

CONCRETE

Journal of the African Cement and Concrete Industry

trends

VOL 20 No 4 November 2017



AfriSam
Creating Concrete Possibilities

African Edition 2017
incorporated in this issue

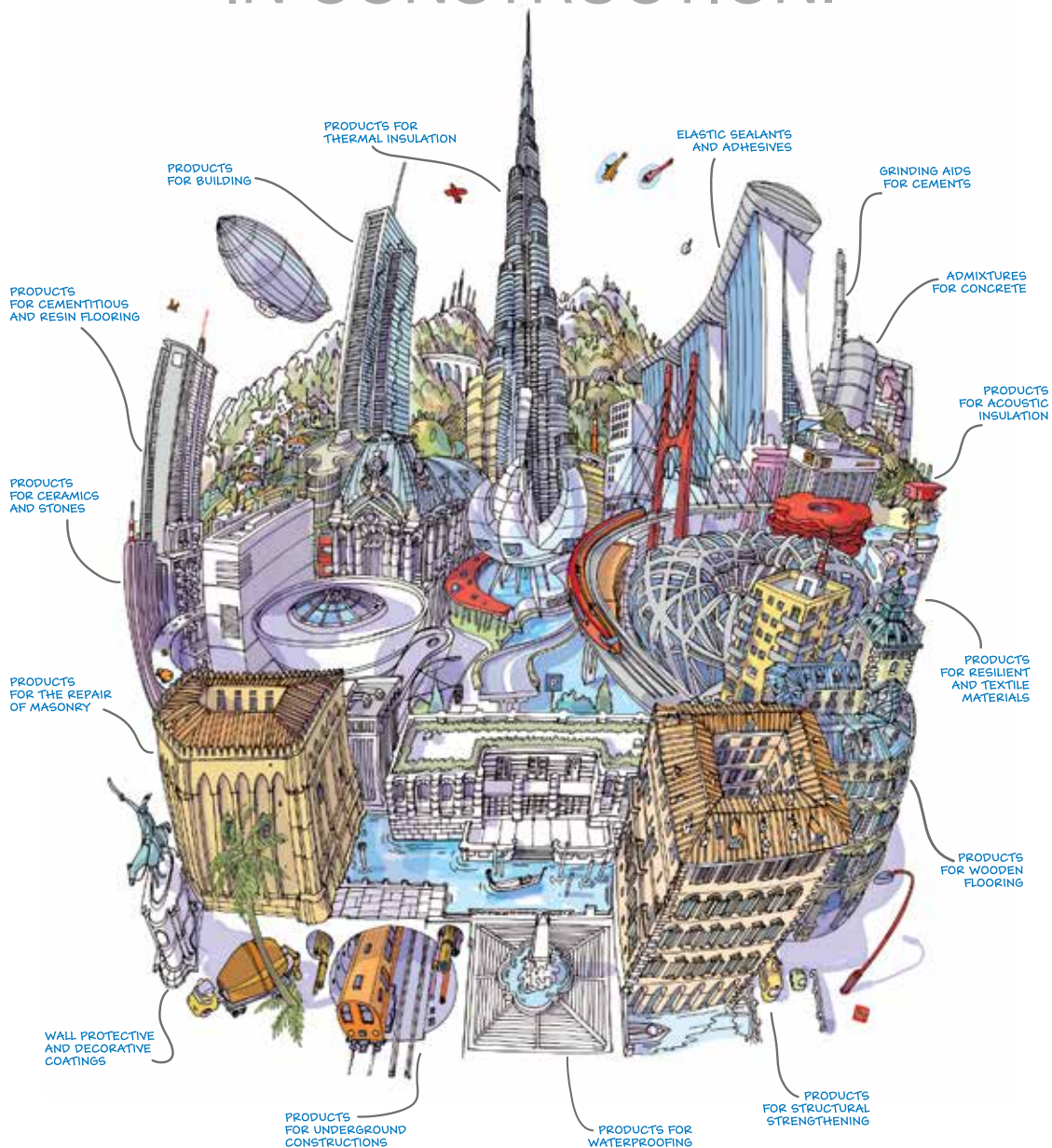
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CONCRETE trends

Volume 20 No 4 November 2017

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14 | COVER STORY



AfriSam is the leading concrete materials supplier in Southern Africa with an annual readymix concrete production capacity of 4 million m³. See page 14.



16 *The Nest, an underwater sculpture by Jason deCaires Taylor.*



39 *Ultra high performance fibre-reinforced concrete used at MuCEM.*

A resilient industry, still “in it to win it”

This November issue of *Concrete Trends* is special – it has incorporated the 2017 African Edition which was to have been distributed at the Big5 Expo in Kenya in early November. However, due to the election rerun in that country, the show has been postponed to 2018. So, the Africa Edition, now at the back of this November issue, will enjoy a guaranteed circulation to the much wider *Concrete Trends* database.

We thank those advertisers who have continued to support the African Edition and hope that the wider distribution will reap tangible benefits for them.

The current turmoil in African and local politics makes it hard to find anything to be optimistic about. Every day seems to bring another sordid revelation that illustrates how deeply corruption is entrenched.

However, there are now mechanisms in place for whistle-blowers to expose dastardly doings – and, encouragingly, across the continent, more people are now coming forward. That the media are daily reporting these dark deeds is in itself a sign that the public is increasingly demanding accountability – something that can only bode well for an improved atmosphere of trust and an end to corruption.

“Inundated by news disturbing to most of us, there is a glimmer of hope in the fact that South Africans can still celebrate pockets of excellence, especially in the civil engineering and construction sectors,” said Marie Ashpole when announcing SAICE’s awards for the Most Outstanding Civil Engineering Achievements for 2016/2017.

These results, together with the Fulton Awards, the African Architects Awards and the CMA Awards, serve to celebrate the expertise of the local civil engineering and construction industries and their ability to continue producing world-class structures. There is also the well-deserved recognition of the outstanding contributions made by many individuals. Despite everything, the industry is alive and well.

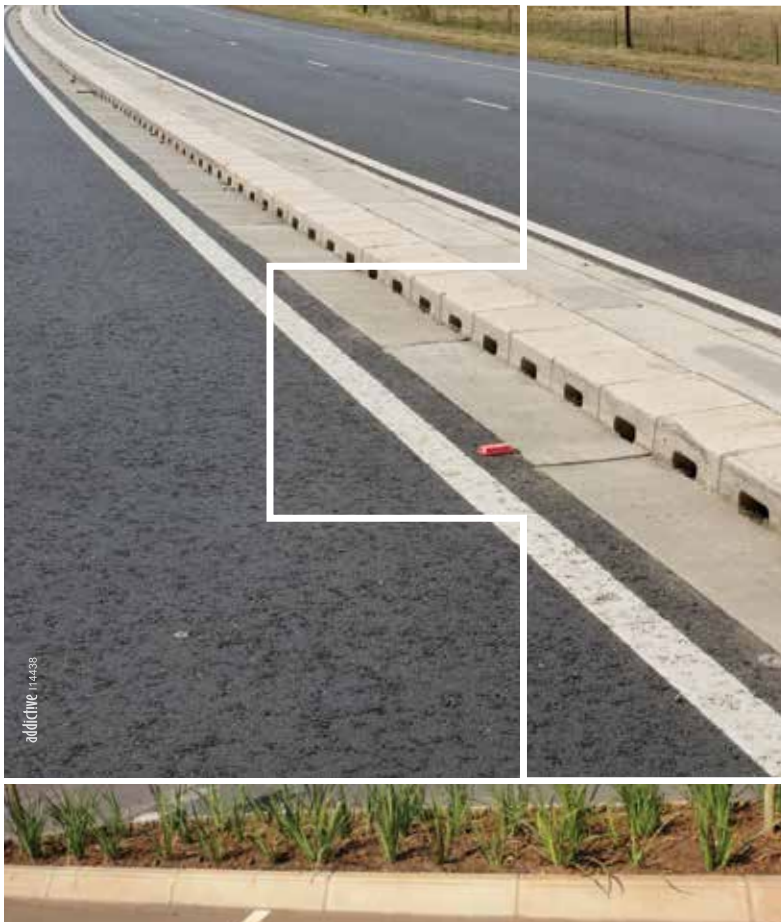
Finally, Chris Campbell, CEO of CESA is a shining example of the determination to continue trying in the face of seemingly insuperable odds. He said: “CESA has availed itself and the services of its over 540 member firms employing over 23,000 people to assist Government in delivering and maintaining this infrastructure.

“Our efforts to partner have so far met with resistance and consequently the survival of companies within the Consulting Engineering industry is now seriously threatened by the lack of effective Government expenditure on infrastructure.

“However, it is very important that we continue to support Government. We believe that partnerships are vital and that by working together we can significantly improve the lives of our people,” concludes Campbell.

It now remains only for me to thank *Concrete Trends* readers, contributors and advertisers for their continued support over the past year and to wish them a happy, peaceful and safe festive season. My wish is that 2018 will be a better year – a much better year – for us all.

Gill Owens, Editor



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Lafarge launches Binastore: your building solutions partner

Lafarge South Africa has launched a unique home building service that is called Binastore.

The first Binastore was opened on Friday, 29 September 2017 with the rebranding of the company's pioneering Orlando East Service Centre. Further Binastores are scheduled to be opened throughout Gauteng, offering the Lafarge extended services across a far wider audience while also aiming to promote added value for its current retail partners.



The brand has been developed in keeping with Lafarge's marketing strategy of moving closer to its customers. The unique aspect of Binastore is that it offers the general public a convenient and welcoming environment, where advice and direct practical help with home building projects is readily available.

"We recognised that bringing the dream of a new house to reality, or even that doing an extension to your existing home can be a complicated, time-consuming and often very stressful experience," says Sibongile Sibanda, Lafarge South Africa's country marketing director. "Binastore is a one-stop service centre that is the solution to making any home building project a straightforward and enjoyable experience."

To ensure easy access to this service offering, Binastore will also be launched as an interactive Web platform. In a few easy steps, it will give access to a wide range of house design options; provide



immediate budget cost estimates; links to information on obtaining finance and how to obtain planning permission, as well as the selection of an approved local building contractor – in fact, it will offer guidance on the whole building process.

"This exciting marketing concept brings us closer to the end users of our products," adds Sibanda. "It is another example of why our company is the leader in service innovation." ■

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Rocla marks 100 years in SA precast concrete market

PRECAST concrete product manufacturer Rocla is celebrating 100 years of existence in South Africa in September, attributing its success to customer satisfaction, competitive pricing, good-quality products and timeous delivery.

The Rocla sales and marketing director Christo van Zyl says another key contributor to the company's centenary is meeting unique customer requirements by providing innovative solutions. "When it comes to an innovative product requirement, we can be approached by customers who have challenging orders or concepts."

He explains that Rocla's technical expertise enables it to adapt existing products or build completely new, one-off products that will meet the required technical specifications.

Further, Rocla has remained a key player in the industry because of its standard catalogue of products, which has been designed to meet the most basic requirements of key customers in industry, particularly for utility-scale applications in various sectors, including electrical ge-

neration and distribution, telecommunications, municipal, water reticulation, mining and roads.

Rocla is one of two companies in South Africa that manufactures concrete poles – a spun pole and a cast pole – which are used primarily in the power transmission, tele-communications and fibre-optic communication sectors. Concrete poles provide an alternative to the traditionally used timber poles, with benefits including less maintenance and mitigation of the damage caused by natural incidents such as fires.

Van Zyl also notes that the company has numerous manufacturing facilities throughout South Africa, as well as in Botswana and Namibia, through which it is able to service a large section of Southern Africa.

Of the next 100 years of its existence, he says Rocla will continue to invest in delivering outstanding service and products of exceptional quality delivered to customers on time every time.

"We always strive to exceed our customer's expectations," Van Zyl says, conclud-



Operations director Roy Robins cuts Rocla's 100th birthday cake with sales and marketing director, Christo van Zyl.

ing that the company undertakes quarterly customer surveys to obtain feedback on its performance. ■

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PPC container pilot and mobile science lab to benefit Ulundi communities

Easy and cost-effective access to resources and materials are critical for the sustainable growth of any town or city. However, transportation is frequently one of the many challenges that rural communities have to overcome when it comes to reaching much needed resources and materials.

Having identified this as one of the problems faced by its rural customers, PPC has started an innovative container project in Ulundi in KwaZulu-Natal, where community members live relatively far from retailers. The pilot, launched at the King Senzangakhona High School recently, aims to assist communities in nearby villages by improving access to quality building products – with sales profits going directly to the school.

Learners received an additional hand-up with a state-of-the-art mobile science and IT lab also being unveiled at the launch. Complete with the very latest science and chemistry equipment, the lab looks set to inspire the next generation of scientists, engineers and doctors at the school, ensuring that today's collective initiatives have long-term and sustained positive impact in the community.

As education and housing continue to challenge communities across South Africa, innovative corporate partnerships are providing new hope and opportunities



in rural areas. PPC's partnership with King Senzangakhona High School in Ulundi is an example of this in action – where both education and housing were given a meaningful hand-up.

The company launched two initiatives at the school, much to the excitement of both learners and community members. The first – something completely new for the company – is a PPC-branded container which will sell cement and other quality building products direct to the public. Profits made from sales will be donated to the school, to use as it sees fit and to improve the level of education at the school. Mr Naphtal Thembinkosi Dlamini, who lives in the area, has been employed to operate the container using a cashless system for payments.

"We've chosen to pilot this project in Ulundi before rolling it out across the country," says Marlene Corrie, PPC

general manager: Sales Inland Region. "We will use community feedback and what we learn from our experiences here to ensure the initiative delivers the maximum possible impact."

