 customers worldwide. The company is renowned for its responsible management of more than 10 million tons of waste each year, playing a significant role in preserving natural resources, minimising health hazards associated with waste, and reducing its carbon footprint.



*The Geocycle management and processing services embrace an extensive variety of waste streams such as used tyres.*

## Today's problem: tomorrow's nightmare

Globally, it is estimated that approximately four billion tons of waste are generated every year and South Africa alone produces 108 million tons. It is a massive and rapidly escalating environmental problem with currently 49% disposed of in landfills and controlled dumping, while 30% is not collected and merely finds its way onto open dumps or is burnt. Only 13% is recycled and 8% is used for energy recovery or incineration. The waste problem consumes 80 km<sup>2</sup> of land for landfills every year.

Putting this into perspective; one of the biggest dumpsites in the world at 136 hectares is in Brazil: equating to almost 200 football pitches!





Careful sorting, blending and pre-processing is an essential part of the co-processing of waste.

### The co-processing solution

The co-processing that Geocycle has developed for hazardous waste is the careful introduction into the cement kiln as AFRs to replace natural fuel resources such as coal, oil and gas. The emphasis is on 'carefully' as the waste has to be sorted, blended and 'pre-processed' before introduction to the kiln to ensure tight quality control.

Conditions in the cement kilns are ideal for the safe and total destruction of the waste stream as they operate at a temperature above 1400°C. In addition, the material in the kilns spends more than 5-10 seconds at this high temperature, ensuring that any contamination will be completely destroyed. The kilns operate with tight quality control and are continually subjected to close monitoring of emissions.

While co-processing as an Alternative Fuel is a critical solution for diverting hazardous waste from landfill sites and dumps, it is only part of the extensive service offered by Geocycle, which incorporates a full needs assessment, waste collection and transportation, laboratory analysis and pre-treatment. The waste is separated into material suitable for recycling such as certain plastics and glass, and AFRs, as well as alternative raw materials (ARMs) for cement manufacture.

### Providing South Africa with waste management solutions

Geocycle South Africa has a Waste Management Licence issued by the Department of Environmental Affairs and is a member of the Institute of Waste Management of Southern Africa (IWMSA), a multidisciplinary, non-profit association committed to the support of professional waste management practices.

"We have the international experience to be a trusted partner in ensuring compliance on waste management and a leader for landfill diversion procedures in South Africa," says Brent Mahoney.

"Health, safety, the environment and landfill diversion is at the heart of everything we do: we are committed to working towards a better, zero-waste future." ■

**More information from Brent Mahoney,  
Tel: +27(0)11 657 2390 / [www.geocycle.com](http://www.geocycle.com)**

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# AfriSam shares expertise to empower small businesses

As part of its commitment to social and economic upliftment, construction materials leader AfriSam puts its Centre for Product Excellence (CPE) at the service of small players in the concrete product manufacturing (CPM) sector – and has had great results.

While the ranks of CPMs include a number of large and well-resourced companies, there are still many small and medium-sized enterprises (SMEs) in this industry that need support to become sustainable. These operations often lack the in-house expertise and experience to fully optimise their production costs, often leaving them uncompetitive.

To help build a sustainable construction industry through empowering SMEs with the necessary knowledge and advice, AfriSam's CPE offers its technical skills and facilities at no charge to its SME customers. Significantly, this support is offered across the country. In tough economic times especially, this can often give the customer the necessary edge it needs to survive and thrive.

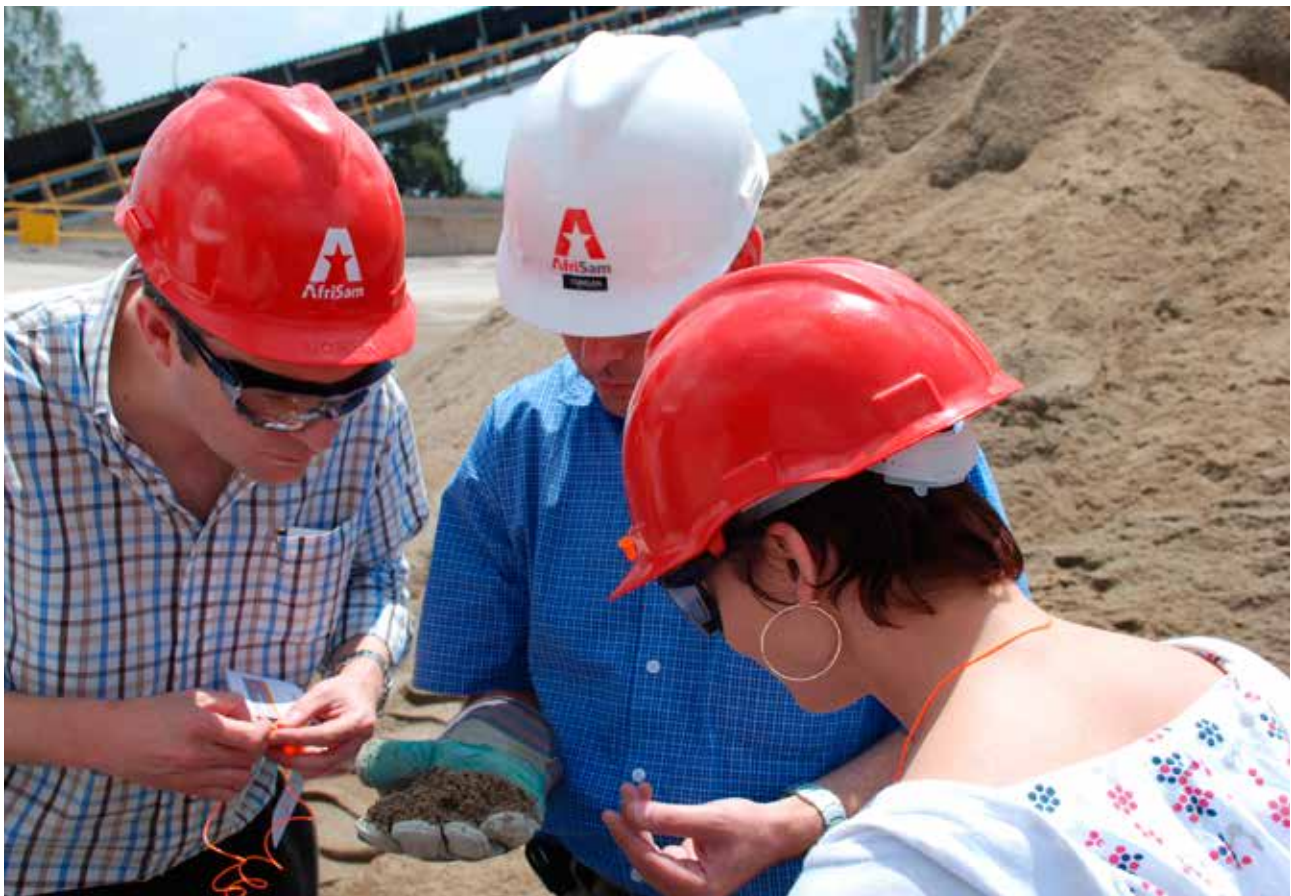
Working with its customer Opehst BCM, a new business near Rustenburg, the CPE team was able to advise on the best cement and the most efficient process to make bricks, blocks and palisade walling with chrome slag instead of stone aggregate. Using AfriSam's High Strength cement (42.5R) – to achieve high early strength – Opehst has been able to produce good quality products at low cost. It has entered the market with a competitive offering of products whose quality conformed to South African Bureau of Standards (SABS) requirements.



*One of the key benefits of AfriSam's Rapid Hard Cement is that it offers fast strength gaining qualities, allowing for quick turn around and form stripping.*

At Smartcrete in Centurion, the CPE was able to help improve the casting rate so the customer could keep up with growing demand without overly raising its cost base. Through the use of AfriSam's Rapid Hard cement (52.5R), together with a super-plasticiser admixture and an accelerator combination, Smartcrete successfully ramped up the output of its concrete tables, windowsills, wall caps, wall copings, stairs, treads, water channels and spouts. ■

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*AfriSam's CPE works with customers to identify the most suitable product and process to optimise their operations.*

# Birkenmayer durability: an intrinsic quality

When a leading Rustenburg-based block-making company acquired an additional two Birkenmayer block-making machines it was to increase its production capacity to 13 million bricks per month. What is significant is that the 37-year-old company, Cemblocks (Pty) Ltd, has only ever used Birkenmayer machinery and attributes its success, in part, to Birkenmayer's high-quality equipment, very professional installation, support, advice and machine spare parts that are readily and speedily available.

Cemblocks, which supplies the leading national contractors and retailers within the greater Rustenburg area, opened its doors in 1981 and decided on Birkenmayer as its preferred supplier based only on contractor word of mouth.

Over three decades later and several Birkenmayer block-making plants, the company is recognised as one of the leading block manufacturers in the whole North West Province. Their current equipment comprises a VB1, purchased when the company began production, a VB4, two VB5 block-making machines and one VB6. The significance of the company's expansion made using only Birkenmayer equipment and services bears testimony to the reliability and durability of Birkenmayer machinery, while professional advice and OEM spares add to the equation.

"The VB1 purchased in '81 is a mechanical miracle," says Cemblocks CEO Francois Alberts. "Birkenmayer assisted with the plant assembly and we feel that this is a key contributing factor to their equipment's durability – correct procedures from installation through the entire process up to initiating production."

He says the plant operated on 24-hour shifts for many years and that its lifespan in combined shifts amounts to approximately four decades. "Despite its age the plant continuously delivers 1,500 pallets of product per day in nine-hour shifts and we have only had to replace the PLC once," emphasises Alberts.

"An endorsement of this nature," comments a Birkenmayer representative, "proves the durability, reliability and consistency of Birkenmayer brick- and block-making machinery and parts."

He says that once a Birkenmayer plant is installed it is very seldom replaced due to production challenges.

"More often than not the plant changes hands as company ownership changes, but machine durability ensures ongoing production," he explains.

As testimony to Birkenmayer's equipment production potential, when Rustenburg's



Midtown Mall was built back in the mid-80s, Cemblocks supplied the only contractor with all their brick requirements, making use of only one Birkenmayer VB1 block-maker over 24-hour shifts.

"In our 37-year history we have seen many other plants producing other suppliers' products and spoken to numerous brick and block producers' owners and senior executives. Our own experience, reinforced by these opinions, means we can say without fear of contradiction that Birkenmayer has contributed to Cemblocks' growth through its equipment, guidance, support and parts availability," Alberts states.

The company's product range comprises solid large blocks, maxis, stock bricks, several paving products, retaining wall blocks and Rock Face bricks. Cemblocks also manufactures tailor-made products on request.