PPC also handed over a state-of-the-art mobile science and IT lab to assist learners at the school studying science. "The mobile lab is an ideal alternative for underprivileged schools such as King Senzangakhona as it incorporates both the technology and science equipment needed to conduct experiments covered in the high school science syllabus," explains Kabira Akoob, PPC Group CSI manager. "It brings physics and chemistry to life as never before."

"PPC recently celebrated 125 years of business, thanks to the support of our customers. Without the customers and the communities we serve, we would not have achieved this milestone," notes Corrie. "We're excited to be able to give back in this way, and to be partnering with King Senzangakhona High School and the community through this initiative. We thank everyone for their contribution today and remain committed to the project's success." ■

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Durability of concrete design and construction

By Mark Alexander, Arnon Bentur and Sidney Mindess

Engineers increasingly face durability issues in concrete design and construction with the emphasis slowly but inexorably shifting to 'design for durability'. Growing pressure from owners and infrastructure agencies for designers and constructors to deliver durable concrete infrastructure, coupled with a focus on sustainability, requires that engineers have the latest tools to handle these challenges. This book provides an up-to-date survey of durability issues, including durability design and specifications as well as how to actually achieve durability in concrete construction.

- Places durability into the context of modern concrete design and construction

- Summarises in understandable terms how and why concrete deteriorates
- Provides information on modern concrete materials and how they can be used to produce durable concretes
- Gives the background to current philosophies around durability design and specifications. ■

CRC Press

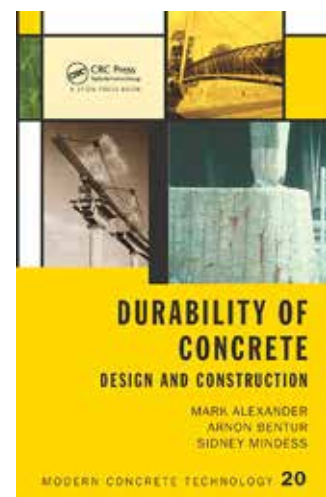
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International construction contract changes to reduce common disputes



New FIDIC standard form contract documents are almost ready to be adopted by the International Federation of Consulting Engineer.

The Rainbow Suite second edition has clarified the roles of engineers and takes a balanced approach to the roles and responsibilities of the main parties, as well as the allocation and management of risk. One of the principal drafters of the FIDIC Yellow Book, Siobhan Fahey, a qualified engineer, attorney and adjudicator, was in South Africa recently to unpack the impact of changes to the FIDIC Rainbow Suite at MDA Consulting's Collective Wisdom event. The FIDIC Rainbow Suite is commonly used in South Africa.

Fahey explained that imbalanced risk-sharing in FIDIC contracts typically results in

higher tender prices; delays to completion; additional time and cost claims; and, in the worst cases, major protracted disputes leading to arbitration, and sometimes to contract termination.

"No two projects are the same, so FIDIC acknowledges that special conditions will be required for project specific issues.

"Much like a three-legged stool, our contracts require employers, contractors and engineers to play their respective roles in reducing uncertainty for construction projects. The last update to the FIDIC suite of construction contracts was 10 years ago, so with this iteration we have addressed common issues gleaned from years of using the Rainbow Suite," she explains.

One of the most noteworthy changes is that contractors and engineers are expected to play more proactive roles in conveying information back and forth. Reciprocity is ingrained and employer's requirements have been tightened up given that this has been the source of many disputes in the past.

Also at the event, Bahati Mbembe, a Tanzanian contract administration expert, who highlighted features of the Red Book

that are particularly applicable in African construction projects.

"In many African construction projects, contractors are often concerned about the neutrality of the engineer, who is frequently perceived to be personnel of the employer," he says.

Another common issue in Africa is outlined in Clause 8.5 of the Red Book and deals with delays caused by authorities.

"It could be that the processes of tax exemption, port clearance and permits take longer than anticipated, so my advice to contractors is to appoint someone to deal specifically with this issue," advises Mbembe.

MDA Consulting Director, Euan Massey, highlighted a number of specific clauses which primarily deal with time and money and clarify the roles of both the employer and the engineer. "Dispute avoidance mechanisms have been introduced and there is an overarching bias throughout towards trying to reach agreement between the parties," he explains. ■

More information at
www.mdaconsulting.co.za

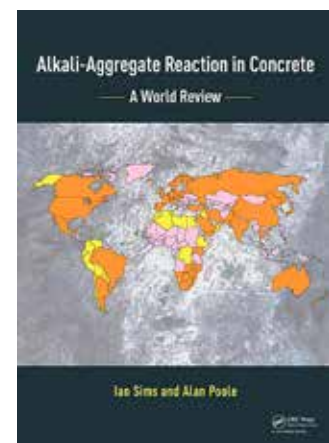
Alkali-Aggregate reaction in concrete: a world review

By Ian Sims, Alan B. Poole

This book is unique in that it provides authoritative and up to date expert information on the causes and effects of alkali-aggregate reaction (AAR) in concrete structures. It has been divided into two parts; the first 5 chapters deal with the most recent research into the mechanisms involved in the reaction, the methods concerning its diagnosis, avoidance, testing and evaluation, together with an appraisal of current methods used in its avoidance and the remediation of affected concrete structures. The second part is divided into 11 chapters covering each region of the world in turn. An authoritative compilation on this topic has never been attempted previously on this scale. It is therefore a primary reference source essential to professional civil engineers and consultant engineers; aggregate and

cement and concrete producers. It also forms an authoritative reference source where technical and legal issues of dispute arise anywhere in the world.

- This is a new and unique country-by-country global review of the problems caused by alkali-aggregate reaction in concrete
- Its contributors are internationally recognised experts from all the relevant regions round the world
- An essential primary reference for those professionals concerned with the premature deterioration of and damage to concrete structures
- An essential reference source for technical investigations and legal disputes concerning concrete in any country in the world.
- Extensively produced in full colour,



with case study illustrations given for each country.

- Extensive up-to-date reference list for each chapter. ■

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Local infrastructure negatively impacted by skills deficit, says SAICE



SAICE CEO Manglin Pillay.

A lack of skilled professionals and infrastructure maintenance have emerged as among the major issues facing most of South Africa's infrastructure sectors, according to the South African Institution of Civil Engineering's (SAICE's) third Infrastructure Report Card (IRC) for South Africa.

The SAICE IRC recognises that South Africa has achieved remarkable strides in the past 20 years, providing water to about 11 million citizens at an unprecedented pace, as well as electricity and sanitation. However, maintenance of existing infrastructure and the provision of new infrastructure require regular Government investment for continued growth in service delivery.

The damning IRC report cautions that maintenance of infrastructure is critical. Infrastructure that is mismanaged through lack of maintenance, will deteriorate and its functional life-span diminish. Deteriorated roads can cost up to six times more to repair.

People in smaller towns face serious health issues when their water purification works and sewage plants fail. This situation arises when municipalities have no, or inexperienced, civil engineering practitioners.

The report further notes that, in the global economy, the state of a nation's infrastructure provides one of the best indicators of its likely prosperity. For South Africa, as a developing nation, its engagement in the global economy is either advanced or constrained by the state of its infrastructure capabilities.

SAICE's current IRC, following on the initial 2006 and the follow-up 2011 IRCs, extended the sectors it assessed to ten, including 29 subsectors. The sectors include water supply and distribution, electricity, roads and rail, schools and universities, sanitation and wastewater, and solid waste management.

The overall grade awarded for the state of South Africa's infrastructure is D+. A short explanation of the symbols is: A = World-class; B = Fit for the Future; C = Satisfactory for Now; D = At Risk of Failure, and E = Unfit for Purpose.

"I believe we are one of the few institutions that carries out this particular measuring of infrastructure. We are helping government assess itself in terms of how it is maintaining and delivering infrastructure and how it can improve infrastructure operations," noted CEO Manglin Pillay.

Consulting Engineers South Africa (CESA) welcomes the IRC but is concerned about the quantity of current under-maintained infrastructure reported. CESA regards infrastructure development as being key to service delivery, an employment enabler and a catalyst for economic growth and transformation.

CESA has availed itself and the services of its over 540 member firms employing over 23,000 people to assist Government in delivering and maintaining this infrastructure.

Says CESA CEO Chris Campbell: "We have been actively pursuing a relationship aimed at partnering Government and industry stakeholders in overcoming the challenges of effective infrastructure maintenance and development.

"Our efforts to partner have so far met with resistance and consequently the survival of companies within the Consulting



Engineering industry is now seriously threatened by the lack of the promised Government expenditure on infrastructure," cautions Campbell.

With very few infrastructure projects flowing out of the 'project pipeline' and a corresponding reduction in the volume of work for the industry, the viability and continued existence of Consulting Engineering organisations is at risk. Without sufficient work, the firms are becoming unsustainable and cannot afford to retain the highly skilled and experienced engineers necessary to ensure growth in South Africa.



CESA CEO Chris Campbell.

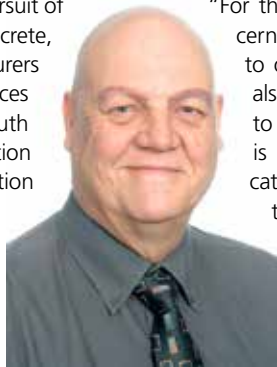
The consulting engineering profession has also been faced with many challenges impacting negatively on the industry – from the downgrade of the country's investment status; concerns about financing and investment in, and maintenance of, infrastructure; the ever-increasing service-delivery protests; escalating concerns about 'state capture' and the effect all this will have on the South Africa's economic outlook.

"However, it is very important that we continue to support Government. We believe that partnerships are vital and that by working together we can significantly improve the lives of our people," concludes Campbell. ■

Sources: www.cesa.co.za and <https://goo.gl/bpkDUY>

Concrete Mark of Approval gains ground

Through its continuing pursuit of excellence in precast concrete, the Concrete Manufacturers Association Certification Services (CMA CS) has obtained South African National Accreditation Services (SANAS) accreditation enabling the certification of a wide range of precast concrete products.



Frans Minnaar of the CMA.

The certification puts it in the forefront of precast certification and ensures that specifiers and engineers can specify products bearing the CMA CS Mark of Approval with the utmost confidence. Products bearing the CMA CS Mark of Approval are certified to comply with requirements as prescribed by the relevant South African National Standards (SANS) code.

CMA CS was established by the precast industry association as an alternative supplier to the traditional SABS certification process, following ongoing complaints from its members and their customers complaining of unwarranted delays in obtaining and renewing product certifications. The CMA CS was subsequently registered and obtained accreditation to become an official certification authority.

Going strong

"Since then we have undertaken a number of audits and provided several companies with product category certifications. Now, with the addition of SANAS accreditation pertaining to specific product groups, we can confidently certify most precast product types that are required to meet SANS specifications.

"In future, all CMA CS Mark of Approval certificates will bear the SANAS number (C75) and logo on them and we will re-issue new certificates to the current mark holders in due course. The best thing about our mark is that it is internationally accepted. This means that we can also provide services outside the borders of South Africa.

"For those producers that were concerned and who are still struggling to obtain new permits or renewals from the SABS, we are happy to inform them that the CMA CS is now available to issue certificates with the SANAS Accreditation number and logo on them in the same manner as any other accredited certification body. But, with the added assurance that we will maintain the highest standards for our certification services always," says

the CMA CS CEO, Frans Minnaar.

SANAS certification has been obtained for the following product categories:

- SANS 508 – Retaining Blocks
- SANS 542 – Roof Tiles
- SANS 677 – Non-Pressure Pipes
- SANS 927 – Kerbs and Edgings
- SANS 986 – Reinforced Culverts
- SANS 1058 – Paving Blocks
- SANS 1215 – Masonry Units
- SANS 1294 – Manhole Components

Rest assured

For the end-users of precast products, the CMA CS mark of approval ensures that the company manufacturing products under this mark of approval is being assessed on a regular basis for compliance with their quality management systems, as well as the applicable product specifications for which they have the CMA CS mark.

"Our CMA CS system auditors are all carefully selected and approved before they are allowed to perform product audits. Likewise, our permits are only issued to producers that meet all the necessary requirements for compliance. However, end-users should take the time to ensure the validity of any mark certificate by confirming the permit number on the "Mark Holder's List" which is published on the CMA website (www.cma.org.za) before acceptance. The CMA CS Mark of Approval is the Mark you can trust for real compliance with SANS specifications," Frans Minnaar, executive director of CMA, concludes. ■

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Contractor cannot stop work if not paid, JBCC cautions

Contrary to what many contractors assume, there is no provision in most building contracts legally permitting the contractor to suspend work if the employer fails to pay by due date, nor are there contractual rights to remove materials and goods from site," says Uwe Putlitz, CEO of the Joint Building Contracts Committee (JBCC).

JBCC is a non-profit company representing building owners and developers, professional consultants, and general and specialist contractors who all provide input for the compilation of JBCC Agreements that portray the consensus view of the committee's members.

"If the contractor is not paid on time, they would have to compel the defaulting employer to honour the contract, or seek other methods of obtaining payment. "The contractor could, for example, offer the employer payment terms and, should the employer still not pay, the contractor could have the contract cancelled and sue the employer for damages."

Putlitz explains that contract payments basically fall into two categories:

1. Interim payments, based on valuations prepared by the principal agent for work done at a given point. These are usually prepared monthly by a specified date and repeated monthly until the final payment. The valuations should represent the total amount of work undertaken to date, including unfixed materials and goods procured by the contractor, less any amounts previously certified.

"While the obligation to prepare the valuation and issue the certificate rests with the principal agent, the contractor is required to assist in determining the valuation by preparing and supplying a claim for payment incorporating measurements and valuations based on the bill of quantities of duly completed work, and material and goods, together with relevant documents, such as invoices.



"This payment method is used in the larger residential or commercial projects," Putlitz explains.

2. Progress payments, based on pre-determined milestones, these are payments for work completed or progress achieved; i.e. when the surface bed has been cast, or the roof installed, the contractor would be paid the amount stipulated in the contract schedules. This payment method is common where no bills of quantities have been used and is mainly employed for smaller projects.