Although 1,200 tons of material is used to produce the daily production average of between 1,200 and 1,600 pallets per shift, Birkenmayer's equipment versatility means Cemblocks can produce normal daily requirements of a particular product on any one of the Birkenmayer plants. This results in far fewer mould changes and ultimately increased uptime.

The Birkenmayer range of brick- and block-making machines was re-branded several years ago from 'VB' to 'HB' to steer away from competitor branding. Aside from design upgrades and changes in pallet sizes there are no significant changes to the range. Clients can rest assured that regardless of model name or class, Birkenmayer's block-making machinery is as reliable as it has been for over 30 years.

## About Birkenmayer South Africa

Birkenmayer South Africa, with its extensive knowledge in industrial processing solutions, has over 50 years' experience in the South African building materials and concrete production market.

Birkenmayer locally manufactures a wide range of reputable, robust, easy-to-operate and cost-considerate brick- and block-making machines and Eirich industrial mixers, as well as supplying Hydronix digital microwave moisture meters.

Birkenmayer South Africa also provides complete industrial processing solutions where plants are designed, manufactured and installed to specific client requirements. Birkenmayer offers overall assistance in the planning of complete processing projects. ■

**More information from**  
**Tel: +27(0)11 970 3880**  
**www.birkenmayer.co.za**

# Sika's structural strengthening solves a tricky problem at Gateway Shopping Centre.

The Gateway Shopping Centre is an upmarket shopping centre situated in the heart of Umhlanga Rocks, on the north coast of KwaZulu-Natal, offering an overall entertainment experience.

Additions to the Shopping Mall have now necessitated the conversion of part of the parking area into shops and a hotel. The beams and roof slabs have required strengthening to take this additional loading and this is where Sika's Internationally respected Carbodur Carbon fibre plates were used.

Sika Carbodur S1014 (7,300 metres) and Sikadur 30 (510 kits / 10,200 litres) were specified for the external structural strengthening of the beams and roof slabs. Sika Carbodur plates are pultruded carbon fibre reinforced polymer (CFRP) laminates designed for strengthening of concrete, masonry and steel structures.

The carbon fibre plates were bonded onto the soffit roof slab using Sikadur-30. This adhesive for bonding Carbodur is a primerless structural epoxy adhesive ideal for bonding to concrete, masonry and steel. The application of the Sika Carbodur S1014 has allowed for the increased load capacity of the floor slabs in the sections where heavier equipment was to be installed.

The high strength and proven excellent durability of the Sika Carbodur structural strengthening products made them an ideal choice for this application.

The time constraints of the construction programme were challenging, as contractors Amsteele Systems were given only six weeks to complete this project. Therefore the correct products needed to be applied effectively in a short time with the best overall outcome.

Sika has proven once again that it has a product for every application and a solution to every problem, ensuring that Sika will always have the correct solution for even the most complex and challenging projects. ■

**More information from Tel: +27(0) 31 792 6500**  
**[www.sika.co.za](http://www.sika.co.za)**

## About Sika

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and automotive industry. Sika has subsidiaries in 100 countries around the world and manufactures in over 200 factories. Its more than 18,000 employees generated annual sales of CHF 6.25 billion in 2017.



# Maxiwall Pro free design software is now live!

In July 2018 Terraforce launched the new state-of-the-art design software, Maxiwall Pro, a private labelled version of the most comprehensive and widely used Segmental Retaining Wall (SRW) Design software available in the industry, the Vespa Mechanical Stabilized Earth (MSE) Design Suite.

Maxiwall Pro enables designers to easily produce complete wall designs utilising the Terraforce line of Concrete Retaining Block (CRB) wall products. With all Block and Geogrid information preloaded, designers can select from a wide range of proven Terraforce systems from easy-to-navigate drop-down menus.

Compared to other MSE Design Software options, Maxiwall Pro increases design efficiency, improves accuracy, and promotes a seamless flow of information between design stages and parties. It generates full wall layouts with accurate quantity estimates and comprehensive reports. The Calculation Engine can simultaneously run Static, Seismic, and Internal Compound Stability (ICS) Analysis in accordance to the US National Concrete Masonry Association (NCMA), American Association of State Highway and Transportation Officials (AASHTO), Standard for Load and Resistance Factor Design (LRFD), AU (Australian Standard), and British Standard Design Methodologies.

The Terraforce package assumes that the Design Engineer's goal is to produce a set of clear, fully comprehensive construction drawings. With the DXF output feature, CAD cross sections and elevation views are automatically generated and ready to import into AutoCAD. Users of the Maxiwall Pro package will also have an option to purchase a copy of the AWall CAD Tool, which allows the user to accurately represent the plan and elevation views of a retaining wall on their grading plan.

AWall takes into account the variable heights along the length of wall, wall batter (inclination), and wall width to generate a plan view, representing the 'real' footprint of the wall and can create elevations and generate quantities.

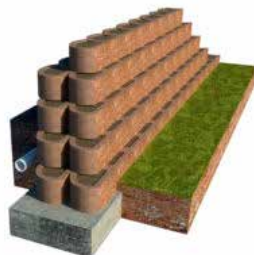
Once the Design is complete, Maxiwall Pro also allows one to export the wall geometry, the soil conditions, and the loading conditions to select Global Stability software programs.

Please note that Maxiwall Pro is a professional analysis tool and should be operated by designers and engineers who are familiar with the design methodologies and well versed in the design of CRB structures.

Simple, easy-to-follow Design Tutorials will also be provided. These cover the generic version of Vespa MSE Design Software but generally apply to Maxiwall Pro.



Maxiwall Pro Composite staggered Rock face.



Maxiwall Pro Gravity staggered rock face.

Terraforce founder Holger Rust says: "Up to this point we have done our part to ensure that your project can be concluded as intended, to your full satisfaction. It's up to our clients to ensure that sub-standard blocks, non-existent design services and sloppy installation procedures are kept at a safe distance."

Try out the free, state-of-the-art design software, exclusively for Terraforce walls, MAXIWALL PRO: <https://goo.gl/Bw3sFo> 100% discount Coupon code: USETHEFORCE  
Tutorials: [www.ctiware.com/tutorials](http://www.ctiware.com/tutorials).

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# New trade outlets for Mapei



Construction chemical manufacturer, Mapei, is continuing its drive to simplify supply of its products with the addition of two new distribution outlets that are aimed at small to medium construction companies and contractors as well as cash buyers.

Mapei's commercial manager, Tracy Harris, says the initiative is part of the company's drive to meet customers wherever they find it most convenient. The appointment of WF Chemicals (Pty) Ltd and Construction Components (Pty) Ltd as official distribution partners therefore provides these contractors with fully-fledged, easy-to-deal-with trade counters where Mapei Products can be bought.

They are essentially one-stop shops where the entire range of products can be sourced, whether it is a single bag of grout or multiple pallet loads of screed. The service is quick and friendly, so customers can collect their orders and be on the road again within 15 minutes of arrival. Payment can be effected by account, card or EFT. Technical assistance is available where needed, and both warehouses are centrally located in both cities.

"Mapei brings a broader range of products to our offering, with the addition of tiles adhesives, tile grouts, self-leveling underlays, adhesives, paints and waterproofing among others."

"The Mapei brand is not as well recognised in South Africa as it is in Europe, so both parties will be working to achieve the desired level of awareness. Mapei brings a whole new branding option to the table, with great packaging designs, printed instructions on their packaging as well as professional electronic media presentations and demonstrations of their products. The Mapei products are of the highest quality and designed to be user friendly," she explains.

"Both parties need to co-operate to achieve optimal results in achieving the desired market penetration. Distribution is a team effort, with Mapei offering great products, branding and customer training, with Construction Components and WF Chemicals offering channels to market, customer support as well as brand awareness. Both companies have been in the market for a long time and will in fact be Mapei customers.

"A building contractor has the same requirements to run his businesses as a large company. They need to have professional assistance to run their portfolios, as well as requiring technical advice and support when undertaking new or difficult types of projects. While most retailers do stock some of our products, they do not necessarily stock all of them. Nor do they stock bulk products, so it pays to have a channel where our contractors can buy everything they need with the benefit of technical documentation and contractor-centric advice," Harris says.

"The merits of partnering with Construction Components and WF Chemicals speak for themselves as both have built up substantial client bases since their establishment in 2008. The companies are geared toward customer service through a stocked warehouse equipped to deliver-on-demand to customers in the Western Cape, through WF Chemicals, as well as Construction Components in Gauteng. The partnership is also investigating the possibility of expanding this footprint in future," Harris notes.

"The partnership with us will give them access to new clients and another channel to introduce our modern and reliable products into the market. They will not only benefit through access to a wider selection of products but will also have access to our substantial resources and training facilities."

## About Mapei South Africa

Mapei South Africa is part of the Mapei Group, an Italian-based multinational that is a leading manufacturer of chemical and adhesive products for the construction industry. As part of the multinational group, Mapei South Africa passes numerous benefits onto its client base by having access to knowledgeable technical experts, research capabilities and product specialists. Mapei South Africa distributes its products throughout sub-Saharan Africa. ■

**More information from Mapei South Africa,  
Tel: +27(0)11 552 8476 / [www.mapei.co.za](http://www.mapei.co.za)**



# Wacker Neuson makes its mark in Zimbabwe

Expanding its dealer network past the South African border, Wacker Neuson, a global manufacturer of light and compact equipment, appointed family-owned Pelgin Consulting Services as its official dealer in Zimbabwe on 28 August 2018.



From left: Dennis (Wacker Neuson) & Gary (Pelgin) shake hands on dealer agreement standing with Christine (Pelgin) and Justin Bergh (Wacker Neuson).

"The need to grow our dealer network stems from our strategy to be closer to the customer," states Dennis Vietze, MD for Wacker Neuson sub-Saharan Africa. "Our very customer-centric approach enables the product to reach customers efficiently regardless of location. In addition to gaining an in-depth understanding of our customers' needs, we can reduce lead times by offering easy access to products and spares, thereby ensuring optimised productivity for our customers."

Pelgin Consulting Services' relationship with Wacker Neuson began when current owner and MD Gary Moorcroft's late father, Bryan, established Conquip Zimbabwe.

Bryan grew Conquip into one of Wacker Neuson's longest-serving dealers with over 40 years in the sub-Saharan region. Now Pelgin, under the leadership of Gary and Christine Moorcroft, will continue this legacy as a leading Wacker Neuson dealer.

Operating primarily in the construction, civils, mining, industrial and agricultural sectors across Zimbabwe, Pelgin is focused on holding appropriate equipment stocks to support customers and end-users across Zimbabwe.

Zimbabwe's improved political, social and economic conditions have attracted investment and Moorcroft predicts enormous growth in the infrastructural rebuilding of the country.

"A new era in Zimbabwe has dawned and Wacker Neuson is excited to expand its footprint further into Sub-Saharan Africa," comments Justin Bergh, territory and export manager at Wacker Neuson South Africa. "Opportunities in Zimbabwe will benefit both companies; the country's growing need for premium construction equipment will be backed by Pelgin, which is perfectly positioned to support the complete Wacker Neuson range including spares, service and warranties."

"Wacker Neuson products are renowned for their superior quality and set the industry benchmark," notes Moorcroft. "For efficiency and reliability, Wacker Neuson is the premium brand of choice for our customers. These products enabled the company to become a household name in Zimbabwe."

As Zimbabwe becomes attractive to competitors, Moorcroft believes Pelgin's reputation for product support and providing sound solutions while maintaining competitiveness will differentiate them from the competition.

"The dealer agreement with Wacker Neuson and the exceptional support from Vietze and his team gives customers confidence in the products and our capability and expertise in a technical environment," affirms Moorcroft.

To ensure exceptional after-sales service to customers, Wacker Neuson will conduct product and service training in Zimbabwe as well as at its head office in South Africa so that Pelgin employees are fully trained on all products within a twelve-month period.

"Growing with respected partners is the first step to long-standing sustainable business and once the global economy picks up, Wacker Neuson must be strategically positioned with competent and experienced partners like Pelgin who share our company values," states Vietze. ■

**More information from Thammy Lang, Tel: +27(0)11 672 0847  
email: [thammy.lang@wackerneuson.com](mailto:thammy.lang@wackerneuson.com) / [www.wackerneuson.com](http://www.wackerneuson.com)**



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# TAL provides concrete flooring options for every project

**W**ith designers the world over exploring a minimalist, industrial look, concrete and concrete-look flooring remains a popular aesthetic for both commercial and domestic spaces. In addition to the on-trend appearance of concrete floors, they are also smooth, high-strength and hard-wearing floor surfaces which are easier to maintain and require little maintenance.

For residential and light commercial interior applications, TAL SuperFlow, a cementitious self-levelling decorative screed provides a smooth floor surface with a homogenous finish. This rapid-setting decorative overlayment can be installed on a new floor surface, or over an existing substrate.

Revive or upcycle an existing concrete floor by covering it with an epoxy coating such as TAL EpoxySeal FLR100, which will increase durability, add colour and improve the finish. To create a non-slip surface around pools and high-traffic areas, anti-slip granules can be sprinkled over and anchored into the resin of the epoxy coating.

For a completely different look, create a custom floor with TAL StoneFlow. This cementitious overlayment includes a selection of aggregates, or small stones, which is then ground and polished to a smooth surface, producing a uniformly textured terrazzo effect suitable for applications exposed to heavy traffic and abrasion, as well as commercial spaces. Be aware that the process of grinding and polishing can be quite dusty and this floor covering is therefore best installed in a new building rather than retrofitting an existing floor.

Given the range of products available, which one is best suited to your project? Consideration of the service conditions



*TAL StoneFlow produces a uniformly textured terrazzo effect suitable for applications exposed to heavy traffic and abrasion.*



*For a smooth floor surface with a homogenous finish in a range of colours TAL SuperFlow decorative overlayment is ideal.*

is key when selecting the right floor covering. Specifying the performance required for the specific project, in addition to correct application, will ensure success.

Concrete floor finishes are available in a broad colour palette of warmer, earthy shades of grey.

## **About TAL:**

TAL, a division of Norcros SA, has been a trusted manufacturer and supplier of the highest quality materials to the construction industry for more than 40 years. Their trusted range of tile adhesives, grout and waterproofing materials, as well as their range of specialised functional and decorative floor coatings and construction chemicals are manufactured and tested in accordance with the most stringent standards of quality and performance. In combination with a commitment to exceptional customer service, encompassing pre-sales advice and after-sales support, this constant pursuit of excellence means that TAL is there for you at every level, to help make your project a success – from conception to completion. TAL products are manufactured and tested to TAL procedures which are maintained in accordance with Quality System Standard ISO 9001:2015, Environmental Management System ISO 14001:2015 and Occupational Health and Safety Management System OHSAS 18001: 2007. The TAL laboratory is an ISO 17025:2005-accredited testing facility. ■

**More information from the TAL Technical Advisory Service on 0860 000 (TAL) 825**  
[www.tal.co.za](http://www.tal.co.za)



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- PU/Rubber (Inyati)
- Vulcanised rubber range

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# Mobile cranes give a lift to N2 Mtunzini-to-Empangeni upgrade

Concord's impressive 440T mobile cranes were deployed on the N2 Mtunzini-to-Empangeni upgrade project in KwaZulu-Natal for main client SANRAL. Construction commenced in 2016 and completion is due in 2019.

According to SANRAL, this has been acknowledged as one of the largest road infrastructure developments to have commenced in KwaZulu-Natal.

The 34-km stretch of road between Mtunzini and Empangeni is known to locals as the 'road of death.' Over the years, there have been many countless accidents and hundreds of lives have been lost. Branch manager of Concord Cranes Richards Bay, Bella Mollentze says, "We feel fortunate to have been involved in this essential infrastructure project, as the upgrade will now make the highway safer for commuters." Once the upgrade is complete, the road between Mtunzini Toll Plaza and Empangeni will be a 14-m-wide dual carriageway.

This new two-lane northbound carriageway includes the construction of two major bridges over the Mlalazi and Mhlatuze rivers, four agricultural overpasses over the N2 will be lengthened and new bridges will be built at the R34 Empangeni/Richards Bay interchange as well as the P537 Port Dunford underpass. Two road-over-rail bridges, 16 major box culverts, numerous minor box culverts as well as other drainage structures will be built. The height of two overpasses will be increased by jacking up the bridges.



Concord Cranes, specialists in mobile crane hire, rigging and specialised transport solutions, were involved in the project in order to provide the craneage needed to erect 30-m-long bridge beams over a dry riverbed, each weighing 52 tons. Concord Cranes placed a total of 76 beams at various crossings, just two days before flooding. The Concord team handled the flash flood challenges extremely effectively.

Subsequent to the flooding, 44 beams, 22 m in length and each weighing 16 tons, were placed on the last bridge. All bridge sections were completed in July 2018 and the actual road building has continued.

Concord Cranes will also be providing the client with a turnkey project solution which will include the supply of cranes, riggers, specialised rigging equipment and extendable trailers to transport the bridge beams.

## About Concord Cranes

Concord Cranes, a proud member of the Bud Industrial Services Group, has been established through the collaboration of well established brands, Elcon Crane Hire, Anglo V3 Crane Hire, Concord Crane Hire Namibia, Material Handling Logistics and Rent-A-Plant, who have collectively been in business for over a decade. These brands have formed our powerful and resourceful Concord team.

Managing a fleet of over 170 cranes, ranging from 7T – 750T, Concord is committed to providing professional, compliant lifting services that are customised to fit our clients' needs. Mobile crane hire, rigging services and specialised transport solutions are included in our specialist service offering.

We have a distinct purpose and a passion for what we do. Excellence is what keeps our team going; striving for greater in everything we do. ■

**More information from Marcus Wilkinson,**  
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# Flowcrete raises the flooring benchMARC

Johannesburg's brand new retail and office complex THE MARC worked with Flowcrete Africa to create a stunning floor that consists of sparkling terrazzo systems weaving around the mall's walkways.

THE MARC is named after its location in the heart of South Africa's financial district, as it is on Maude and Rivonia Corner in the Sandton CBD. The project's architects, Boogertman + Partners, wanted to build a facility that reflected the area's fashionable, modern and energetic atmosphere.

Getting the floor area right was central to achieving this aim, as it is one of the biggest surfaces in any shopping centre and so plays an important role in setting the look and feel of the environment. To achieve this, the architects knew that they needed a floor finish that conveys a contemporary, decorative aesthetic and that would last – even after extensive use and wear.

Having seen what could be achieved in shopping centres using the seamless resin terrazzo system Mondéco, consulting with Flowcrete Africa's team of resin flooring experts and putting down and analysing test samples, THE MARC's architects specified a bespoke, eye-catching Mondéco Earth floor.

Three complementary colours were chosen and applied in bands and blocks across the shopping centre's main walkways. Light reflective and decorative additives are included within every Mondéco floor to create a glittering, dappled aesthetic.

Mondéco Earth in Polar Mist was selected for 1,865 m<sup>2</sup> of the floor as the main backdrop colour with 840 m<sup>2</sup> of Light Grey and 550 m<sup>2</sup> of Mid Grey used for adding interest and accents into the finish, particularly along the floor's edge and for breaking up the main colour with curving shapes.

The floor's design included a cone-like area of wooden planking in the mall's central atrium, which was bordered by the resin terrazzo systems. The floor finish also incorporated blocks of carpet at the mall's entrances to absorb any water or dirt walked in from outside.

## About Flowcrete

Flowcrete Africa has offices in Durban, Johannesburg, Cape Town and Nairobi and is one of the four divisions of the Flowcrete Group Ltd.

Flowcrete Group Ltd. is a world leader in the manufacture of seamless industrial and commercial resin floor, wall and coving solutions as well as other specialist coating technologies. Flowcrete Group Ltd. has international manufacturing facilities in Europe and Africa as well as Central and South East Asia.

Flowcrete supplies world-class seamless flooring solutions to transform environments across the globe including; decorative seamless resins, waterproof car park deck coating systems, seamless resin terrazzo, durable antimicrobial flooring, fast curing systems, corrosion protection and self-levelling underlayments.

Flowcrete's ambitious and dedicated team, led by president Craig Brookes, is inspired by excellence in people, products and service as well as continual innovation and sustainable growth. Flowcrete continues to use its global expertise to introduce environmentally friendly, hygienic and aesthetically attractive floors to create a better and more sustainable world



The durability of Flowcrete Africa's seamless resin terrazzo solution meant that THE MARC could rest assured that its floor would be able to withstand the heavy foot traffic, high heels, food and drink spillages as well as the scuffs, scrapes and stains that floors in busy retail areas inherently face. The impervious nature of Mondéco Earth means that it is very easy to clean, which helps the mall's staff to keep the floor area looking its best.

In addition to Mondéco Earth, 374 m<sup>2</sup> of Peran STB in Light Grey was applied on levels 15 and 16 of the development. Peran STB is a decorative and durable epoxy resin floor coating comprising colour-stable quartz granules sealed within a clear resin binder.

Due to its robust nature, 7,000 m<sup>2</sup> of the self-smoothing epoxy resin floor finish Flowshield SL 1000 in Mid Grey was applied throughout the tank rooms and back of house areas.