Putlitz adds: "The employer is obliged to pay the amount certified, or pay the pre-determined progress payment within a reasonable time, usually seven calendar days of the date of issue of the certificate or the contractor providing the employer with an invoice for the amount certified, or for the amount of the pre-determined progress payment." ■

More information: Tel +27(0)11 482 3102 or email info@jbcc.co.za.

GBCSA launches Net Zero pilot certification scheme



The certification of the first four projects under the Green Building Council South Africa's (GBCSA's) Net Zero pilot certification scheme was announced recently.

Net zero carbon buildings are defined as highly energy efficient buildings, with remaining energy demand supplied by on-site and/or off-site renewable sources, or through offsets.

The GBCSA is one of 14 green building councils participating in the World Green Building Council's Advancing Net Zero project, which aims to promote and support the acceleration of net zero carbon buildings to 100% by 2050.

The GBCSA has gone further by launching its Net Zero/Net Positive certification scheme, which rewards projects for completely neutralising (Net Zero) or positively redressing (Net Positive) their environmental impacts under four categories – carbon, water, waste and ecology. Net Zero certification is awarded over and above any Green Star certification a project already has, the body said.

The first four projects to be certified as Net Zero under the pilot programme in South Africa are the Vodafone Site Solution Innovation Centre, in Midrand, Gauteng, which is net zero rated in terms of both carbon and ecology; in the Western Cape Estuaries Plaza, in Century City, Cape Town is net zero in terms of water, and Greenfields Industrial Park, in Cape Town, and Two Dam, in Montagu are both net zero in terms of carbon.

"We are excited to see GBCSA officially launch its net zero programme, which includes certification, training and advocacy for net zero carbon, water, waste and ecology in buildings. The work our green building councils are undertaking through the Advancing Net Zero project will change the way the world's buildings perform," said World Green Building Council CEO Terri Wills. ■

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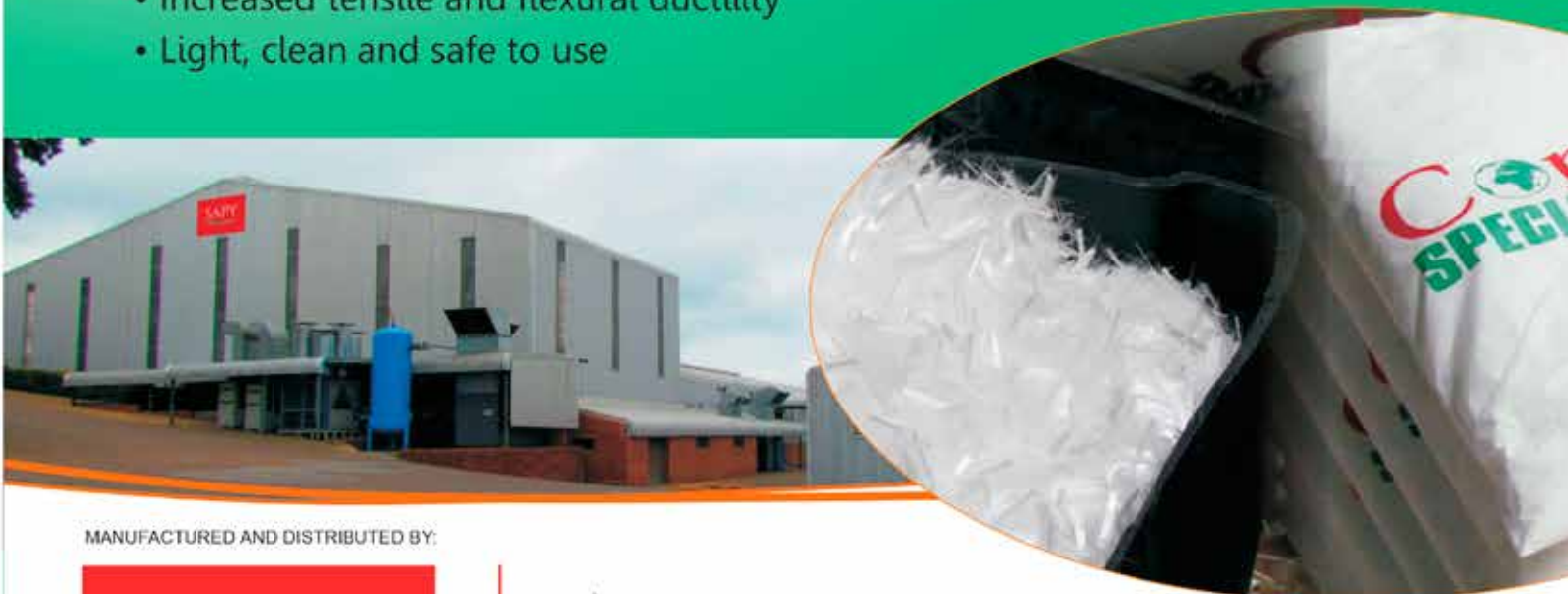
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Nico Pienaar, director of Aspasa, clarifies the Association's new direction

Recently well-known local quarrying and mining industry representative association, the Aggregate and Sand Producers Association of Southern Africa, announced that it would in future be known only by the acronym Aspasa. This reflected the widening of its membership to include mining and dimension stone operators. *Concrete Trends* editor, Gill Owens, visited Aspasa's offices to better understand the new direction the body is taking.

Q How long have you been involved with Aspasa?

A I joined on 1 January 1999, taking over from Sir Rupert Bromley who had 'birthed' Aspasa in August 1990.

When I entered the industry I knew very little about mining or quarrying. My background had been in law, labour law, training and industrial relations. My experience of running an organisation such as Aspasa had been gained by working for the then BIFSA and a Trade Union. The concept of having to provide a service while spending money not your own came from my previous experience.



Q How did you come to be doing what you do today?

A This was not my choice. I was given a chance to do the job and I grabbed it with both hands. I had started my career in a law firm, wanting to become a lawyer but once I saw that one had to defend somebody who was 'guilty', I lost my enthusiasm. However, I found my love in Labour Law and Industrial Relations and was one of the first people to move into this new field.

I was employed by BIFSA as the first Industrial Relations Advisor. After this I became a trade unionist and being so involved in Industrial relations taught me the lesson that there are always two sides to every situation. Industrial Relations before 1994 was a tough field to work in – in many cases the workplace was a war zone!



Legislation covering surface mining has become extremely challenging and Aspasa can help members comply.



Aspasa has allowed me to be involved in the legal issues, although labour and industrial relations are not what I do today. Mining legislation is very interesting, but laws like the MHSa have a very close relationship to labour law. These two actually work hand in hand, so many of the lessons learnt from labour law are therefore relevant to basic mining law.

Q Did you have a mentor to help you in this new field?

A Definitely. If when you are younger and inexperienced, you don't have somebody to help you and monitor you in a new field, you will be lost.

From the start Sir Rupert Bromley was very supportive and helped me understand issues better. I also received help and guidance from industry luminaries like Jannie Hooman, Trevor McAdam, Gert Coffee, Avi Bhoora and, more recently Andries van Heerden. These men, and a number of others, played a very meaningful role in my career.

Running a body like Aspasa is a very lonely position and having a mentor is very important. When I was recruited I was told: "Do your job, people might not like you, but you are here to be liked, you have a job to do." These words have always stuck in my mind as I actually want to be liked, but there will always be people who don't like you – but what really matters is whether they respect you?

Q What was Aspasa's focus in the past?

A If I look back to the small office, small bank account and little direction, then there are days when I think that if I knew then what I know now, I would have run away. In the early days it was a matter of finding out what made the industry tick and what people in the industry needed.

Health & Safety and Environment were issues that have long been our focus. Aspasa ran effective conferences, arranged trips to construction sites and made many regional visits. Over the years some were dropped. The financial situation in the country put a stop to the 4 x 4 trips which reached out to poor communities.

Q And now, what is Aspasa's focus?

A Firstly, Aspasa has a clear definition and knows what it has to focus on.

Aspasa has represented the sand and aggregate quarrying industry for almost two decades. Recently legislation has become much more challenging and pressures on the overall mining sector have increased tenfold.

This has led organisations outside the quarrying industry to request assistance and membership. So we took the decision to act broadly for the entire opencast and related mining industries, wherever operations are similar and face similar challenges.

As a result, the Association has adopted the salt and dimension stone mining industries and incorporated the Coal Ash Association into its care. Any other opencast mining operation applying for membership and agreeing to uphold Aspasa's strict standards and be legally compliant with the legislation, is welcome to join.

The issues are many, but Aspasa is mainly involved in issues that include legal, skills, technical, quality, health and safety, environment, transport and public relations.

Issues such as the Diesel Rebate, the Royalty Act, H&S, the environment etc. takes up a great amount of time and expertise. Being able to run Aspasa one has to get involved in issues that are new and not always understood or easy to grasp.

The learning curve is even today very high. One needs to keep up. Over the last few months, it has been interesting how much info is relevant when getting involved in quality issues as well as skills development, compliance to satisfy SLP, MQA requirements and SAQA compliance.

So for the future, we need to ensure that Aspasa becomes a very effective Association of Surface Mines. Aspasa has learnt that there are many mining operations that are small and that need the services Aspasa provides. This is the reason why Aspasa is extending its membership. ■

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Drafting standards for aggregates

Aspasa has begun a formal process to review quality requirements pertaining to sand and aggregates for all sectors of the construction industry. Saartjie Duvenhage, the chairperson of Aspasa's technical committee on Quality Management, says quality is not legislated in the aggregates industry and as a result there are no hard and fast rules. Different sectors, such as road construction and railways, have their own requirements and others use blanket standards as set out in SABS 1083.

Duvenhage adds that all aspects involved in the production of aggregates will be considered including the identification of mineral types, methods and techniques of processing, skills requirements, laboratory testing and sampling, storage requirements, as well as delivery and acceptance criteria on the construction site.

There are also plans to introduce a mandatory Quality Management System (QMS) across all member operations aimed at ensuring that quality standards are met and adhered to. ■



Aspasa's technical committee is in the process of compiling standards for improved classification of aggregates in the building industry. The committee are front: Luthando Mkhize, Nico Pienaar and Saartjie Duvenhage. Back: Rynard Brits, Danny de Villiers, Abri Erasmus, Ray Bonser, Zain Babamia and Sasheen Rajkumar.

Continued quality focus delivers value to AfriSam customers

With not much sign of significant recovery in the construction market, concrete materials leader AfriSam is ensuring that hard-pressed customers across the country get top-drawer products and service while minimising their business risk.

“During difficult economic times like these, customers must be able to rely on quality offerings, as everyone’s margins are tight and there is simply no room for error,” explains AfriSam’s general manager readymix, Amit Dawneerangen. “This is why our integrated quality systems are so vital; they create the foundation for the confidence that the market has in the AfriSam brand.”

Dawneerangen highlights that running a ‘tight ship’ with high standards of operational, technical and environmental compliance translates into value for money for customers at the end of the day.

“Our own cost controls and quality controls also feed our ongoing continuous improvement process, making our delivery of services and products to customers more efficient and cost effective and distinguishing the AfriSam offering from that of our competitors,” says Nithia Pillay, national product technical manager readymix. “This is particularly important in the highly competitive readymix market, where barriers to entry are not necessarily very high, yet our target markets expect excellence on a daily basis.”

He highlights that customers also have to meet high levels of performance despite the lower margins in the current climate.

“Our fine-tuned systems across the group enable us to standardise our processes which drive performance, so that the customer can rest assured of the consistency in the service and quality of product they will receive, irrespective of where in the country they are conducting their projects,” says Dawneerangen. “This means the capacity to always deliver the right quality and quantity of product to the right place at the right time.

“The backbone of these systems is, of course, the global ISO 9001 accreditation – which underpins our approach and drives the standardisation imperative at all our plants,” says Pillay. “Through honing our operations and carefully monitoring every aspect of our performance, we drive our own efficiencies, thereby enabling the offering of added value to customers.”

Making all this possible is the depth of skills and experience in the business, which has a reputation for retaining quality staff even through challenging times. With low staff turnover,

Capacity and expertise has made AfriSam a leading supplier of customised mixes; value-added products that serve a customer’s specific needs.



AfriSam offers green star concretes, which comply with the Green Building Council’s star rating and contribute to improving the carbon footprint of many new corporate buildings.

AfriSam has been able to develop and grow a remarkable technical capacity, which customers are quick to recognise.

This experience is a substantial value-add for customers, says Dawneerangen, as they benefit directly not just from the smooth ordering and delivery process, but from the advice and input they can get on technical and scientific issues related to all aspects of readymix and its applications.

“One of the key aspects of our promise to customers is that we don’t outsource our process control testing,” says Pillay. “We conduct most of our own testing, for instance, and our laboratories are well equipped and skilled for all the

AfriSam’s standardised systems enable consistency in service and product quality no matter where in the country customers conduct their projects.



basic process control testing. Where necessary, we also use independent SANAS accredited laboratories for testing. All test results, whether derived via process control or externally procured, are available to our customers on request."

AfriSam's three main construction materials laboratories are located at Jukskei Quarry in Gauteng, at Coedmore Quarry in KwaZulu-Natal and at Peninsula Quarry in the Western Cape. There are, in addition, about 15 satellite laboratories around the country.

Pillay adds that being a vertically integrated business – operating in aggregates and cement in addition to the readymix segment – also has significant advantages for customers.

"AfriSam's construction materials business is in a unique position where it thrives on the close synergies with our aggregate business unit and our cement business unit, as readymix is very reliant on the performance of the input materials," he says. "This allows us to have all the relevant information readily available, to make the right decisions to manage cost to our customers and the quality and performance of our products."