The architect's behind THE MARC are founding members of the Green Building Council of South Africa, and so it was important that the new site be designed and constructed in as environmentally sustainable a manner as possible. Mondéco Earth was ideal for this, as its long lifespan obviates the need for early flooring refurbishment and the associated environmental impacts.

Flowcrete Africa has extensive experience in supplying high-end floor finishes for prestigious, large-scale commercial developments, having also recently worked with Benguela Cove, Sasol Recreation Club and the Constantia Uitsig Wine Estate. ■

**More information from Flowcrete on**

**Tel: +27(0)31 461 3411 / [www.flowcretesa.co.za](http://www.flowcretesa.co.za)**

# Why robots will build the cities of the future

By Pdraig Belton

**S**hinichi Sakamoto is 57, and works for Shimizu, one of Japan's biggest construction companies. He is part of a greying, and dwindling, workforce.

"Statistics show a third of [Japanese construction] labourers are over 54 years old, and are considering retiring soon," says Sakamoto, the deputy head of Shimizu's production technology division. And they're not being replaced by younger builders. "The number of labourers under 30 is just above 10%," he says.

In September, Sakamoto's firm gained a promising new co-worker – a robot.

Robo-Carrier is currently working on a high-rise development in Osaka, transporting heavy gypsum board pallets nightly from the ground floor to where they're needed. "Can you imagine that materials are in the right position in the morning when labourers come to the site?" says Sakamoto. "He even works at night time."

Robotics is one area poised to benefit from coming superfast 5G mobile networks. Better connectivity will make it easier for multiple robots to co-operate.

Many small robots could 'swarm', working together on different parts of a task. An example is the collaborating 3D printing robots being developed at Singapore's Nanyang Technological University – each of which can print concrete following a computer map and learn from each other.

Shimizu also boasts other robots. Robo-Welder welds steel columns, while Robo-Buddy, inserts hanger bolts and installs ceiling boards. The robots operate autonomously, performing tasks a supervisor assigns them on a tablet.

"We will need to have more and more robots on site," says Sakamoto. "The shortage of labour is our nationwide problem." Japan's construction labour pool will fall to 2.2 million by 2025, down from 3.4 million in 2014, Shimizu says.

Globally, the construction robot market is set to more than double in size to \$420m by 2025, up from \$200m in 2017, say consultants QY Research.

US construction workers are also getting older with a current average age of 43, up from mid-thirties 10 years ago, says Jeremy Searock, the co-founder of Pittsburgh firm, Advanced Construction Robotics.

And 80% of US general contractors say they are having trouble filling vacancies for skilled workers. "There's a clear



Collaborating robots can tackle different parts of a job simultaneously. Photograph Nanyang Technical University

trend", states Searock. "The younger generation is not going into the construction fields."

This is why Shimizu has invested 20 billion yen (\$179m) since 2015 developing construction robots, says spokesman Hideo Imamura. Its robots reduce manpower needs for a given task by 70% to 80%, he says.

In the US, nearly half of construction jobs could be replaced by robots by 2057, say researchers at the University of Illinois at Urbana-Champaign and Midwest Economic Policy Institute. As well as being tireless, robots can do the toughest, most dangerous jobs on a building site, says Sakamoto, preventing injury and loss of life.

"Work which suits robots is for robots, and work which suits humans is for humans," he explains.

In future, faster data speeds thanks to 5G means robots will be able to put more processing tasks into the cloud. The end result is a cheaper, cleverer robot.

Robots could then carry out hazardous or repetitive tasks on remote sites without the need for installing a wi-fi base station – providing, of course, that the 5G network stretches that far.

One of hardest bits of building bridges is tying together rebars. "Bent over, in hot sun on a bridge, with your hands manually tying this stuff, is tough work," says Searock.

So last year, Advanced Construction Robotics developed TyBot to do this job, working on the Freedom Road bridge in Beaver County, Pennsylvania. It tied 24,000 rebar intersections at a rate of 5.5 seconds for each one.

Tokyo's National Institute of Advanced Industrial Science and Technology has built a prototype robot, called HRP-5P, which can install plasterboard partitions and New York-based Construction Robotics, has built a semi-automated bricklayer or mason – SAM for short – which laid 250,000 bricks for the Poff Federal Building in Roanoke, Virginia.

Laying 380 bricks an hour, it is six times faster than a human bricklayer, its makers say. ■



Shimizu demonstrating its construction robot Robo-Buddy. Photograph Getty images.

Source: <https://www.bbc.com/news/business-46034469>

# iCONS: a paradigm shift in construction

**D**igitalisation is a buzz word in every business field. In construction, the possibilities for new technology are impressive. The iCONS research project by Aalto University based in Finland is a step into the future.

In today's construction, only 30% of the time is used for actual production. Another 30% goes to logistics and traffic, and the highest number, 40%, goes to waiting. The most alarming number is the 30% that is used for productive work, says Olli Seppänen, Professor of Practice at Aalto University.

"The productive work time can be raised to 50-60%. We have created a system that enables workers to minimise the time spent searching for materials or tools," he says.

The idea is to present real-time situational awareness for everyone at the construction site when Seppänen was previously working as a consultant solving disputes in construction, he wondered how to get an overview of the construction site as a whole.

"No-one had the big picture. Real-time situational awareness exists in other areas, for example hospitals and offices, why not in construction?"

Seppänen soon commenced with the appropriate research through Aalto University.

## Finding the tools

The iCONS (Intelligent Construction Site) research project began in October 2016 and was followed by two other projects that delve deeper into the digital world, ReCap (Reality Capture) and DiCtion (Digitalised Construction Flows).

"The follow-up projects are linked to iCONS. First, we need data, then we need to analyse that data and then we need to act based on the data analysis. This way we can make detailed plans and predict the workflow accurately."

Other universities involved in the project include Tianjin University, China, Stanford University, California and Unicamp from Brazil. The Technion Institute of Technology in Israel is



*Olli Seppänen, Professor of Practice at Aalto University.*

a technology partner along with Tianjin University and Trimble, a company behind the Tekla software solutions for advanced building information modeling and for structural engineering. Several construction companies are either members of the consortium or are on board as observers.

The main idea of iCONS is that if everyone has access to data that shows where the people, materials and tools are, it saves a lot of time and wasted effort at the site.

For example, instead of having to search endlessly around, a worker can simply check on his phone where the hammer drill is or where a certain precast element is.

"We simply place an RFID tag on the tools, materials and workers. This allows us to get information on the entire situation in real-time very easily."

## Prefabrication

In prefabrication, the new technology opens many doors. An RFID tag can be placed on a slab already at the factory, so the construction site knows in real-time when it is sent. Both the factory and the site can monitor how and when that particular slab arrives at the site. After installation, the tag can be removed and the product checked in as installed.

This is only a simple example. When situational awareness is enabled and progress at the construction site is monitored, the gathered data can be leveraged by artificial intelligence.

This means that there is automatic communication between the construction site and the precast concrete factory. Both have access to the same digital twin of the project, which is updated automatically according to the changes made.

"In future, builders will be able to see continuous automatic schedule optimisation. Precast concrete producers who offer new solutions are ahead of the game for sure," Seppänen says.

Lasse Rajala, Business Area director at Sweco, adds that not only buildings or parts can be monitored digitally, but also machinery.



“Suppliers are able to get data about how the supplied machinery is used. This is a big improvement and helps in designing machines that meet the needs of the clients. Whenever there is a problem, the supplier can analyse the situation in real-time.”

### Real-time monitoring

The iCONS project is an example of large scale progress in construction. Senior advisor Lassi Järvinen from Elematic says that a major ambition in the whole industry is to make the construction site master everything: the prefabrication, the logistics, the whole workflow.

“From our point of view, the construction site should be controlling the precast process by ordering exactly what is needed to be delivered exactly when it is needed. We have built an integrated system with Trimble that enables this.

The EliPlan system is a resource planning solution specifically designed for precast factories. It automatically brings accurate data directly from the BIM (Building Information Model) to the production line. This helps the factory to optimise the use of resources and minimise waste.

The BIM model alone is a great tool and should be used a lot more, Järvinen says. Especially in bigger projects, companies should always make a ‘master model’ available to all parties.

“Currently the providers often make their own models based on whatever information is available. Way too often this information is limited and inaccurate.”

“The BIM model should be made available to every provider at the beginning. Then the providers could easily calculate the exact amounts of resources needed. The BIM model could then be modified along the way and used as a central source of information for the entire life cycle of the building,” Järvinen explains.

Rajala continues saying that the entire life cycle should be kept in mind more. “Today, even if digital tools are used in construction, they are often forgotten when the project is finished.”

### Baby steps

Seppänen says that the iCONS system is not yet commercialised, but that interest is growing. One major challenge is that construction sites are always at a new location.

“In other areas of industry such as car manufacturing or dockyards, the location never changes. It is easier to get data. In construction, we are taking the first steps towards new effective solutions,” Seppänen says.

“However simple it may sound, it is a big step forward if everyone at the construction site is able to check where everything is.”

“Workers are able to work much more efficiently and management is able to monitor the situation in real-time. For example, if you can see that the tools, the materials and the workers are in the same space, you can assume that work is going on.”

### Modeling on the go

iCONS is about locating things. The follow-up project ReCap is about being able to monitor not only the situation, but also the progress of the project.

In current construction, the company gets a progress report typically once or twice per month.



### ReCap provides information in real-time.

“For example, we can equip a crane or a drone with a camera that takes pictures of the building. A 3D model of the building can be created and compared to the BIM model in real-time. This makes it possible to react immediately if something is wrong,” Seppänen explains.

The third research project, DiCtion, sees big opportunities in task assignment, logistics and waste reduction. Artificial intelligence can control and optimise workflows through detailed data analysis.

“Material orders and prefabrication can also be controlled automatically. The BIM model can be updated automatically. The sky is the limit when it comes to possibilities for digital solutions, but progress is slow.

“We need more research and forward-looking companies to develop the applications further. For the first time ever, we are able to gather data for analysis. Before digitalisation, all data was hidden in files and papers, impossible to process.”

### Saving time and money

Lassi Järvinen sees that the whole production chain, from prefabrication to logistics to the construction site, will work a lot more efficiently in the future.

“It’s all about accessing and processing data. Not only data from the companies involved, but from the surroundings as well, for example, traffic.”

Seppänen notes that another important tool that works very well with new technology is takt time. It is the average time between the start of production of one unit and the start of production of the next unit, when these production starts are set to match the rate of customer demand.

“The idea of takt is to minimise the time wasted. This needs real-time data since everything has to run like clockwork.”

The examples are impressive. BMW in Germany and Skanska in Norway were able to reduce construction time by 50% with takt planning and execution.

The construction business is often viewed as a slow-changing industry. Järvinen and Seppänen recognise this stigma and encourage everyone to look beyond this. New technology benefits the whole business.

“It is in everyone’s interest to reduce waste in time, money and materials,” Järvinen concludes. ■

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## Dangote is world's 6th most charitable person

Nigeria's richest man Aliko Dangote has been named the 6th most charitable individual in the world, by Richtopia, a UK based organisation.

Dangote, in 2014 endowed the foundation with \$1.25 billion, making it one of the largest private foundations in Africa.

The foundation began operations in 1981 but was incorporated in 1994. Its operations span across Nigeria and the rest of Africa.

In April last year, the Dangote foundation, in collaboration with the Bill and Melinda Gates Foundation, engaged more than 138,000 vaccinators to conduct vaccinations across five African countries in the Lake Chad area.

In May this year, the foundation provided N130 million as a grant for 13,000 women across the 13 local government areas of Nasarawa state.



The foundation in July this year, also donated the Aliko Dangote Complex, a N300 million ultra-modern building to the University of Ibadan, School of Business, at the Ajibode University extension, Ibadan.

Aliko Dangote is Nigeria's richest billionaire with holdings in the capital market valued at N3.5 trillion as at July 2018.

Dangote Cement accounts for about a third of the market capitalisation on the Nigerian Stock Exchange. The Dangote Group is a diversified conglomerate, with interests across a range of sectors in Africa. Current interests include cement, sugar, flour, salt, pasta, beverages and real estate, with new projects in development in oil and natural gas, telecommunications, fertiliser, and steel. ■

Source: <https://goo.gl/jXsBjf>

## Nigeria seeks US \$1tr to modernise its energy infrastructure

US \$1tr is needed by the Nigerian Government to help modernise its energy infrastructure. This was confirmed by Vice President Yemi Osinbajo at the National Energy and Climate Change summit at State House.

Osinbajo, who was represented by the Minister of Science and Technology, Dr. Ogonnaya Onu, said the federal government was doing a lot to attract both domestic and foreign direct investment into the energy sector to meet the required investment.

"We are convinced that this will help us to create more jobs, create additional wealth and reduce poverty in our country. We would like foreign investors to work with local investors and professionals in line with the Presidential Executive Order No.5," Osinbajo stated.

The presentation of the report on the study of the Energy Investment Risk Assessment (EIRA) for Nigeria scored Nigeria



Energy Investment Risk as moderate. All stakeholders were called upon to study the report and come up with recommendations that will enhance the investment climate in the country's energy sector.

The head of European Union (EU) cooperation to Nigeria, Kurt Cornelis, said the EU has committed US \$173m to support Nigeria through several projects across the electricity value chain in the country.

Director General of the Energy Commission of Nigeria (ECN), Professor Eli Bala Jidere said the summit was conceived to address the investment requirement in the country's energy sector.

The government indicated that the money was required over 29 years, between now and 2043 to make the dream a reality. ■

Source: <https://goo.gl/Vo5eYK>

## Uganda gets Shs90b grant for Tororo-Gulu railway line

The European Union (EU) has given the Uganda government a grant of Shs90 billion to rehabilitate the 375-km Tororo-Gulu railway line that ceased operation over a decade ago.

Ambassador Attilio Pacifici, the EU head of delegation to Uganda, said: "Uganda will provide Shs57 billion. The money will finance the physical rehabilitation of the line, the supervision of the works, capacity building to the Uganda Railway Corporation, and compensation of the Project Affected Persons.

"With this project, the EU continues to support Uganda's economy through the promotion of a multimodal, safe and



efficient transport sector. We will in particular support the efforts of government to shift cargo from roads to more environmentally friendly - or greener- transport modes such as railways and waterways," he explained

The railway is to complement the construction of Gulu logistics hub done in a partnership with the Uganda government and DFID Trademark East Africa to facilitate trade by reducing import and export transportation costs. ■

Source: <https://allafrica.com/stories/201810180505.html>



## Kenya: Cabinet approves creation of a regional roads authority

**K**enya's cabinet has approved the creation of the East African Regional Roads Authority Forum (EARRAF) which will look into issues relating to road construction costs and quality. The EARRAF will mainly focus on the development of quality of design, standards and valuation costs of transnational roads across East Africa.

The authority is expected to provide a platform for agencies mandated in the implementation and management of roads such as the Kenya National Highway Authority (KenHA), Kenya Urban Roads Authority (KURA), Kenya Rural Roads Authority (KeRRA) and the Kenya Roads Board, the Uganda National Roads Authority and the Tanzania



National Roads Agency among others for the harmonisation of road infrastructure in the region in terms of design, costing and standards.

President Uhuru Kenyatta's office said in a statement after the meeting, "EARRAF will bring together agencies responsible for the implementation and management of road infrastructure across the region.

EARRAF will work closely with management bodies from Kenya, Tanzania and Uganda." ■

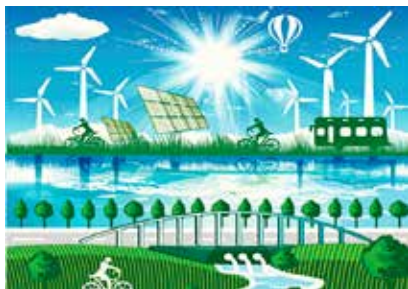
Source: <https://goo.gl/KrzPkV>

## Morocco to invest US \$40bn in energy sector

**M**orocco is planning to invest US \$40bn in the energy sector, which includes a liquefied natural gas project, by the year 2030.

Confirming these reports was the Minister of Energy, Mines, and Sustainable Development, Aziz Rebbah who said that the US \$30bn will be devoted to renewable energy projects and that the investment will create great opportunities for the national, regional, and international private sector.

The minister pointed out that renewable energies, including wind, hydroelectric, and solar energy, contributed 5.8% in 2017, compared to only 2.6% in 2002 in the country. They have reduced Morocco's energy consump-



tion from 98% in 2008 to 93% in 2017. Aziz Rebbah also touted Morocco's liquefied natural gas (LNG) project in Jorf Lasfar, 120 kilometers south of Casablanca.

Morocco's demand for energy is increasing, and the country is almost entirely dependent on imports.

Morocco's overall consumption of primary energy amounted to 20.8 million tons in 2017, including oil (55.9%) and coal (25.5%).

The project comes as a part of the Moroccan strategy to diversify energy supplies and

reduce Morocco's dependence on oil and gas. ■

Source: <https://goo.gl/4jf7tf>

## Ghana to receive US \$10bn to improve roads

**T**he Ghanaian government has received US \$10 bn in order to undertake major reconstruction of road its road network to spur economic and social development through easier access from rural areas to the main population centres.

The MoU was signed between Ghana through Investgroup, an international organisation with offices in several African countries, and the MFAR Group of Companies in Oman to renovate and/or construct road infrastructure in the country.

Investgroup CEO, Dr Kizito Owusu, said: "Africa's development is changing; so too is Ghana's. Recent economic analyses indicate that six African countries are among the world's fastest growing economies. Yet countries such as Ghana face road infrastructural constraints that could undermine and even negate those advances if nothing is done and done fast."

The US \$10bn project will include assessment of Ghana's current road network to identify and build roads, from scratch,



to expand some existing roads as well as maintain others.

It is estimated that road transport accounts for 96% of passenger and freight traffic in Ghana and about 97% of passenger miles in the country. Moreover, the Ministry of Roads and Highways indicate that Ghana's total road transport infrastructure of 63,122 km as of 2006 linking the entire country had made some im-

provement by 2011 but remains in dire need for further improvement to facilitate its transition from a rural economy to a middle-income country.

"The government, cognisant that for real development it needs to build, expand and maintain infrastructure, principally its road infrastructure, has launched a road rehabilitation programme that requires US \$1.5bn per year for the next 10 years to plug the current infrastructure gap," Dr Owusu stated. ■

Source: <https://goo.gl/LB3vKN>



# Engr. Prof. Fola Lasisi: 10th President of the Nigerian Academy of Engineering

By Engr. Dr. Kolawole Adisa Olonade (PhD, MNSE, R. Engr., MNICE)



Engr. Prof. Fola Lasisi, 10th President of the Nigerian Academy of Engineering

**O**n 21 June, 2018 luminaries in engineering, policy makers, government functionaries, academia and other prominent people gathered at the University of Lagos to celebrate the investiture of Engr. Prof. Rasaki Afolabi Lasisi (known as Fola Lasisi) as 10th President of the Nigerian Academy of Engineering (NAE). Engr. Prof. Lasisi took over the leadership of the Academy from the veteran engineer, Engr. Mrs. Johana Olu Maduka.

The educational career of Engr. Prof. Fola Lasisi is inspiring; from humble beginnings he rose to the peak of a distinguished career. His secondary education was at the Yaba Technical Institute where he graduated with distinction in June 1962. He was awarded the African Scholarship Program of American Universities (ASPAU) in July 1963 to study Civil Engineering at the University of Washington, Seattle. He graduated in June 1966, spending only three years to obtain a BSc followed by an MSc degree in Structures a year later on the University Fellowship. He obtained a PhD degree in Agricultural Engineering in September 1974 from the University of Wisconsin, Madison, sponsored by the University of Ife (now Obafemi Awolowo University) and USAID. He became a Professional Engineer (USA) in 1972 and a Registered Engineer (COREN) in 1974.

Engr. Prof. Fola Lasisi is an academic par excellence, a teacher of repute and a veteran engineer. He was the pioneer Vice-Chancellor of the University of Uyo, a position he held for eight years. He was also the pioneer Vice-Chancellor of the Crescent University, Abeokuta, Nigeria. In addition, he served as Chairman, Committee of Vice Chancellors of Nigerian Universities between 1996 and 1997.

During his stay as an academic at the University of Ife, he was instrumental in establishing the Departments of Agricultural and Civil Engineering. He contributed greatly to the physical development of the university as Chairman of many committees for the university's infrastructural development. Engr. Prof. Fola Lasisi is a member of notable professional bodies, which include the Nigerian Society of Engineers, American Society of Civil Engineers, Nigerian Institution of Agricultural Engineers and Nigerian Institute of Management.

In his inaugural speech, the 10th President of NAE, Engr. Prof. Lasisi, promised to consolidate the existing projects of the academy and elevate engineering practice to its rightful position in the country. He said: "For the next two years, the focus

of the activities of our Academy will take off with a RETREAT by the new council to take the proposals below and expand their effectiveness:

- The immediate Past President has proposed a programme to develop a Technology Village, through a committee I chaired. For true continuity, this will commence in my term.
- The celebration of the twentieth year of the Academy when we hope to highlight the activities of the Academy to date and our plans for the next five years.
- Cooperation with all stakeholders in Engineering, including the Nigerian Society of Engineers (NSE), the Council for the Regulation of Engineering in Nigeria (COREN), the Association of Consulting Engineers of Nigeria (ACEN) and the National Board for Technical Education (NBTE).
- Encouraging increased cooperation with national Academies of other countries to focus on three technological challenges facing our nation: energy, infrastructure and food security. high-quality engineering education lies at the centre of all these.
- The strategic plan that is under development will be used to determine short-, medium- and long-term programmes of the Academy."