Dawneerangen agrees: "The inter-relationship between our business units gives us better control over the management of the different ingredients, allowing us to take the necessary action to mitigate risk and enhance product performance. This also makes the company readily accountable to customers, as it has more direct control over the full value-chain of inputs and technology."

Capacity and expertise have also made AfriSam a leading supplier of customised mixes – value-added products that serve a customer's specific need.

"We produce specialised concretes for niche applications in certain projects, and have, in fact, become the 'go to' company when customers have a very specific requirement," he says. "Accommodating these specialised products is really a testament to our depth of technical skill, which keeps customers coming back whenever they have a special need in a project."

These special mixes are suitable for both architectural and structural concrete applications including self-levelling concrete, pigmented concrete, retarded mortars, exposed aggregates, surface-polished concrete, underwater concrete, and durability concretes, as well as high-strength concretes used increasingly in the construction of multi-storey urban buildings.

"A contractor needs to know that the 90 MPa concrete in the ground floor columns is going to reach the strengths required, as construction proceeds apace on these projects and higher floors could already be in place before a problem is detected," he says. "Quality and reliability in these situations is essential."

Another popular product is the Green Star concretes, which comply with the Green Building Council's star rating and contribute to improving the carbon footprint of many

new corporate buildings. The production and supply of 'green' concrete aligns well with AfriSam's environmental pillar in its three-pronged values of 'people, planet and performance'.

"Our cements maintain their high performance even with the greater portion of extenders – such as fly ash or slag – in the mix to augment the portland cement," says Pillay.

As part of its commitment to sustainability principles, AfriSam ensures the incorporation of returned and recycled concrete into its readymix, contributing further to the carbon footprint 'score' of a project in terms of Green Building Council ratings. Managing environmental impact also includes careful water conservation and recycling, so all AfriSam's readymix plants make use of 'grey water' in their concrete.

"Water only enters our mixing process once it has been put to other uses in the plant, such as washing the facilities and rinsing the mixing truck drums," says Pillay. "Run-off from rainwater also goes into the grey water channel."

AfriSam's membership and participation in the various industry associations in the concrete and readymix sector is an important part of its commitment to shared growth and development. Its membership of the Southern Africa Readymix Association (SARMA) is an indication that it is compliant with the stringent audits conducted in order to qualify as a member. Indeed, its leadership position in this segment was amply reflected recently when it won both SARMA's coveted Best Plant award for its Wynberg facility, and the Best Fleet award for its Gauteng readymix fleet.

AfriSam is an active member supporting the work of the Concrete Society of Southern Africa and The Concrete Institute, while also being the founding member and sponsor of the AfriSam-SAIA Award for Sustainable Architecture. The company supports both local and international industry related conferences facilitating continuous improvement by ensuring best practice and new technology are always top of mind for inclusion into business processes.

"Usually hidden from the limelight but equally important in keeping the South African construction industry on a world class level of performance, is the role that AfriSam – along with our industry peers – plays on the standards committees of the South African Bureau of Standards (SABS)," says Pillay. "We also make our expertise available to organisations like the South African National Roads Agency SOC Ltd (SANRAL), when they need input on issues like the Committee of Land Transport Officials (COLTO) specifications for road and bridge works."

Overall, he concludes, the AfriSam value proposition is not just good for customers but for the industry and the economy as a whole. ■

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AfriSam recently won both the SARMA Best Plant award for its Wynberg facility and the Best Fleet award for its Gauteng readymix fleet.

AfriSam's laboratories are well equipped and skilled for all the basic process control tests on a project.





Underwater sculpture offers art for tourists and homes for coral

Jason deCaires Taylor, the artist whose speciality is creating underwater statues, has just completed his latest project off the coast of the Gili Islands to the east of Bali in Indonesia.

The Nest installation is formed of 48 life-size human figures. The sculpture, which was commissioned by luxury resort developer BASK, is located four metres underwater, and is intended to make snorkelling more interesting for holiday makers and provide a home for corals.

The installation has been gifted to the local community and it is hoped that it will support local employment, by providing further interest in the region and a greater appreciation of the exceptional beauty of the underwater world surrounding the Gilis.

Nest symbolises the intersection between mankind and nature. It has been deliberately made so that it is accessible to everyone.

Taylor says: "The circular formation is an echo of the circle of life. The interlocking figures situated upon the edge of the reef offer a platform for soft corals, sponges and other filter feeding organisms to colonise and inhabit, while reminding us of our connection to the marine environment.

"Over time, as marine life takes hold, further layers of marine biomass will be added naturally creating a complex symbiotic artwork and an invaluable space for life to thrive," he explains.



The figures comprising Nest are sculpted from pH neutral, environmental grade concrete and are based on casts of real people. Within a year, Nest will provide a natural home for soft corals and sponges and will encourage other marine life. Beyond this it should pave the way for delicate hard corals and eventually a fully established reef will form. The ecological focus of the sculptures is aligned with the ethos of the BASK resorts.

Previous works from DeCaires have formed vibrant and thriving ecosystems. Forty per cent of the world's coral reefs have been lost over the past few decades and scientists predict more is now at risk. Nest will remind visitors of the many fragile treasures beneath the sea.

Nest offers a more poignant take on the human condition – as opposed to the more confrontational Gyre constructed off Lanzarote.

Taylor has recently completed an ambitious series of underwater installations off the coast of Lanzarote in the Canary Islands. This is the first time he has worked in the western Pacific. ■

Sources: <https://goo.gl/SNwwGw> and <https://goo.gl/uMyrTp>

Bosjes Chapel's undulating roof echoes the surrounding mountains

The new chapel, set within a vineyard in South Africa, is designed by South African-born Coetzee Steyn of London-based Steyn Studio. Its serene sculptural form emulates the silhouette of surrounding mountain ranges, paying tribute to the historic Cape Dutch gables dotting the rural landscapes of the Western Cape.

Constructed from a slim concrete cast shell, the roof supports itself as each undulation dramatically falls to meet the ground. Where each wave of the roof structure rises to a peak, expanses of glazing adjoined centrally by a crucifix adorn the façade.

Drawing poetic inspiration from Psalm 36:7, the crisp white form is conceived as a lightweight, and dynamic structure which appears to float within the valley. A reflective pond emphasises the apparent weightlessness of the structure.

Elevated upon a plinth, the chapel rises from the flat land it sits upon, providing a focal point within its surroundings. New planting, including a vineyard and pomegranate orchard, create a lush green oasis on the otherwise exposed site.

Inside, a large and open assembly space is created within a simple rectangular plan. Highly polished terazzo floors reflect light internally. The undulating whitewashed ceiling casts an array of shadows which dance within the volume as light levels change throughout the day.

To keep the structural form of the roof and assembly space pure, other elements of the building's functional programme are either hidden within the plinth, or discretely within the outer corners of the surrounding garden.

Inspired by the simplicity of the Moravian Mission Stations established on Cape Dutch farms in the 19th Century, the chapel lacks a spire – relinquishing a sense of significance in relation to its impressive natural surroundings.

An open embrace which invites people in, the chapel is also a space that extends outwards into the valley and mountains beyond, raising the awareness of God's creation in the immediate environment. ■

All photographs by Adam Letch

Source: <https://goo.gl/YsW3cC>

Project team

Architects: Steyn Studio

Location: Ceres, South Africa

Area: 430 m²

Project Year: 2016

Photographs: Adam Letch

Manufacturers: Peri, Terrazzo

Lead Project architect: TV3 Architects (South Africa)

Furniture Design: Liam Mooney Studio

Contractor: Longworth & Faul

Structural engineer: Henry Fagan & Partners

Mechanical & Electrical engineer: Solution Station

Quantity surveyor: De Leeuw

Planning consultant: Ron Brunings

Landscape architect: CNdV Landscape Architects

Heritage Consultants: Graham Jacobs, Elzet Albertyn & Lize Malan
More SpecsLess Specs



Concrete rehabilitation success at Finsch Diamond Mine

Botes & Kennedy Manyano offered Petra Diamonds a workable solution to rehabilitate three concrete silos at its Finsch Diamond Mine in the Northern Cape.

The design and construct project was to restore the structural integrity of the silos while addressing issues such as concrete and liner wear inside the structures.

Mantie du Toit, contracts manager at Botes & Kennedy Manyano, says the solution provided an option whereby the concrete repair work would be done by taking one silo out of production at a time and recommissioning it before work started on the next silo, minimising impact on the plant's operation.

Du Toit says that prior to the concrete repair work and construction commencing, Botes & Kennedy Manyano along with contracted consultants were also responsible for the stability analysis of the structures. This formed part of the risk analysis phase of the project.

Rehabilitation commenced April 2016, and involved surface concrete repair work on the external and internal faces of the three silos. The spalled surfaces were repaired using various techniques depending on the severity of the damage.

Each silo has an external diameter (OD) of 13,4 m and an internal diameter (ID) of 12,8 m. The total height of the silo, including a conical section at the bottom, stands at 22,8 m; the cylindrical storage section is 13 m.

Access into the silos is restricted to entry from the top of the structure and the bottom outlet of the silo, and at the time of starting the repair work, each silo was filled to the top with kimberlite ore. The ore levels were discharged in a controlled way to a predetermined level to facilitate the concrete repair work. Use was made of a working platform lowered from the top giving access to the different levels going down at two-metre increments.

Outside access was facilitated through the use of scaffolding that was erected to the required height.



The installation of stressing tendons underway.

"During the project each of the silos was taken offline for a limited period, so the necessary resources had to be available to ensure optimum productivity was achieved, while still working safely within the operational plant," Du Toit says.

To work at height required careful planning and stringent safety systems were implemented. All personnel received specific working at height training to ensure that all were competent and understood required procedures. Du Toit says that the project safety statistics reflect the commitment of the team.

Concrete repair generates large quantities of dust, further aggravated by working inside a silo. To mitigate this, ventilation ducting was installed to extract the dust and fumes, facilitating a much safer working environment.

In addition to concrete repair work on the inside of the silos, Botes & Kennedy Manyano was tasked with increasing the wearability of these internal surfaces. This was achieved using a special epoxy to increase the abrasion resistance of the concrete surface.

Work also included rehabilitating the bottom cone section of each silo. Before starting, custom carbon steel liner plates were manufactured and later installed to protect the concrete surfaces at the cone section. These also acted as an external shutter to facilitate casting a concrete lining to strengthen the cone section of the silo. As the installation of the steel liner progressed upwards, the casting of the new 300-mm concrete lining followed the installation operation.

This was labour intensive and, for greater productivity in areas not subjected to interfacing with the mine, a bagged prepacked concrete mix was used. The bags were raised to the deck at the top of the silo, where batching of the concrete was done in a portable concrete mixer. The concrete was then lowered from the deck through a centre access, using a working platform with buckets of concrete placed on it, lowering it to the level of casting. The concrete was hand placed using the buckets and then densified. A retarder was used to lengthen the window of casting to prevent dry joints.

Attention to detail during planning and execution was essential to ensure that personnel were not put at risk, and that the quality of the final product was not compromised. Some 64 m³ of concrete was used for the cone section of each silo.

A circular concrete beam was also cast on the outside circumference of each silo to increase the strength and stability of the storage structure. This was done above the cone section of the silo.

Once all the concrete repair work had been completed, post-tensioning was done on the outside of the structures. In total 58 strands, spaced vertically at predetermined intervals, were stressed. This could only be done once all the internal and external repair work had been completed.

Du Toit says that generally, concrete repair methods are application-specific and the solutions utilised depend on the individual requirements. "We have the necessary technical expertise and experience to assess the best course of action in each circumstance and to develop a sustainable solution such as the one applied at Finsch to rectify any issues and maximise the useful life of the structure," he concludes. ■

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Design and build of a 12,000-m³ reservoir for Namwater at Rundu, Namibia

Work is progressing well on the new 12,000-m³ reservoir and associated pipework on Namibia's northern-most border with Angola. Progress is over 60% and completion is expected to be well in advance of the contractual completion date of 12 April 2018.

The design and construction of the reservoir – awarded by the Namibia Water Corporation Ltd (NamWater) in October 2016 – is being conducted by a joint venture between B&K Civils and Windhoek-based Rock Leigh Investments.

The concrete reservoir, situated near the Ndama Water Treatment Plant, is being built to expand the water storage capacity in the Kavango-region. The current water storage capacity at Rundu is insufficient to sustain the target area for the recommended 48-hour period. The new facility has been designed to cater for increased future water storage demands for this arid region.

According to B&K Civils' project engineer, Antoni Botes, an interesting aspect of the project is that the reservoir foundation was constructed using the so-called RIC method or Rapid Impact Compaction.

"This methodology entails the use of a specially designed compaction unit fitted to the front of an excavator. It compacts the raft foundation at a grid spacing of 4.5 metres," Botes explains. "The kinetic energy of this compaction technique is sufficient to densify the soil up to a depth of at least five metres and will provide the necessary bearing capacity to ensure the long-term durability and stability of the reservoir."

The remote location of the town – over 700 km north of the capital Windhoek and just south of the Cubango River – presents a logistical challenge for the consistent supply of the necessary high quality building materials used in the construction process.

"While this could be challenging for some contractors, our teams are well versed in operating in remote regions," Botes says. "Streamlined logistics processes and careful planning ensures that all materials reach the project site on time. Adding to this are our stringent quality control procedures and the diligence applied by our quality control team, which will ensure the final product is of high quality and will meet the client's specifications."

Significantly since the Botes & Kennedy Group, which includes B&K Civils, began operations in 1980, the group has built more than 60 concrete water-retaining structures in Namibia and South Africa.

"It is perhaps significant that our very first project was a water retaining structure; a 2,500-m³ reservoir with a 1,700 m³ pressure tower integrated into the reservoir," says Botes. In the period since then, the company has undertaken numerous projects around Namibia, including a 20,000-m³ as well as a 16,000-m³ reservoir near Swakopmund.