As part of the historic occasion, reputable engineers were inducted as fellows of the Academy. These are internationally recognised engineers who are and distinguished in their practice of engineering. Inductees included Engr. Kashim Ali, President of the Council for the Regulation of Engineering in Nigeria (COREN), Engr. Prof. Mrs. K. A. Taiwo, past Dean of the Faculty of Technology, Obafemi Awolowo University, Ile-Ife and Engr. Prof. John Ade Ajayi. Others are Engr. Prof. Oluwatoyin Ashiru, Engr. Prof. Linus Asuquo, Engr. Prof. Umar Dambata, Engr. Prof. Godwin Ifeanyichukwu Igwe and Engr. Dr. Muhammad Jibrin. Engr. Anthony Ogbuigwe, Engr. Prof. Chinedu Ositadinma Ogbuigwe, Engr Prof Bolaji Abdulfatai Sule as well as Engr. Solomon Uwaifo were also newly admitted members of the Academy.

The new President urged the new fellows to show commitment in contributing to the development of the Academy and to engineering practice. "It is through selfless service that the academy can make a difference. The academy is ready to continue the pursuit of the great dreams of our founding fathers," he stated.

The Nigerian Academy of Engineering ([www.nae.org.ng](http://www.nae.org.ng)) is the highest engineering body in Nigeria. It is a national 'Think Tank' for Engineering and Technology, which provides leadership in national engineering and technological issues by conducting studies and research on relevant national topics and making inputs to developmental policies at the highest possible level. ■

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## Female construction boss in Mozambique wins top UN award

The founder of a large construction company in Mozambique has won a top United Nations award, the UNCTAD Empretec Women in Business Gold Award, for quality, sustainability and environmental protection – and for leadership in a male-dominated sector.

Civil engineer Uneiza Ali Issufo founded her company ConsMoz Ltd. in Nampula after struggling to get ahead working other firms, despite being president of her local contractors' association.

After participating in UN entrepreneurship training workshop in 2017, organised by Empretec, the MBA graduate was able to expand her business so that it now employs 800 women and men, and lands large building contracts demanding top quality and green credentials.

She beat other contestants from around the world to win Gold Prize in the Women in Business Awards in Geneva, Switzerland on 25 October, organised by the United Nations Conference on Trade and Development (UNCTAD).

Judges praised Issufo "for courage and audacity as a woman starting a green construction business, and her systematic and on-



going efforts to grow her business in innovative ways, creating employment opportunities for local communities particularly women."

"Taking risk is my natural way of being," Issufo said. "You cannot discover the oceans unless you dare to lose sight of the pier."

Ms. Issufo received her gold award from UNCTAD Secretary-General Mukhisa Kituyi and Francesca Lavazza, board member of the Lavazza Group, along with the winners of silver, bronze, export potential and special recognition awards, at a gala ceremony during the World Investment Forum 2018 in the historic Assembly Hall of the Palais des Nations in Geneva.

Winners receive the opportunity of attending a study tour in Brazil donated by Lavazza, an executive course in digital marketing by IMD Lausanne, Switzerland, mentoring by the MBA Business School in Grenoble, France, a watch by Delance of Switzerland, mentoring from impact investor Skyar and other gifts donated by sponsors, including MontBlanc. ■

Source: <https://goo.gl/rtVXkm> and <https://goo.gl/oEC9Np>

## Adewunmi Alode's inspirational journey

By Alfred Akuki



From being an advocate and solicitor in a prestigious law firm, to becoming the company secretary/senior legal counsel at Lafarge Africa Plc, one of the biggest players in Nigeria's cement industry, Adewunmi Alode's career has been an inspiration.

The 37-year-old graduated in 2003 with a Law degree (LLB) and was called to the Nigerian Bar in 2004 (BL). She also holds an Institute of Chartered Secretaries and Administrators, UK professional certification and is currently enrolled in a Business School, Netherlands (BSN) MBA programme.

Prior to joining Lafarge in May 2008, she had a three-year active legal practice as an advocate and solicitor in a Lagos law firm.

She says: "I joined Lafarge (then Lafarge Cement WAPCO Nigeria Plc) in a period of massive operational, commercial and industrial transformation and expansion. The Lakataba Expansion

Project afforded me the opportunity to play a pivotal role in project management, negotiations of complex international commercial contracts, on-shore and off-shore syndicated loans, and power projects.

"In 2011, I became legal manager of the then Lafarge Cement WAPCO Nigeria Plc and company secretary of Lafarge Ready Mix Nigeria Limited. Over a four-year period, I recorded a major milestone of zero litigation, fines, claims and compliance breach against the company, despite its operations in various parts of the country."

She was subsequently appointed senior legal counsel, commercial contracts and compliance for the three LafargeHolcim business operations in Nigeria.

"Being appointed company secretary of a blue-chip multinational company in Nigeria easily ranks as my biggest career break. However, I am someone who appreciates even the smallest successes, so I consider the pivotal roles I played in several highly successful company projects as big breaks in their own rights.

"I had the honour of working closely with three amazing company secretaries, all women, whose mentorship and opportunities given to me developed my confidence and assisted me enormously in my career.

"My advice to young folks aspiring to get this far is to inculcate the right attitude, stay humble to learn and unlearn, admit wrong or ignorance and learn, ensure to add value in whatever capacity they may find themselves, and finally, God's wisdom. If I got this far with this recipe, I believe they can get even farther," Adewunmi Alode concludes. ■

Source: <https://goo.gl/ceFq9L>



# Ten big-dollar projects that will reshape Africa forever

By Joy Makena

**W**ork is currently under way on some of the largest construction projects ever completed in Africa as the continent builds key infrastructure to support its fast-growing population.

**Below is a list of the top 10 major infrastructure projects in Africa.**

1. **Grand Inga Dam** - The Grand Inga Dam, a proposed hydroelectric dam at Inga Falls on Congo River in the Democratic Republic of Congo, tops the list of the top 10 largest construction projects in Africa.

The dam is designed to have an average output of 39,000 MW annually, nearly twice as much as the Three Gorges dam in China – making it the world’s largest hydro-power scheme.

Grand Inga Dam is expected to cost an estimated \$100 billion, including the cost of transmission lines needed to carry its power across the continent. The project was expected to begin by December 2016. However, in July of that year the World Bank withdrew its funding following disagreements over the project.



2. **Egypt’s new capital city** - Construction of housing units in a new, yet-to-be-named, administrative capital of Egypt has been completed but delivery will be within a year once key facilities have been installed

Located 45 kilometres east of Cairo, the smart city has 21 residential districts and 25 commercial districts. The city will have a recreation park double the size of New York City’s Central Park, 90 square kilometres of solar energy farms, and several artificial lakes.



Other key features include a technology park, 40,000 hotel rooms, a theme park four times the size of Disneyland, 2,000 educational institutions, 1,250 mosques, 663 hospitals and clinics, and a new international airport.

Transfer of government ministries, foreign embassies, parliament, and presidential palaces is expected to take place between 2020 and 2022 at a cost of \$45 billion. The total cost of the venture is yet to be disclosed, but the city is indeed one of the biggest construction projects in Africa.

3. **Konza Technology City** - Konza City, 64 km south of the capital Nairobi, is modelled around the US Silicon Valley – hence the moniker ‘African Silicon Savanna’. The smart city targets business process outsourcing, software development, data centres, disaster recovery centres, call centres, light manufacturing industries, and research institutions.



4. **Dangote Oil Refinery** - Africa’s richest man, Aliko Dangote, is building a huge oil refinery in Ibeju Lekki district, on the outskirts of Lagos, Nigeria at between \$12 billion and \$14 billion. Able to process 650,000 barrels of crude a day, Dangote Oil Refinery will be one of the world’s biggest oil refineries when it begins operations in 2022.

The refinery, which is expected to generate 9,500 direct and 25,000 indirect jobs, will produce Euro-V quality gasoline and diesel, as well as jet fuel and polypropylene.

While Dangote took on a \$3.3 billion syndicated loan, which Standard Chartered Plc arranged, about 60% of the Dangote Oil Refinery will be self-funded.



5. **Lagos-Calabar Railway** - On completion, the \$10-billion 1,400-km Lagos-Calabar railway, will connect the cities of Port Harcourt, Uyo and Aba – enhancing movement of goods and services in the region. The project, initially con-



tracted to a Chinese company, is being eyed by US-based Ameri Metro Inc after the Chinese failed to raise the funds.



6. **Bagamoyo Port** - Tanzania has embarked on the construction of an \$11-billion mega port at Bagamoyo as it strives to become a regional economic powerhouse. Funded mainly by China, Bagamoyo Port is expected to handle 20 million containers a year by 2045, making it the largest such facility in East Africa.

The project is a tri-State venture between Tanzania, China, and Oman. State-owned China Merchants Port is building the port while an Omani sovereign wealth fund will establish a 1,700 hectare special economic zone adjacent to the port.



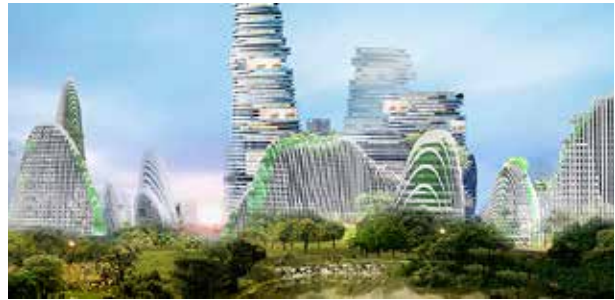
7. **Kenya Standard Gauge Railway** - Kenya's 969-km standard gauge railway from Mombasa to Malaba, costing \$9.9 billion, is one of the largest and most ambitious transport infrastructure projects in Africa.

The first phase, spanning 472 km from Mombasa to Nairobi, has been completed for \$3.27 billion; phase 2A – from Nairobi to Naivasha (120 km) is currently under construction at a cost of \$1.5 billion. Phase 2B, from Naivasha to Kisumu (270km), will cost \$3.8 billion, with phase 2C, from Kisumu to Malaba (107 km), costing \$1.31 billion.



8. **Modderfontein Mega City** - Modderfontein New City is a Chinese-funded \$8-billion city being built in Johannesburg, as a hub for Chinese firms investing in Africa. The 1,600 hectare metropolis, to be known as Modderfontein Mega City, is designed by the Shanghai Zendai Group and is the company's first estate venture.

Work for the proposed Modderfontein Mega City is expected to be completed in the next 15 to 20 years. The city will include commercial, industrial and residential components.



9. **The Mambilla Hydroelectric Power Project** - Nigeria is undertaking construction of a mega hydropower dam as it seeks to boost its energy production. Dubbed Mambilla Hydroelectric Power Project the facility, planned for more than three decades, is one of the biggest construction projects in Africa.

The Mambilla Hydroelectric Power Project, which is being undertaken by China's Sinohydro Corp at a cost of \$5.8 billion, will be connected to three dams across the Donga River in Taraba State, Nigeria. The facility will have a total installed capacity of 3,050 MW of electricity.



10. **Grand Ethiopian Dam** - The \$4.8 billion Grand Ethiopian Renaissance Dam is a gravity dam under construction on the Blue Nile River in Benishangul-Gumuz in Ethiopia.

Once completed, it will be the largest hydroelectric power plant in Africa, and the 7th largest in the world.

Work on the 6,000 MW dam began in 2011 and is now 70% complete. It is estimated that the reservoir will take five to 15 years to fill with water. ■



Source: <https://goo.gl/9t57eA>



# The new Swiss Embassy in Nairobi: designed for sustainability



The New Swiss Embassy in the Kenyan Capital of Nairobi, designed by Lucerne-based architects ro.ma (roeoeli & maeder gmbh, dipl. Architekten ETH BSA), is an architecturally superior building that represents Switzerland in an appropriate way.

At the same time, it incorporates local building practices and local companies and manages to bring together the required aspects of functionality, safety, and sustainability in a coherent spatial structure.

By allowing the actual building to grow out of the enclosing wall (required for compound security), a spiral spatial relationship is created that frames the entire compound, culminating in the central two-storey structure. The twisting, multifaceted shape of the building respects the existing distinctive tree-filled landscape. It responds to the slightly sloping north-facing site with a split-level arrangement of the floors. The reception hall connects the mezzanine sections of the building and forms the hub of the complex.

The East African countryside is reflected in the individual character of the building, and particularly in the red-brown pigmentation of the exposed concrete of the outer façade and perimeter wall.

Thus, the building takes on the colour of the so-called 'coffee soil', the earth found throughout Kenya's capital, which owes its rich red hue to the high iron content. The generously dimensioned windows are another striking feature, framed with geometrical projections that provide shade on the façade. Other 'green' features add to the building's sustainability. The glass surfaces reflect the vegetation and make the building itself a part of the landscape. ■

Source: <https://goo.gl/XErgzQ>

## Project team

**Architects:** ro.ma architekten

**Location:** Nairobi, Kenya

**Lead Architects:** Philip Roeoeli, Christian Maeder

**Project Year:** 2018

**Photographs:** Iwan Baan







## Will Alsop's only African project to be a fun-filled shopping centre

The late Will Alsop's first project built in Africa, a shopping centre in Nairobi, Kenya, will feature a monorail with 'jellybean' carriages and a 'piano staircase'.

aLL Design has won planning permission for The Beacon, which was designed by studio founder Alsop before he passed away earlier this year.

It is the first new project revealed by the London-based team since then, and will become Alsop's only built project on the African continent.

Proposed for central Nairobi, The Beacon is described by aLL Design as an open-air mall. It will contain 24,300 square metres of shops and restaurants, topped with a roof garden and bar.

The contents of the mall will be characterised by a 'sweet factory' theme with many details commissioned by local craftspeople and artisans as well as those using the latest manufactured materials and technology.

The Beacon is intended to bring delight to locals and tourists; the vivid colours and striking patterns of the façade will hint at the amusements and leisure facilities inside. A light monorail with 'jellybean' style carriages is planned; a helter-skelter, piano staircase and merry-go-round will enliven the space and encourage community interaction and shared experience. Playful twists on form and function will fulfil Alsop's desire that architecture should always be fun.

The main façade to Uhuru Highway is clad in monochromatic porcelain panels broken by a bright red leisure box. Internally, mallscape walkways are sheltered from seasonal rain and sun by colourful solar fabric canopies. A thatched rooftop restaurant and solid surface clad bar sit atop a biodiverse brown roof.

It is intended that the mall will become a destination in its own right and will sit well on its prime retail pitch immediately between the major employment zones of the Central Business District, the Industrial Area and Upper Hill financial district, broadening the localised leisure offer to provide facilities that encourage longer dwell time onsite by visiting families with children; teenagers and young people.

It is a shared commitment to 'create places people like' and a common approach to promote shopping experience that brought Kiloran and Will Alsop, with his team at aLL Design, together on this flagship development for East Africa.

A seven-storey office tower will stand alongside the shopping centre. Both this and the shopping centre are backed by London- and Nairobi-based developer Kiloran, and are expected to complete in 2020.

Marcos Rosello, co-founder of aLL Design said, "We were intrigued by Kiloran's ideas for this mall in Nairobi and were

pleased to be able to create an open-air mall with a focus on sustainability, fun and family which we believe to be key drivers on future international mall design."

The Beacon is the first project in Africa for the late Will Alsop and aLL Design and is the second shopping centre-led development for Kiloran LLP, who have offices in both London and Nairobi.

The challenge to deliver an Alsop / aLL Design concept in East Africa has been addressed by Kiloran through direct engagement with first-class specialist engineers, fabricators, suppliers and subcontractors.

Kiloran is focused on value-driven sustainability at conceptual level and through the encouragement of local fabrication and procurement. The concepts of both fun and sustainability are not applied merely as devices; rather they are designed into the grain of development.

The completion and grand opening of The Beacon is planned for the spring of 2020 and the building will be an architectural legacy for Nairobi that will serve to promote tourism.

Will Alsop passed away on 12 May 2018, aged 70, following a short illness. Described as "one of architecture's biggest characters and talents", his legacy includes the turquoise Peckham Library in London and the stilted Sharp Centre in Ontario, Canada.

The Beacon marks the continuation of the work of aLL Design, which he founded in 2011. It joins a series of large-scale proposals for Nairobi, which has become a centre for Africa's tech innovations. ■

Sources: <https://goo.gl/rKtDBY>

### Project details

**Location:** Uhuru Highway, Nairobi, Kenya

**Type:** Mixed-use retail, office and leisure

**Context:** Uhuru Highway, Nairobi centre

**Client:** Kiloran

**Size:** 28,500 m<sup>2</sup>

**Year:** 2018

**Completion:** Due spring 2020



*CHRYSO has the expertise and experience to design shaft lining concrete.*

## Concrete for mining applications – CHRYSO has all the answers

**M**ines have their own particular logistical, safety and environmental requirements that need to be considered when designing concrete and this is in addition to meeting demanding performance specifications. Amongst



*CHRYSO teams have assisted many shaft sinking jobs over the years.*

the global leaders in concrete admixtures, CHRYSO understands this and has an extensive product offering to meet varying operating conditions.

In addition to experience in designing shaft lining concrete, CHRYSO has the expertise to formulate high-flow, highly accelerated concrete that can be transported through slick lines. This expertise also encompasses providing solutions for shotcreting, thin skin liners, tailings grout support and backfill.

Driven by the advances in admixture technology, the use of sprayed concrete as a temporary and permanent support element on mines has increased significantly in recent decades. CHRYSO admixtures control the workability of concrete and create longer open times. They also lower cement-to-water ratios, improve early or late strength development and reduce rebound.

Used extensively on copper, gold, platinum and diamond mines, the CHRYSO® Jet range of accelerators ensures early hydration of concrete. It also allows the concrete to be formulated to suit the size of the shotcrete machine, as well as shotcrete thickness. To reduce rebound and improve early strength in dry shotcrete, CHRYSO® HPB Powder assists with bonding in wet conditions.

CHRYSO's market-leading expertise has made it the first supplier to develop the use of tailings shotcrete and concrete to help alleviate mines' logistical issues. Now, the bulk of the material can be pumped over long distances and stored before being sprayed.

A significant portion of CHRYSO's shotcrete fibre range is made from polypropylene and is specially coated to increase bond strength. Capable of replacing mesh reinforcement used for reduction of shrinkage cracking, these are low-dose fibres that do not clog pumps. Where material needs to be pumped over a long distance from the mixing plant to the point of application, CHRYSO® Fluid Optima T4 is a powerful superplasticiser with a long open time.

When it comes to thin skin liners (TSLs), CHRYSO has pioneered two dustless products for the mining industry. Its patented single part and liquid polymer are safer and healthier to use than traditional TSLs.



There are several CHRYSO solutions to improve the stability of tailings grout. CHRYSO® Fluid Optima 206, for instance, is a superplasticiser that reduces shrinkage in grout packs. This allows the packs to better support the hanging wall.

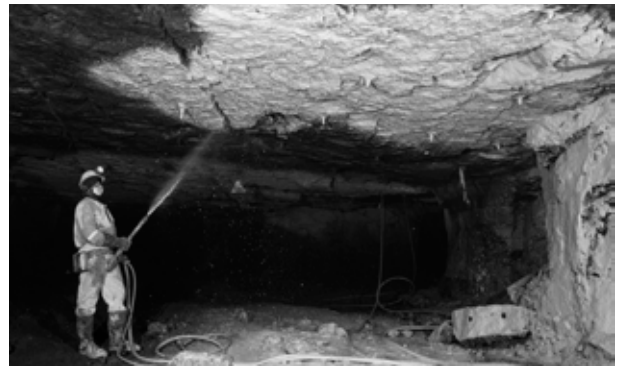
The CHRYSO® Eco Dust range of dust suppressants includes a surface primer, as well as a surface sealer that is an emulsified dust lubrication system. It also has a fine particle size poly-adhesive for dust binding and an emulsified surface lubricant that coalesces particles to form a dust suppressing film.

At the forefront of using admixtures in backfill, CHRYSO products increase the density of pumped grout while reducing costs through less cement content. These admixtures can vary the flow characteristics of cementitious backfill and grouts, using less energy while achieving better settlement rates and compaction of the final backfill.

The CHRYSO Group, with its head office in France, is represented locally by the CHRYSO Southern Africa Group, which started operations 22 years ago. Locally, since 2010 the CHRYSO Southern Africa Group has included a.b.e.® Construction Chemicals, a leading supplier of specialist construction products.

a.b.e. has a unique range of chemical-resistant coatings and waterproofing solutions for mines' processing plants. This includes specialised concrete repair systems and polyurea-based protective coatings for concrete and steel. a.b.e.'s products complement the CHRYSO range of admixtures and ancillary products. ■

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*CHRYSO has the expertise and experience to design shaft lining concrete.*



*Advances in concrete admixture technology have increased and CHRYSO has a range of solutions for shotcrete applications.*

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All 6 COMANSA cranes have flat-top design and maximum load capacity of 18 and 20 tonnes.