"In all our work, we apply the highest standards of engineering quality and environmental protection, and this carries through to all phases of building and construction activities," Botes says. ■

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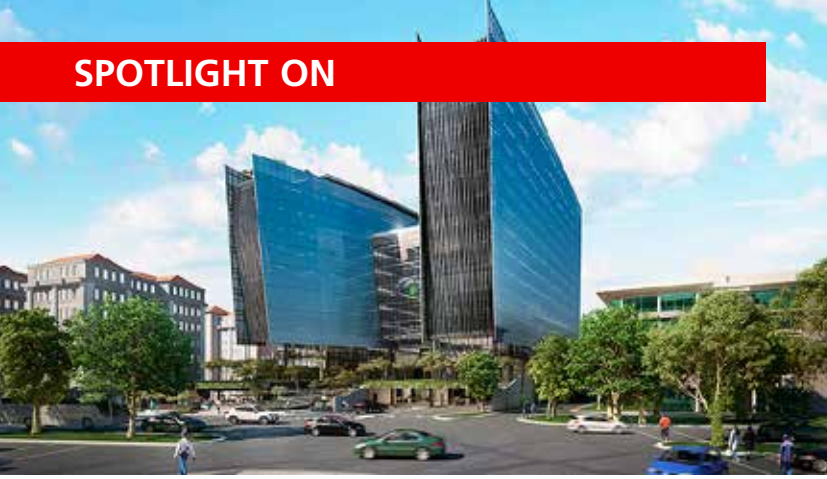
Panoramic view of the reservoir interior.



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In conversation with Fernando Cardoso, CEO of Tiber Construction

Talking to Tiber CEO, Fernando Cardoso, is like a breath of fresh air. At a time when the construction industry is in the doldrums, it is refreshing to meet someone who radiates enthusiasm and approaches the future with confidence and tremendous excitement.

The words “Don’t be the same, be better” on the Tiber Construction home page epitomises the attitude that has enabled the company to survive for 66 years through the boom and bust periods of the South African construction industry.

Established in 1951 by Paolo Rivera, the company has grown to become a respected leader in the property development and construction sectors. A private and management-owned company, Tiber Construction’s culture of loyalty and commitment has enabled it to attract and retain the best talent available and to tackle an impressive list of iconic structures.

By expanding its areas of expertise to include property acquisition, development and management, value engineering, full turnkey solutions and special projects, in addition to its traditional building capabilities, the Tiber Group was able to draw on their other income streams when construction activity declined. The company used profits from construction to buy and develop properties – commercial office developments, shopping centres as well as industrial developments – working on the premise that if one has “the right product, in the right location, there will always be demand.”

In 2014 Growthpoint purchased the Tiber property portfolio of 35 income-generating developments for R6.6 billion and the company, rebranded as Tiber Construction, returned to its core strengths but with capabilities enhanced by its experience in development and management.

Cardoso says that the company has a vision of continuity and of building for the future. Having been in the business for many years and having created iconic buildings, Tiber Construction is able to attract talented staff and retain them because of the company’s people and development orientation. Tiber Construction strives to achieve continuous excitement for their staff by providing new challenges, new techniques and new ways to stay relevant.

An open-door policy helps to keep staff motivated and excited to come to work each day. There is also a strong emphasis on career-path development.

Tiber Construction is a close-knit ‘family’ and the company gives staff members a supportive environment in which to grow and thrive. Management stays close to staff and strives to make their ambitions a reality.



This policy has certainly borne fruit as is evidenced by the fact that more than 30% of the staff complement is under 30 years of age and more than 50% have been with company for 10 years or more.

Asked how Tiber remains relevant, Cardoso explained: “We innovate to remain leaders in the field and to differentiate ourselves from the rest of the contracting fraternity. We aim to be a company that attracts blue-chip clients and ensure that we add value to their investments, thereby justifying the confidence they have shown in us.”

On the subject of innovation, Cardoso said the company was committed to eliminating waste at all levels of the project. “On a recent trip to Australia I saw what can be achieved to make projects sustainable and efficient. We in South Africa are behind the rest of the world in this respect and must move away from using an unskilled, unsupervised workforce that wastes time and money to fix mistakes,” he added.

Cardoso feels that the contracting fraternity must work to build a skilled workforce and investigate the possibility of incorporating innovative technology – precast elements and lightweight elements for example – along with adopting BIM



The impressive new R3 billion Discovery Headquarters in Sandton.

to better coordinate and manage projects. Tiber is investing in intensive staff training in BIM to be able to fully exploit the system's capabilities. This was applied very successfully in the Discovery Building and resulted in improved efficiencies that saved time and money.

Another example of adopting technology is how Tiber Construction's building yard is managed. The company owns, operates and maintains a substantial amount of major plant and equipment, enhancing its ability to service all types of contracts in an effective and cost-efficient manner.

The world class facility in Village Deep incorporates a secure 15,000-m² covered area equipped with overhead cranes to facilitate the efficient storing, handling, maintaining and transportation of plant and equipment.

Run like a factory, the Village Deep yard's computerised stock control system provides live reporting on the status of each stock item, enabling very accurate planning and scheduling of plant and equipment. This minimises waste and gives staff a sense of pride in a yard that wins safety awards.

In fact, the Village Deep Yard achieved first place in the 2012, 2016 and 2017 National MBSA Health and Safety Awards and has, since 2011, never ranked lower than third place. When not winning, it has generally walked away with the second-place awards.

However, it is not only the Village Deep Yard that has won safety awards, the Tiber Construction website lists a very impressive list of awards for its projects and its staff members on those projects. Since its listing began in 2006, not one year has gone by without recognition.

With today's emphasis on 'green building' it is gratifying to find a formal Environmental Policy and GBCSA membership certificate displayed on the website. Tiber's 'green' policy states: "The management of Tiber Construction, striving for excellence in all we do, recognise the impact that our activities may have on people and the environment. We are committed to implement and maintain, as far as is reasonably practicable, the activities of the company in such a manner, as to prevent harm or damage to persons, property respectfully, and the environmental footprint."

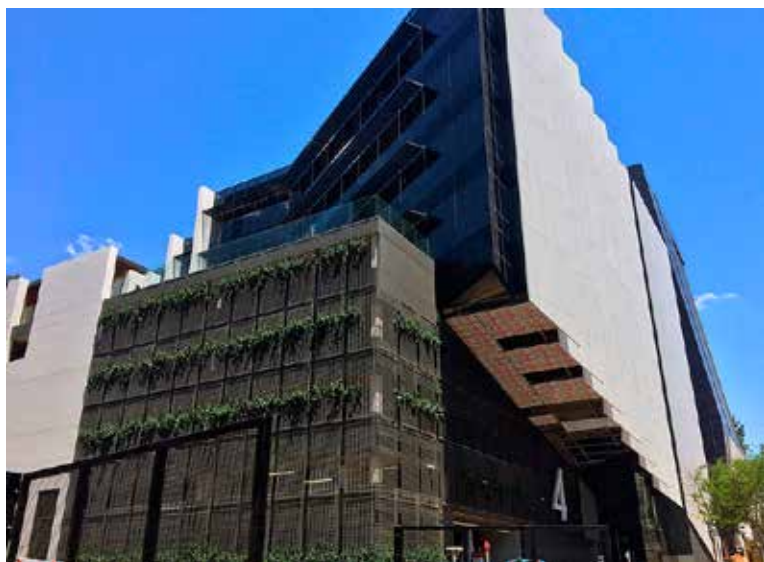
It goes on to describe the measures that will be taken to implement this policy on all its projects. This has ensured that a number of projects, past and present, have been awarded 4 and 5 Star GBCSA ratings. These include 4 Stan Road (4 Star); Anslow Park Phase 2 (4 Star); Discovery (5 star); and 140 West Street (4 Star).

Tiber is also campaigning for contractors to be part of the planning process from the very outset so that they are able to give advice on aspects of the design (for example buildability) that could save time and/or money later in the project. Because the company has comprehensive experience and expertise in property development, they can help realise meaningful savings.



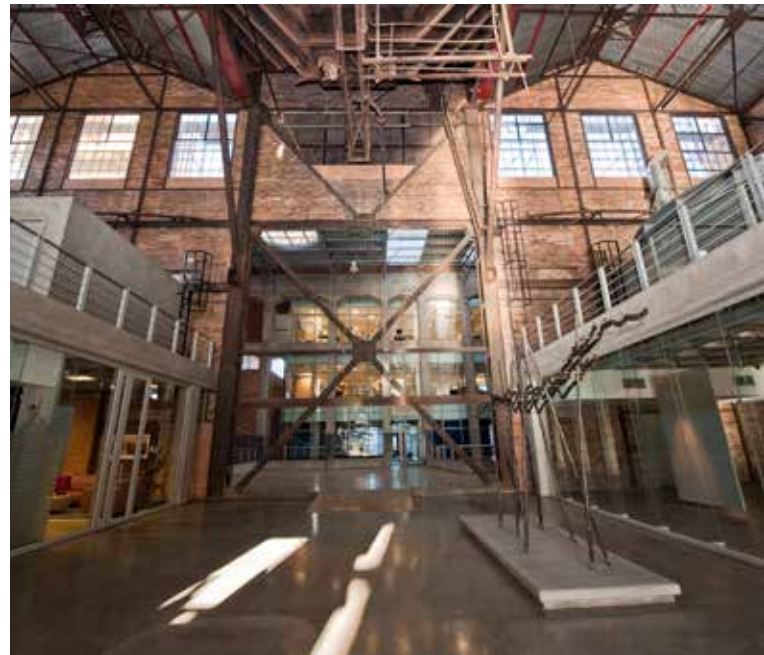
The Norton Rose Fulbright building at 15 Alice Lane, Sandton.

4 Stan Road office development has a 4-star Green rating.





The historic Turbine Place redevelopment and below the Norton Rose Fulbright building.



The interior of the Turbine Hall in Turbine Place, Newtown.



Cardoso says that Tiber Construction chooses their clients carefully and has built up a loyal client base – owners who want quality and longevity for their developments and don't just opt for the lowest-price tender. These are clients who understand, he says, that "price is what you pay, value is what you get."

The company continues to be pro-active in creating its own pipeline of projects. There is always a financial risk in participation, but this can be offset by being prudent in the good times.

"We build for the future," Cardoso says. "For example, the world-class Sandton Gate mixed-use precinct that we are developing in partnership with Abland, will be rolled out over a 7-10 year period."

The intention is for every commercial building in Sandton Gate to obtain a minimum 4 Star Green Star SA rating. The entire precinct will be Green Star SA rated and Sandton Gate is one of the sites being used as a pilot in the development of a precinct rating tool by the Green Building Council of South Africa, which will in future be widely applied.

Asked which buildings, of the many projects that bear the Tiber Construction stamp, he regards as his most memorable, Cardoso explains: "A watershed for the company was the Norton Rose Fulbright building in the Alice Lane precinct. We went into that project as one company and came out another. The project gave us all a new confidence in our ability to tackle structures so striking that they will forever be part of the city skyline. It also brought added prestige and an increased public 'brand awareness' for Tiber Construction.

"And, for a completely different reason, the Turbine Hall redevelopment is special for me. It was a truly satisfying experience to be part of the preservation of a heritage building while at the same time creating a successful, efficient and modern working environment."

John W. Gardner's quote on the Tiber Construction website "Excellence is doing ordinary things extraordinarily well" epitomises the positivity and enthusiasm of a company that can certainly look forward to another 66 years of creating memorable buildings. ■

More information at: www.tiber.co.za



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South Africa's cities of the future: are we #ReadyToDeliver?

With Africa's urban population growing at 3.5% per annum and 65% of growth happening in smaller cities and urban areas, pressure on our cities and their infrastructure is increasing. Given that the median age of African cities is less than 20 years old, Rajesh Harripersadh, PPC key accounts manager, notes that the future of our country and continent is critically linked to the success of our cities. This has to start with infrastructure development – meeting current needs while gearing for the medium and long-term future. This was an important discussion at the 2017 Safcec (South African Forum of Civil Engineering Contractors) conference in October.

Themed #ReadyToDeliver, this year's conference unpacked some of the most critical challenges facing the local engineering and construction industries, including when the sector can expect to see crucial spending decisions made on key infrastructure upgrades and new builds.

"With Africa set to reach its demographic dividend by 2050 and our country's population becoming increasingly youthful, cities currently find themselves facing either a massive challenge or an opportunity," says Harripersadh. "For South Africa and Africa to capitalise on and realise this opportunity, we cannot plan and execute as we have in the past. We also have to make critical decisions now – without hesitation or delay in committing to key projects."

Changes in how we live, work and interact in cities, coupled with space and sustainability constraints as well as mobility and technology requirements means that a new approach is needed for design and infrastructure creation. "Urban areas of the future cannot be modelled on cities of the past. They must boost business; enable convenience and encourage suburban activity; and bring work closer to home – mitigating the time and cost of travel. They must also reduce pressure on land and existing infrastructure in towns and cities to ensure long-term sustainability." Harripersadh adds that integration and functionality must enable communities to thrive and help to combat the poverty that is becoming systemic in our urban areas by creating access to key infrastructure.

He emphasises that the massive scale of development needed – and the time this will take to deliver – means that decisions about investing in fully functional urban areas that meet integrated needs must be made now. "Government and the greater cement industry need to work harder to clarify policy uncertainty, commit resources and finance, and unlock procurement processes to initiate both new build projects and upgrades and maintenance work on critical infrastructure. This will ensure we get the best possible value from infrastructure throughout its lifetime, as opposed to starting to rebuild after disasters or system failure."



With Gauteng alone currently planning vast new human settlements, and healthcare, education and recreation facilities, as well as solving how best to integrate land-use for residential, commercial and industrial purposes, the future vision is a compelling one – if players work together to create a conducive collaborative environment.