The cranes are working 24 hours a day.

# COMANSA cranes build a luxury residential complex in Nigeria



The cranes at Azuri Peninsula were equipped with the Effi-Plus system which increases hoisting speeds with light loads and below the COMANSA cranes are now working at their maximum height, the tallest reaching up to 163.5 metres.



Contractor ITB Nigeria is using six COMANSA cranes for the construction of the Azuri Peninsula apartments, developed by Eko Development Company in a brand new city on reclaimed land in Lagos

The 244 luxury apartments of the Azuri Peninsula complex will be amongst the first to be occupied in the entire Eko Atlantic project, a spectacular business and residential city under construction on an artificial peninsula in Lagos, Nigeria.

The State of Lagos and the Chagoury Group are leading this ambitious project that will allow Africa's most populated country to gain around 10 km<sup>2</sup> of land reclaimed from the Atlantic Ocean, to create an important business hub for the entire continent.

Azuri Peninsula is being built at the Marina District, one of 10 new districts of this city and the one that will concentrate most of its leisure opportunities. There are six COMANSA cranes working in this project all which belong to the fleet of the turnkey contractor ITB Nigeria FZE. The machines, all with flat-top design and maximum load capacity of 18 and 20 tonnes, are taking on the construction of the three towers that form the complex, of more than 140 m in height and up to 32 floors.

Among the six cranes, two are model 21LC550, one is a 21LC335 model and the remaining three are 21LC290 model. All were erected initially with low heights, but the team from ITB Nigeria used the hydraulic jacking cages on different occasions to jack-up the machines as the buildings were growing taller. The cranes are now working at their maximum height, the tallest reaching up to 163.5 metres.

All COMANSA cranes at Azuri Peninsula were equipped with the Effi-Plus system, which increases significantly the hoisting speeds with light loads. "Due to the height of the buildings, it has been essential to rely on cranes with high hoist speeds", says Paul Kattar, tower crane manager at ITB Nigeria. "The work cycles of the COMANSA cranes on site are very short, increasing productivity, and helping us to shorten work times," adds Kattar.

COMANSA's PowerLift System, which improves the load diagram of the crane by 10%, was also used. According to Kattar: "The podium of the building is formed mainly by precast elements from 6 to 8 tonnes and concrete beams of different sizes with maximum weights up to 13 tonnes. For its construction, the PowerLift System had to assist us many times in operations for which we required 10% extra capacity".

The cranes are working 24 hours a day, lifting steel structures during the daytime and helping with the concrete works during the night. Many weekends, the tower crane team had to move and fix the collars and jack the cranes up to leave them ready before Monday morning. ■

**More information about COMANSA at [www.comansa.com](http://www.comansa.com)**



# Twelve tips on making it big in other African countries

South African entrepreneur Hein Koen is involved in mobile tech and coffee businesses across the African continent. Over the years, he has learned hard lessons about doing business in other African countries. He shares 12 top tips on how to succeed.

To expand your business into other African countries, you need to put in the miles, says Hein Koen, director of Flickswitch, a South African technology firm that assists businesses with SIM card management services. The company has seen rapid growth over the past seven years and has expanded, to date, into Namibia, Zimbabwe, Zambia, Kenya, Tanzania, Ghana and Nigeria.

He is also involved in Bean There Coffee Company, South Africa's first roaster of certified fairtrade coffee. The range of Bean There coffees is available at retailers like Pick n Pay, and the coffee is sourced from countries like Burundi, Democratic Republic of Congo and Rwanda.

"Every country on the continent has very unique business culture, dynamics and 'styles' of doing business – much more so than neighbouring countries on other continents," says Hein Koen.

"You might have a product or service that you know has a need in many countries, but the way in which you take it to market or approach potential local business partners is radically different.

## Here's his advice for South African companies who want expand on the continent

**1. Get on a plane.** It is extremely difficult to understand the business dynamics of a country (or even a city in some cases) without spending some time there, says Koen. "There is no way that you can remotely understand the nuances of each country's business style."

**2. Listen more than you talk.** When going to a different country, South Africans tend to want to explain what has worked in South Africa, instead of listening and really understanding what might be a different (and better) approach locally.

**3. Inaction often doesn't mean what you think it does.** In some countries, especially those with more old-world business styles, inaction or a lack of strong opinion can easily be seen as someone being disinterested.

But in many African markets, this is usually not the case, but rather a reaction to a pitch that is too forceful. This type of selling style often silences potential business partners, instead of engaging them.

**4. Yes can mean no.** In some African countries, such as Botswana, with a very polite business style, you might never get a clear "no", so listen out and be open to small cues.

Sometimes it is best to ask the question quite directly to test whether "yes" means "no", while in others, with a more 'American' or upfront culture, such as Nigeria, you might get a "no, thanks for coming and goodbye" within the first minute!

**5. Leave your arrogance at home.** Just because the South African market may be advanced in some sectors, don't underestimate the local skills, capability or customer insight. You will find some of the brightest minds and most innovative companies in the most unlikely places on this continent.



Hein Koen, director of Flickswitch.

**6. It's expensive, but there are ways to save.** Doing business in some African countries can be expensive. Flights, hotels and good local talent can attract big premiums. Try and operate smartly – look for alternative (local) airlines, avoid big-name hotels and AirBnB and use local partners to assist with recruitment.

**7. Don't believe the interwebs.** Some businesses might only have a dodgy-looking Facebook page, but behind that lie large, very successful businesses.

**8. Traditional marketing doesn't always work.** Don't think running a Google search, LinkedIn or Twitter campaign will necessarily give you the same exposure and results in every country. Every country has its own style and business tools. "We have discovered things like WhatsApp-friendly product brochure images to be of value in some countries. "WhatsApp is everywhere," says Koen.

Also, e-mail marketing works great in some markets, not in others. Phone calls work great in some countries, not in others. Physical meetings are essential in some countries, and disliked in others.

**9. Formal or casual: be prepared for both.** The style and formality of business interactions must be understood. Getting that suit and tie out of the cupboard (despite the temperature) is sometimes needed. Also, don't be surprised if business meetings are opened with prayer or lengthy chatting about the weather.

In other countries, meeting at a bar wearing a T-shirt and slippers is totally acceptable, says Koen.

**10. Perceptions are usually not reality.** Some countries have stereotypes associated to them. I have found these mostly not to be true, and sometimes the complete opposite.

**11. Don't over-value a contract.** Often a handshake deal carries much more weight than a formal contract with limited legal enforcement frameworks.

**12. You need networks.** Networking and creating word-of-mouth still remain crucial for most businesses to succeed in a new market. Don't think that you will be able to access these easily, warns Koen. Either choose a good local partner, or employ local people with established networks. ■

Source: <https://goo.gl/8T1a9F>

# Fine furniture from old coffee and good old concrete – Olé!

*Mexico has brewed a most unusual, magnificent mocha, writes Jan de Beer*

**W**hat do you get when you mix concrete with coffee? No, not a Starbucks customer threatening to sue but something much more unusual and aesthetic: designer furniture.

One of the highlights of the recent Design Week Mexico in Mexico City was a striking brown, grainy stool and table with tops made from used coffee grounds – the waste product from brewing coffee – that designer, Xavier Loránd, sourced from cafés near his Mexico City studio. The Nero side table and stool he unveiled at the major interior design show were created after a series of material experiments by this self-proclaimed coffee lover, who also has a passion for concrete.

He explains: “It all started as a personal project inspired by my love for coffee and everything it represents. After all, I am from Veracruz, the second largest coffee producing state in Mexico. So I wanted to create comfort and style with coffee. My design team and I gathered leftover coffee from nearby coffee shops and restaurants. We then mixed it with binding materials such as plant-based bio-resin and left the mixture to set in a mould to create the surfaces.

“We collected coffee waste for a month, then cleaned it, washed it, sun-dried it, and ground it again to get it even finer. After doing that we added fine wood husk and started testing with the bio-resin percentage and mould pressing.”

The designer, who describes the finish as having the “texture and hardness between that of cork and medium-density fibreboard but with the scent of coffee”, collaborated on the project with concrete company, Muro Blanco, to obtain the concrete needed to add the finishing touch to his innovative collection.

The grainy top of the stool is set on a dark base formed by a combination of concrete and recinto – a black volcanic stone. For the side table, half of the top is the grainy coffee mixture, while the other is a smooth beige chunk created by blending coffee grounds with concrete. “We decided to mix coffee and concrete to get something in-between. After several trials, the result was just what we had hoped for: a mocha-looking concrete.”

Completing the set, the side table’s speckled pale base is made of concrete and terrazzo. Loránd also designed a blue ceramic coffee set, named Provincia, which includes a rimmed jug and two cups.

Last year, leading global architecture and design magazine, *Dezeen*, picked Loránd as one of Mexico’s emerging designers

to watch after he had developed a dining chair and table made of a mix of resin and wood chips. The magazine has again devoted much space to his new coffee-concrete furniture.

Concrete and cement are well-known and well-loved in Mexico. In fact, purchasing an older home in Mexico, you will most likely find built-in concrete sofas and bed bases. Concrete used to be a very common frame for living and bedroom furniture also. The bases were topped with cushions or mattresses, and this off-beat furniture became an exciting and different design style that speaks of Mexico.

Usage of cement and concrete in Mexico dates to the end of the 19th Century. By the 1920s, concrete was the material of choice not just for the exterior of the home but also for interior furniture not only because it is one of the most economical and durable construction materials around but also because it can withstand earthquakes.

For over a hundred years, houses and some furniture in Mexico have been made primarily of reinforced masonry: brick and cement blocks, reinforced with concrete and rebar. Concrete’s popularity was boosted in Mexico primarily by Cemex and Apasco, the two main cement companies in Mexico, which have been extremely active in promoting the advantages of using and designing with concrete.

The producers had converted Mexicans to the durability and longevity of concrete over other materials, and their advertising campaigns also served to communicate the benefits of concrete’s hygiene and health qualities. Concrete is easy to clean and, being smooth, prevents the build-up of bacteria. The producers also showed how concrete could be used to create lower-cost attractive and decorative elements such as columns and arches.

Along with their doing philanthropic work in the communities and creating popular training documents (in the form of user-friendly graphic comic books), these two companies did a great job ensuring concrete became the building material of choice south of the border, as they say in America.

There was apparently a brief lull in the consumer campaigns and commitment to concrete but right now concrete is making a major comeback in Mexico with countertops, tables and outdoor furniture increasingly made of concrete. Sheryl Novak, an expat from Canada who has owned a home in Mexico for over 10 years and runs an online furniture store, expects the trend to continue.

All readers of *Concrete Trends* will no doubt shout “Olé”! ■





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