"We need to work together to take advantage of local development opportunities and shape the cities and urban areas we live and work in. As an industry, it's up to us to drive this change. Only then will we ensure that future cities are sustainable spaces where all our communities can thrive," Harripersadh concludes.

About PPC Ltd

As a leading supplier of cement and related products in southern Africa, PPC has 11 cement factories in South Africa, Botswana, DRC, Ethiopia, Rwanda and Zimbabwe. In 2016, PPC commissioned its fifth milling depot, located in Harare, Zimbabwe. The recent commissioning of PPC's new plants in DRC and Ethiopia bring PPC's capacity to around eleven and a half million tonnes of cement products each year. As part of its strategy and long-term vision, PPC is expanding its operations in South Africa with the construction of a new kiln line (SK9) at PPC Slurry outside Mafikeng in the North-West province.

PPC's Materials business, comprising Safika Cement, Pronto Readymix (including Ulula Ash) and 3Q Mahuma Concrete, forms part of the company's channel management strategy for southern Africa. PPC's footprint in the readymix sector has grown to include 26 batching plants across South Africa and Mozambique and the capacity to produce half a million tonnes of fly ash.

PPC also produces aggregates with its Mooiplaas aggregates quarry in Gauteng having the largest aggregate production capacity in South Africa. PPC Lime, one of the largest lime producers in the southern hemisphere, produces metallurgical-grade lime, burnt dolomite and limestone. ■

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A Terraforce wall at Llwyn Onn residential complex in Holywell, Wales.



This wall in Sheffield is a perfect showcase for a DIY project.

Turning a corner with Terraforce UK

Seven years ago, Peter Craven, Terraforce UK, and his business partner Rebecca Lents, recognised the potential for Terraforce to become a sought-after landscaping and erosion control product for the commercial and residential construction industry in England, Scotland and Wales.

Says Craven: "Terraforce has so many applications and finishes, offering versatility unmatched by other retaining wall products locally available. By simply turning the block around you can have a different finish to your wall, as well as having a rock face option and colour choices."

After introducing the L15 block to local contractors and civil engineers, Craven's predictions have proven to be correct.



Derek Turner of the Green Company in Brill, a village in Buckinghamshire.

Karin Johns, marketing manager, Terraforce South Africa notes: "Having visited the UK recently to meet Terraforce clients in Wales and England, I was very happy to see how wholeheartedly building contractors have embraced the Terraforce retaining block system. All of them praised the straightforward installation and ability of the block to turn a corner easily."

Having documented four sites all over the country, Johns says it was a joy to see the L15 blocks installed with a great degree of workmanship: "Every site I visited was impeccably installed. Each contractor was happy to recommend Terraforce and said they would be using the blocks again. I could tell that a big effort had been made to get every job just right."

The first Terraforce retaining wall Johns visited was the Cornish town of Rock, a holiday resort across the Camel Estuary from the fishing port of Padstow. Installed by Ross Campbell Contractors, the 4000-block wall is built with starter bar to the top of the vertical section, with concrete infill, a double-block layer and no-fines concrete infill for extra reinforcing. The sloped section has a geogrid layer placed every second row of blocks. Excess water is drained by a perforated 110-mm drainpipe via two discharge points.

Another wall was installed at Llwyn Onn, new residential complex in Holywell, Wales. Here the round-face finish was chosen to retain a four-metre-high building platform for some of the new homes on site. The 3000-block wall was installed with the first six courses concrete filled and then completed with geogrid reinforcing for the rest. A filter layer in the backfill guides any excess water into a perforated 100-mm drainage pipe that runs along the length of the wall. Jon Bond, contracts manager for the developer, Williams Homes (Bala) Ltd, says they will be using the blocks for other projects: "The block is affordable in comparison to other earth retaining solutions, easy to install and transport and in the next season we will be establishing some plant cover, which will finish the wall nicely."

The next wall Johns visited was a perfect showcase for a DIY retaining wall. Situated in Sheffield, the small retaining wall stands out with a creative pattern of grey and red rock-face L15 blocks. Martyn Symonds, who laid the blocks with the help of a family member, says he loved the versatility of the blocks:

"I went onto the Terraforce website and all the information for installation was easy to find. I then played around with the different finishes, initially setting up a small 'test wall'. The fact



Ross Campbell Contractors erected this 4000-block wall in Rock, Cornwall.

that the blocks can be laid without mortar is what attracted me to the system, I knew I could do this myself without too many tools!"

Symonds chose an alternating-colour pattern with a rock-face finish. He first dug a trench for the foundation filled it with 25-40 mm compacted aggregate 200-250 mm deep.

Says Symonds: "Once the first layer of blocks was laid perfectly level it was surprisingly easy to finish the wall. I would definitely do this again!"

Finally Johns visited the village Brill, an hour outside London, where Scott Morton, Landscaping & Agricultural Services Ltd, introduced the blocks to Derek Turner, The Green Company,

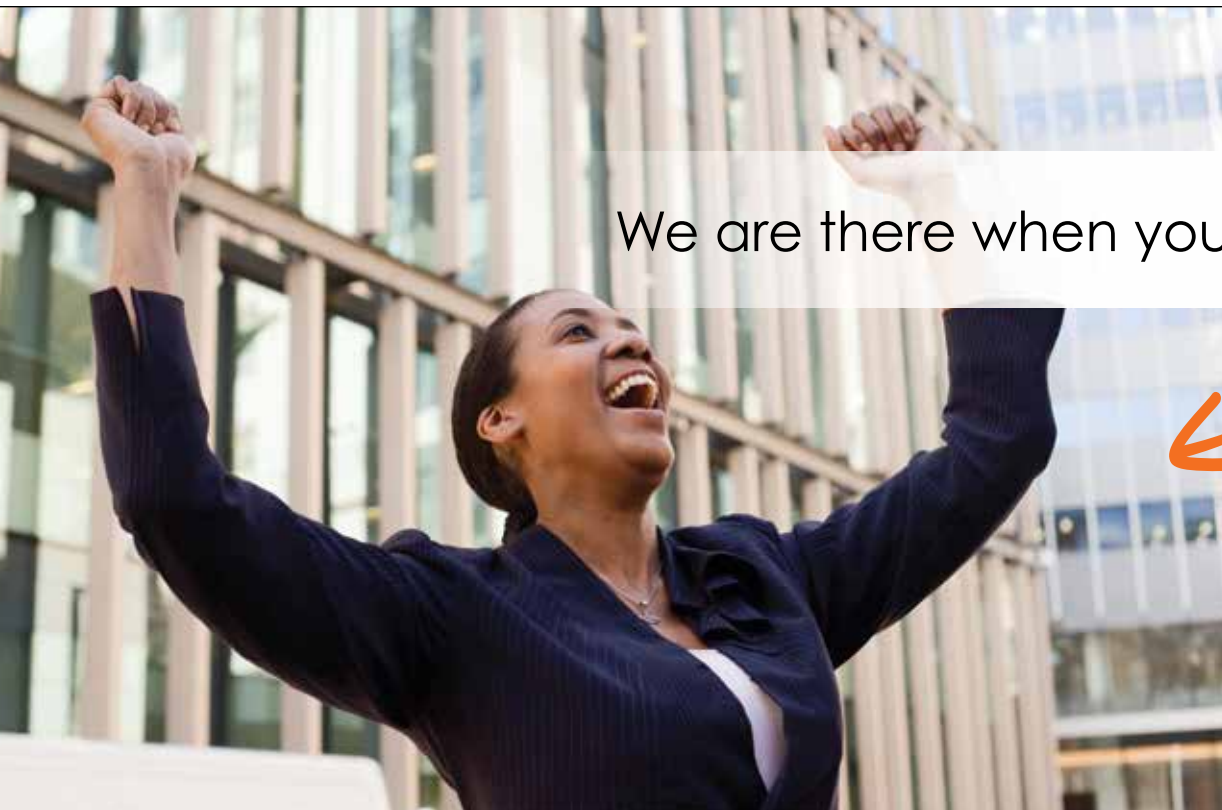


In Brill Terraforce blocks provided an affordable retaining wall for a cut slope.

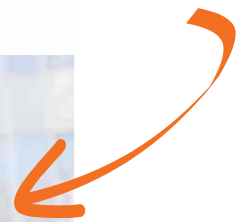
who needed an affordable retaining wall solution for an exposed cut slope in the garden of a home being renovated. Says Turner: "I would absolutely use the blocks again, they turn a corner easily and are fast and easy to install."

The wall reaches 2.4 m at its highest point, with a double layer of blocks for the first six courses. Backfill consists of self-compacting backfill of 20-mm shingle. In this instance all blocks are concrete filled.■

More information from Terraforce,
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Technicrete Enviro-Wall installed at new CTM factory in Polokwane

A positive customer experience is what all retailers seek to achieve through their sales outlets. This includes a good aesthetic appearance internally and externally, which is what the new CTM retail outlet in Thornhill, Polokwane considered when choosing Technicrete Enviro-Wall retaining wall blocks for the external features for their newest retail outlet.

The Enviro-Wall system is a gravity retaining wall constructed with dry stacked interlocking precast blocks. The configuration of the retaining wall can be changed by opening or closing the space between the blocks. In the open configuration, the cavities between the blocks can be filled with soil, ideal for plant growth due to the moisture collected in the open spaces.

The Enviro-Wall is reversible, enabling a smooth or rough texture to be chosen, or a combination of both, which can create a unique design.

Technicrete supplied 10,962 blocks to the CTM project, which was installed by FN Civils.

Marius Nel, project manager and Frikkie Nel owner of FN Civils said: "We have worked with Technicrete for over 30 years on various projects, so the quality of their product and soundness



of their technical recommendations are not up for question. They have a proven track record. The final appearance of the Enviro-Wall product at CTM is testimony to this."

"The Thornhill CTM project was awarded to FN Civils who sought our technical input to select most appropriate Technicrete product for the retaining walls. We recommended Enviro-Wall as being the best option for its durability in walls requiring reinforcement with horizontal geogrids,"

said Peter Hilton, sales representative for Technicrete.

The Enviro-Wall system is suitable for installation on a wide variety of embankment heights, although high and vertical walls should be supported by a reinforced fill. Foundation requirements will be dependent on the wall's height and underlying soil conditions.

The system is suited to bridge abutments, earth embankments, cut slopes, landscaping of cut and fill areas around buildings, the protection of steep channels, river banks and culvert inlets and outlets. The Enviro-Wall also has the ability to reduce noise when installed alongside roadways.

Technicrete ISG is part of the Infrastructure Specialist Group which also comprises Rocla and Ocon Brick. ■

Giyani's Gon'on'o village road upgraded

Situated in the north-east of the Limpopo Province, in the heart of the Limpopo bushveld, is the rural town of Giyani. While the area is comprised mainly of rural villages, infrastructural upgrades are required for the continued upliftment of the local communities in terms of residential and transportation facilities and skills development.

Technicrete was recently contracted to supply all the paving and kerbs required to upgrade Phase Two of a 5.10-km gravel access road, the D3892, by Tzaneen-based PGN Civils at Gon'on'o Village. The entire upgrading project is valued at R8 million (for the paving and kerbs) and was initiated by the Limpopo Department of Public Works, Roads and Infrastructure.

PGN Civils director Tintswalo Mothupa commented: "The upgrade of the gravel access road formed part of a general upgrading project for the Gon'on'o Village area. The upgrade of the road makes vehicle traffic easier and the sidewalks make it a safer environment for pedestrians. Additionally, it was important that members from the local community received skills training in order for them to participate in the application of the paving and kerbs as well as other associated construction activities. The ability to upskill and become employable is critical in these outlying rural areas."



Technicrete supplied 36,000 80-mm grey class 40 DZZs, 5,000 80-mm terracotta DZZs as well as 1,500 figure 8c mountable kerbs.

Mishack Mdhuli, sales representative for Technicrete ISG in Polokwane added "Every infrastructure project is an important project, particularly where the local community members can receive skills training to earn or supplement their income as they did at Gon'on'o Village. We take our role in such contracts very seriously, not

only in our ability to supply a quality product to make such upgrades successful and long lasting, but to ensure that communities also come away with useful skills for the long term. It is always a pleasure for Technicrete to be part of these kinds of projects".

Technicrete offers an extensive range of paving and kerbing products not only for infrastructure related projects but also for commercial, industrial and residential developments.

Technicrete ISG is part of the Infrastructure Specialist Group which also comprises Rocla and Ocon Brick. ■

**More information from Guinevere Thomas,
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email: Guinevere.Thomas@isgroup.co.za
www.technicrete.co.za**

Kwena Rocla culverts for Botswana road upgrade



Kwena Rocla, part of the Infrastructure Specialist Group (ISG) of companies, was recently awarded the contract to supply the culverts and inverted base slabs for the upgrading of the Gaborone to Botatle Road project which will upgrade the road to a dual carriageway standard in Botswana. This upgrade forms a part of the Botswana Government's Economic Stimulus Programme and is scheduled to take two years to complete.

This major project commenced in March 2017 and while the Botatle Road is upgraded to a 19.4-km dual carriageway status, the existing road will continue to be operational albeit with 24-hour traffic management in place to cope with the high volume of traffic.

Kwena Rocla were chosen to supply culverts and inverted base slabs to the project due to the well-known quality and longevity of their products.

Kwena Rocla will be supplying 7,696 rectangular portal culverts of varied dimensions with inverted base slabs.

Mbuya Basoli, sales and marketing manager for Kwena Rocla commented: "The project aims to improve the high traffic volume and congestion on this route while limiting major disruptions to local business and residents. We have previously worked with CCC/CSCEC JV on projects and believe that our ability to assist them meet project challenges is what makes our relationship a strong and mutually beneficial partnership". Drainage works, pedestrian and cattle underpasses will also be constructed with the installation of street lighting and traffic signals throughout the project. ■

**More information from Guinevere Thomas,
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Precast at the CORE of the 2Ten Hotel

The new six-storey 2Ten Hotel is immediately noticeable by the slender and elegant vertical and horizontal lines that traverse the full length and width of the east, west and south walls of the structure.

Lean horizontal and vertical strips of precast concrete coping on the perimeter of the north side seamlessly blend in with the exposed concrete columns and roof slabs, as well as other building materials, to complete the external aesthetics. The look is enhanced by the rounded chamfers, as well as smooth and silky finish of each precast concrete panel and coping that makes up the external façade of the new hotel.

The façade of the structure was the most complex aspect of Corestruc's involvement in this project, which entailed accurate installation of more than 800 m² of precast concrete wall panels and coping.

By August, the Corestruc team was finalising minor aspects of its contract, while the various specialist trades had already commenced operations.

Corestruc's team started working on the façade earlier this year after completing the bulk of the superstructure – precast concrete columns, beams and slabs.

George Magwabeni, developer of 2Ten Hotel and owner of EMM Convention Centre, was introduced to the company's modular construction system by Paul Botha the structural engineer on the project. Representing VBL Consulting Engineers, Botha had previously worked with Corestruc and CORE Group companies on a successful project.

The professional team agreed that the system would meet the client's requirements for a durable build that would add value for many years, while providing a modern and sophisticated look.

A modular approach would also overcome complexities associated with in-situ construction techniques, especially on this extremely congested site. In addition to the EMM Convention

Centre to the right, the site abuts another building expansion programme to the north. Only a few metres separates the west wall of the new 2Ten Hotel from the existing EMM Convention Centre's boundary.

Willie de Jager, MD of Corestruc, says a precast concrete system eliminated the need to erect scaffolding, to have large shuttering and formwork teams on site, and to co-ordinate building material deliveries.

"From the outset, we were aware that the success of the project relied on close co-ordination between our teams and CoreSlab, the manufacturer of the system. During the early design phases, we worked closely with our sister company to determine the optimal construction sequence, which relied on timely supply of the precast concrete items," De Jager tells *Concrete Trends*.

Meticulous attention was paid to the connection system designed and manufactured especially for this project to avoid unnecessary handling of the panels and coping, while striking a balance between cost and site conditions.

A template to guide the installation teams was also finalised, and work commenced with bolting and grouting the coping into the hollow-core slabs at each floor level of the structure which, in turn, support the large wall panels to complete the external precast concrete shell.

Up to nine wall panels were delivered to site and installed in a day, and accuracies between two millimetres (mm) and three millimetres were achieved by Corestruc's installation team.

They were dispatched by CoreSlab on a just-in-time basis due to the severely constrained working conditions. There was just enough space for the tower crane laydown area behind the structure, while deliveries also had to be co-ordinated via the main entrance to the EMM Convention Centre. Once on site, trailers had to be separated to allow the truck to manoeuvre around the tower crane.



Jaco de Bruin, MD of CoreSlab, says a special self-compacting concrete mix was designed for this project to ensure swift turnaround times at the batching plant, and has since been introduced to all the company's other projects.

Precision in the casting process was also facilitated by the specialised forms that were imported from Australia.

As is the case on all of the company's projects, a system of pre-checks and post-checks are undertaken throughout the production cycle, while sensors inside the sophisticated plant constantly monitor the temperature and moisture content of the concrete mix.

Only aggregate from reputable suppliers enters the production cycle and silica fume supplements a portion of the cement to create a denser concrete micro-structure. A separate steel-fixing yard ensures high-quality reinforcing.

The skills of Corehire, a CORE Group specialist in heavy lifting, was appointed to erect the tower crane once the foundations had been cast. Positioned in the middle of the site, it provided adequate reach to help Corestruc's team of seven, including the crane operator, erect the precast concrete structure successfully.

Extending all the way from ground level to the roof of the hotel, the internal continuous columns vary between 60 and 80 MPa, with each column bearing about 400 tons, including structural steel, as well as the precast concrete floor slabs and beams.

The latter span from 5,5 m to 8 m between the centre columns, thereby optimising the use of floor space. They are connected to the perfectly aligned columns that were installed according to a template placed on top of the foundations in the very early stages of the column installation.

De Jager says that, as is the case on all of the company's projects, nothing was left to chance. A total station was used to align the columns to achieve the desired levels, demonstrated by the small tolerances in height achieved by the installation teams at this stage of the build.

Once the beams were in place, the floor slabs were laid and then filled using a non-stitching self-compacting concrete designed by Corestruc to provide high weatherproofing properties. This is in addition to the extremely good curing characteristics of the grouting.

Corestruc took ownership of the site when the foundations had already been completed by another contractor. These needed to be demolished and rebuilt by Corestruc, adding time pressures to the works programme. The professional team had to contend with unpredictable and heavy rainfalls in Limpopo. The notorious clay ground conditions in the area, when wet, make it impossible to operate heavy equipment, halting deliveries to the site.

2Ten Hotel will open in June 2018, by which Magwabeni will have almost doubled available room capacity at the very popular EMM Convention Centre in Sibasa.



Visitors will enter 2Ten Hotel via a wooden bridge spanning a swimming pool to enjoy the amenities, which include a bar, restaurant and gymnasium. The top floor provides spectacular views of Sibasa's rolling green topography. ■

**More information from Tel: 087 232 2462
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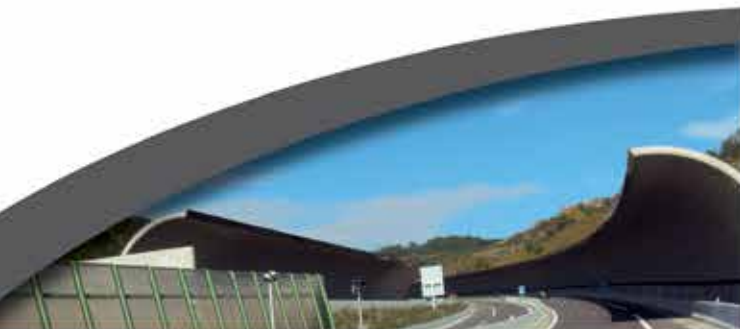
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SPC continuously adapts to clients' needs and provides them with innovative solutions, such as the Gautrain tunnel segments and noise attenuation barriers.

To complement our full range of services, SPC offers research, development and structure design on new products, for any type of structure, thanks to the flexibility of SPC's high production capacity factory.

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ISO 9001:2015



An exciting recent development underscores the vision of Louis-Xavier Havard, CEO of SPC, "Our core focus is to partner our clients for the ultimate solution for any specific project." Operating in South Africa since 1965, SPC (Southern Pipeline Contractors), part of the French international construction groups, Sogea-Satom and Vinci, partnered multiple consortiums and construction companies to produce standard, as well as various specially designed and engineered pre-cast products.

SPC has recently procured a license from another giant in the construction industry based in Europe, namely Matière, to manufacture their complete range of innovative products. "This further extends our product range and is to the immediate benefit to the construction industry in Southern Africa", says Havard.

This development strengthens SPC's production of innovative pre-cast concrete products, from concept, design and manufacture, to on-site delivery.

Recognising its principal business as a pre-cast concrete manufacturer, SPC is ISO certified to the highest, and latest, regulations and specifications - ISO 9001, 2015. For more than 50 years, Southern Pipeline Contractors has developed and produced superior quality Spigot & Socket, IWJ pipes with various types of special inner and sacrificial linings for various applications, jacking and interlocking concrete pipes, box culverts and round and square manholes.

In the past decade, the company had been contracted by the Bombela Consortium to design and manufacture





For more than 50 years, SPC provides a full range of precast products, supported by continuous research, development and structure design backed the flexibility of SPC's high production capacity factory.

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ISO 9001:2015

the tunnel segments for the underground Gautrain section between Rosebank and Park Station. Furthermore, at noise sensitive areas along the Gautrain route, SPC designed and produced 15 000m² absorptive and reflective noise barriers. These tunnels segments, as well as noise attenuation barriers were manufactured to a life-cycle standard of 100 years, the high standard set for all pre-cast elements for the Gautrain project. This had been the highest standards ever set for any engineering project in South Africa.

Noise Barriers are a basic construction requirement in all the major countries and cities of the world, and the design and construction thereof are a first introduction of this essential technology against noise pollution in Southern Africa. SPC's highly effective noise barriers are visually and aesthetically pleasing.

Committed to reduce the impact on the environment, SPC is committed to effective waste management practices and the prevention of pollution, though efficient use of resources. Therefore, SPC complies with ISO 14001:2004 in order to make our environment a better place for all our people.

SPC is proud to offer its extensive experience of more than 50 years, to provide innovative, robust and importantly cost-effective solutions to the construction fraternity in Southern Africa. Please call them at 011-914-8500/1/2/3.

These pictures provide a brief oversight of the design and technology expertise of Matière, in association with SPC for the benefit of Southern African clients.

SABS



AfriSam readymix for Ultimate Dynamic's Droogheuwel Reservoir Project

Gauteng continues to be an urban magnet drawing job seekers from far and wide, making the Droogheuwel municipal bulk water reservoir in Randfontein a vital piece of infrastructure to keep sufficient water flowing to the growing area of Randgate.

Working on this 20-megalitre reservoir is Stilfontein-based contractor Ultimate Dynamic, supported with concrete from construction materials leader AfriSam. The project is due for completion in March 2018.

According to Pieter van der Merwe, the Ultimate Dynamic project manager, the 47.6-m-diameter structure, with a wall thickness of 500 mm, will require about 2,000 m³ of 40-MPa water-tight pump-mix concrete.

"After the contract was awarded in December 2016, we started preparation on site in January and were ready for our first concrete pour in April," says Van der Merwe. "We are now about a third of the way to completion, and are busy on the third lift (or level) of the reservoir wall, which will require eight lifts to take it to the required height of almost 13 m."

Readymix is being delivered from AfriSam's Technikon plant in its six cubic metre capacity trucks, with each pour comprising about 60 m³ – or ten trucks of readymix. Concrete is raised and deposited into the formwork moulds by a truck-mounted boom pump with a reach of over 40 m, according to AfriSam production team leader Mark Wernich.

"We currently deliver on average once every seven working days, and our plant is conveniently located less than 25 km from site," explains Wernich. "Our production capacity and



AfriSam's deliveries from their Technikon plant proceeded like clockwork.

specialised equipment will also allow a continuous pour of about 380 m³ for the roof of the reservoir, once the walls are completed towards the end of the year."

Van der Merwe says the project also covers the reinforced concrete construction of the reservoir walls and roof, as well as all pipes, valves, access manhole doors and step ladders. It also includes the inlet and outlet chambers for the reservoir, pump rooms and the access road from the existing tar road nearby.

"It has been a smooth operation working with AfriSam," he says. "We place our site orders with Ultimate Dynamics's head office, which contacts the AfriSam call centre. The concrete is then dispatched from the plant in Technikon in Roodepoort, and it has all proceeded like clockwork."

He highlights the value of AfriSam's quality control function, which includes conducting their own concrete tests on site with every delivery, ensuring that concrete of the correct strength has found its way into the structure.

"It is vital that tests are conducted on every batch, and the results carefully recorded, so that our client can be assured of the integrity of the work," says Van der Merwe. "With a major structure like this, holding such a large volume of water, there needs to be great attention to every detail."

Wernich says that AfriSam's quality systems are a key element of its offering to customers.

"Even when our customers do their own testing, we also test and keep records that they can refer back to if there is ever any query about any particular batch of readymix delivered," he says. "AfriSam's plant laboratories – based at our cement, aggregate and readymix operations – ensure ongoing process control testing on all our products."

Once the Droogheuwel reservoir is complete, the pipeline to feed the new reservoir will be laid over a distance of about seven kilometres through the town of Randfontein, linking it to an inlet pump station on one of Rand Water's main lines. Water from the reservoir will then be pumped from the outlet chamber on site to the pressure tower about two kilometres away, from where it can enter the reticulation system serving the surrounding area. ■



The 20-megalitre Droogheuwel bulk water reservoir underway in Randfontein; with the first concrete pour conducted in April, the structure is scheduled for completion in March 2018.

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South African-developed concrete tough enough for Trump's wall

The South African company Poynting has developed and patented a tough concrete called HeliCrete, which is suitable to protect valuable assets from criminals.

The concrete was developed as part of Poynting's MagiCube secure concrete container project. The containers are used to fight the scourge of battery theft and base station vandalism in South Africa.

The MagiCube design considers cable access, weather protection, heat dissipation, and protection against theft and vandalism. Poynting's HeliCrete makes it nearly impossible for criminals to break and access an enclosure.

Andre Fourie, Chairman at Poynting Group, provided a summary of the tests they undertook on three different types of concrete to demonstrate their strength. The concrete tests were:

- 100 MPa with 19-mm rebar spaced 75 mm apart – it took 8 hits with a sledgehammer to destroy the concrete block.
- 100 MPa with 19-mm rebar spaced 300 mm apart with helices/springs – it took 50 hits with a sledgehammer to destroy the concrete block.
- 100 MPa geopolymer concrete with metal shavings (HeliCrete solution) – It took 200 hits with a sledgehammer to damage the concrete block.

The geopolymer cement costs the same as normal cement, but sets much faster and is much harder. It proved more resilient than normal concrete, and when combined with the HeliCrete process proved to be up to 20 times more difficult to break.



100-MPa geopolymer concrete with metal shavings after 200 hits.

The HeliCrete test block was still intact after 200 blows – and it would take much longer to get into when used as part of an enclosure.

"HeliCrete allows us to make an enclosure with much-reduced dimensions and weight while retaining or improving on its strength," said Fourie.

Fourie said they used spirals of mild steel metal shavings rather than "springs" (high tensile steel helices) in their HeliCrete tests, and that springs are even better. However, Poynting has not tested springs with the geopolymer cement in block form yet.

He said Poynting is already using spring-based 100-MPa HeliCrete in their 'next generation' products and have achieved excellent results. ■

Source: <https://goo.gl/ew55TD>

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Admixtures give concrete innovation a lift

With architects and designers worldwide realising the extraordinary possibilities achieved by admixtures in concrete, the South African construction sector is also seeing the benefits of innovative thinking in concrete mix design.

Using the iconic Museum of European and Mediterranean Civilizations (MuCEM) in Marseille, France, as an example, Hannes Engelbrecht, Chryso Southern Africa general manager: marketing and commercial sales, says contractors are starting to embrace the power of modern technologies.

“The MuCEM is a pioneering design utilising the flexible architectural and strong structural properties of ultra-high-performance fibre-reinforced concrete,” says Engelbrecht. “The concrete structure includes a 115-metre slender ‘super-concrete’ pathway, built without arches or stays, and constructed by a team of specially trained workers.”

He says that South Africa is already seeing more regular use of high-strength concrete and the uptake of a range of admixtures for special applications. Also, as buildings become taller due to growing pressure on land demand in urban areas, contractors need to pump concrete to greater heights.

“Superplasticisers from Chryso Southern Africa are invaluable in achieving the plasticity and workability needed for the concrete to pass more easily through reducers and move through bends in the pump and pipeline without causing blockages,” he says.

Admixtures are also used to create a concrete with the desired slump at a lower water:cement ratio, as well as obtaining specific concrete strength using a lower cement content. Lower cement content results in lower carbon dioxide emissions and energy usage per volume of concrete produced. This type of admixture improves concrete properties and helps with the placement of concrete under difficult conditions.

Air-entraining admixtures normally come in two forms; as dedicated air-entraining admixtures or as water reducers/plasticisers/superplasticisers which, as a secondary function, entrain air to a controlled greater or lesser degree. The entrained air bubbles range in size from 0.05 to 0.5 mm in diameter and are evenly dispersed throughout a concrete mix; as opposed to uncontrolled entrapped air, which is in the form of much larger air bubbles that may not necessarily be evenly dispersed throughout the concrete.

In a South African context, controlled air entrainment is utilised in a concrete for a number of reasons including to compensate for a lack of fines and in the finer fractions of a fine aggregate. These aggregate fines essentially form part of the

paste volume and a lack of these will decrease it and as a result decrease mobility in the concrete. The micro air bubbles act like tiny ball bearings, in place of the fine aggregate particles which are lacking. This increases cohesion, reduces rate of bleed and total bleed in concrete, as well as reducing segregation, which could lead to surface defects or in extreme cases honeycombing due to the increase in general cohesive mobility of the mix. In many cases air entrainment may, in addition, act as a relatively effective water reducer.

In countries, other than South Africa, that have long very cold winters, minimum air entrainment levels are specified for concretes in order to vastly improve their durability. Air entrainment within these concretes allows them to withstand cycles of freeze-thaw more effectively.

Water that is contained within the concrete’s capillaries will expand when it freezes and the entrained air bubbles provide comparatively large outlets into which the ice can expand. This prevents pressure build up in the capillaries which could potentially result in cracking.

The need to control air entrainment is essential; the basic rule of thumb is that for every 1% of entrained air there is a loss of between four to six percent of the concrete’s 28-day compressive strength.

Hardening and shrinkage-compensating admixtures play a very important role in modern concrete mix design. Added to concrete during initial mixing, this type of admixture can reduce early or long-term drying shrinkage, preventing cracking that could undermine the durability of the finished product.

Chryso’s Fill Free technology facilitates a cohesive concrete paste which is less sticky. Stickiness can increase pipeline pressure, reducing the flow of the concrete in the pipeline. A paste that is too sticky will also make it difficult to maintain a constant rate of pumping. This technology also provides the opportunity to design self-compacting concretes (SCC), with superior flow/mobility characteristics.

“Concrete admixtures have evolved substantially over the past few decades,” Engelbrecht says. “As new construction techniques are devised, these admixtures are becoming more technologically advanced, with benefits including improved concrete quality and manageability, as well as the acceleration or retardation of setting time.”

As contractors and end-users look for products with a lower carbon footprint, many are opting for concrete mix designs that contain much higher proportions of extenders or cement

Chryso admixtures were used in the construction of the PwC Tower.



The iconic Nelson Mandela Bridge where Chryso admixtures were used.



replacements. The ready availability of pulverised fly ash (PFA) from power stations in South Africa has made this a popular extender, leading to the widespread use of extended cements.

“Chryso has played an important role in working with local contractors to facilitate the use of these extended cements without affecting the slump retention, the workability and the durability of the concrete,” Engelbrecht says. “The use of correct admixtures facilitates further extension of the concrete; Chryso has been involved in projects where in excess of 50% PFA has been used.”

Although extended cements do reach the required strengths, they react more slowly. The more pure cement that is replaced, the lower the early strength of the mix will be. Activators are therefore introduced to trigger the early strength characteristics of the concrete.

Chryso is constantly innovating its admixtures and decorative concretes to the extent that over a third of its market offerings are less than five years old, according to Engelbrecht.

Among the most recent product lines is LuminTech®, a remarkable range that contains a variety of different luminescent particles that are applied to the surface and incorporated into the concrete skin. Apart from its aesthetic value in illuminating concrete surfaces, this product can be used in walkways and paths to enhance the safety of pedestrians at night.

“During the day, the particles imitate natural aggregates, absorbing natural and artificial ultra-violet radiation,” he says. “After dark, they then release the energy to give an attractive luminous glow to concrete surfaces, illuminating selected areas of a building or home or outdoor area.”

LuminTech offers new and exciting design possibilities for architects and landscapers as well as home owners, enhancing architectural lines of an urban building at night, or highlighting a domestic terrace or the edges of a swimming pool.

The particles are available in four colours, and the intensity of the illumination can be adjusted by changing the volume of particles on the concrete skin.

A further innovation from Chryso is its Eco Dust range of dust suppressants, which is an environmentally friendly and water saving option, for reducing the amount of dust created by vehicles on a construction site or on a mine’s haul road.

This is discussed on page 65 in the African Issue of *Concrete Trends*. ■

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Ultra high performance fibre-reinforced concrete was used in the construction of the MuCEM.



The iconic Museum of European and Mediterranean Civilizations (MuCEM) in Marseille, France.

The 115-m ‘super-concrete’ pathway that leads to the MuCEM.



Fibre reinforced concrete.



Stretchy cement makes buildings immune to earthquakes

Researchers at the University of British Columbia have developed a form of concrete that is able to stretch without breaking, making it better able to resist the kind of forces produced by earth movements.

As all structural engineers learn when still very young, concrete is strong under compression but weak under tension. This material, which is about to make its debut at a Vancouver elementary school, has had its molecular structure altered to give it the malleability and ductility of a metal, which allows it to stretch rather than snap when subject to tensile forces. What is more, the material does not have to form the main structural frame of a building – rather, it can be sprayed on as a thin coating.

Unbreakable

The material has been called ‘eco-friendly ductile cementitious composite’, or EDCC, and according to its inventors it is able to resist earthquakes as high as 9.1 on the Richter scale – a rating that usually means more than a thousand dead and damage in the billions of dollars if it strikes an urban area.

This magnitude was last seen in the 2011 Tōhoku quake that led to the tsunami that destroyed the Fukushima Daiichi nuclear power station.

Salman Soleimani-Dashtaki, a doctoral candidate in the department of civil engineering, said: “We sprayed a number of walls with a 10-mm-thick layer of EDCC. Then we subjected them to Tōhoku-level quakes and other types and intensities of earthquakes – and we couldn’t break them.”

A YouTube video of the EDCC in action can be seen at <https://goo.gl/mthXdQ>. This shows a concrete panel being subjected to a simulated earthquake, and bending like a sheet of rubber.

How it works

The cement gains its ductility by an addition of plastic fibres, fly ash and other industrial additives. The use of ash allows the material to claim the ‘eco’ label.

Nemy Banthia, a professor of civil engineering at UBC, said: “By replacing nearly 70% of cement with fly ash, an industrial by-product, we can reduce the amount of cement used. This is quite an urgent requirement as one tonne of cement production releases almost a tonne of carbon dioxide into the atmosphere, and the cement industry produces close to 7% of global greenhouse gas emissions.”

Melanie Mark, the current Education Minister for the province of British Columbia, commented: “This technology has far-reaching impact and could save the lives of not only British Columbians, but citizens throughout the world.”

After the EDCC is used on the Annie Jamieson Elementary School, it will be made available to retrofit a school in Roorkee in Uttarakhand, a seismic area in northern India. Other future EDCC applications include resilient homes for First Nations communities, pipelines, pavements, offshore platforms, blast-resistant structures and industrial floors. ■

Source: <https://goo.gl/R3KRMi>



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a.b.e. products for two major highway construction projects

a.b.e. Construction Chemicals is supplying products for two major highway bridge construction projects in Gauteng: the new Bus Rapid Transport (BRT) cable-stayed bridge over the M1 near Sandton, and maintenance on several of the bridges on the N14 between the Hartbeespoort/Sandton and Lanseria off-ramps.

Daniel Lambie, a technical sales consultant for a.b.e. in Boksburg, says for the first phase of the new Rea Vaya BRT cable-stayed bridge construction, a.b.e. supplied the main contractor, WBHO Construction, with four products: duragrout, durarep FR, epidermix 395 and epidermix 345.



Work in progress on the N14 highway bridges for which a.b.e. Construction Chemicals is supplying three products.



a.b.e. supplied WBHO Construction with four products for the new Rea Vaya BRT cable-stayed bridge.

“duragrout is a non-shrink, cement-based grouting compound, containing graded siliceous aggregates and chemical reagents that prevent shrinkage during curing. The product can be used for bedding applications such as on column base plates, machinery base plates, bearing plates and crane rails. It is ideal for grouting anchor bolts, cables, starter bars, and top steel; and also for repairing cavities in concrete,” Lambie states.

The new 255-m-long BRT cable-stayed bridge will include dedicated bus lanes as well as cycling lanes.

The other a.b.e. products supplied to WBHO for this project are durarep FR, a fibre-reinforced cement-based structural repair mortar which is chloride-free and ready to use; epidermix 395, a liquid epoxy grouting compound; and epidermix 345, a solvent-free, wet-to-dry epoxy resin system with extended open time formulation.

Rens Pelsler, a.b.e. technical sales consultant, says for the refurbishment of the N14 highway bridges, a.b.e. is supplying the main contractor, Power Construction, with three products: silocoat, Dow Corning 890-SL and Dow Corning 888.

The Gauteng Department of Roads and Transport is undertaking a multi-million rand project to rehabilitate the N14. The project forms part of the Department’s mission to improve road conditions in the major arterial routes and improve the surface and sub-surface drainage.

The scope of works assigned to Power Construction includes the reconstruction of the road base and sub-base, milling out old asphalt in slow lanes and planing asphalt in fast lanes; construction of new concrete-lined side drains as well as new subsoil drains; construction of new bridge parapets and the provision of new fence line and guardrails.

a.b.e. is supplying products to Power Construction as well as to the sub-contractor, DSC Zendon, which is handling the refurbishment of sealing joints as well as the concrete repairs on the N14 bridges.

“silocoat is being block-brush applied by DSC Zendon to a total area of over 1,300 m² on the upstands of the bridges. silocoat is a two-part polymer modified cementitious coating that can easily be mixed on site and applied with a brush, roller or spray gun. The product cures to form a waterproof elastomeric membrane and has been widely used all over southern Africa and the Indian Ocean islands to waterproof new and old silos,” Pelsler explains.

Dow Corning 890-SL is a self-levelling joint sealant that requires no tools to apply. It can be extruded from well below freezing point to temperatures of around 50° Celsius and can extend by 100% and compress by 50%.

The sealant easily flows into irregular joint widths and, with a skin-over time of about an hour, allows for roads to be quickly opened to traffic.

“Dow Corning 888 silicone joint sealant offers much the same benefits as 890-SL and is ideal for the concrete bridge joints without any primer required for bonding,” Pelsler adds.

a.b.e. Construction Chemicals has been a wholly owned subsidiary of the Chryso Southern Africa Group since September 2010. Chryso and a.b.e. together provide a complete product solution for the construction industry. ■

**More information from Elrene Smuts,
Tel: +27(0)11 306 9000 / www.abe.co.za**



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Colourful concrete that glows after dark

CHRYSO Southern Africa has launched a new product that adds an attractive luminous glow to concrete surfaces after dark.

LuminTech®, the impressive new addition to Chryso's wide range of decorative concretes, comprises a variety of luminescent particles that are applied to the surface and incorporated into the concrete skin. The particles – which during the day imitate natural aggregates – absorb UV radiation, both natural and artificial, and then after dark release the energy to illuminate selected areas of a building or home.

Michelle Fick, executive relationship and project manager for the Chryso Southern Africa Group, says LuminTech® offers exciting new design possibilities for architects, landscapers, designers and home-owners.

"The innovative technology can be used to illuminate and enhance the architectural lines of an urban building at night, or highlight a domestic terrace or garden pathway, or the edges of a swimming pool. The intensity of the illumination depends on the volume of particles scattered on the concrete skin. Available in four colours, the particles are ideal for outdoor use as they are not epoxy-based," Fick explains.

She says LuminTech®'s glowing appearance can generally be seen for more than 10 hours after dark, and can be used as luminous nocturnal marking in lowlight areas or even replace



LuminTech® pathways absorb UV Radiation by day.



LuminTech® pathways are illuminated by night.

electric lighting on cycle paths, for example. The luminous concrete marking enhances quality of life as it clearly defines spaces making it easier for users to find their way in the dark.

"LuminTech® application merely calls for the particles to be placed on the concrete surface. It also requires no manual input to 'switch on' and just needs conventional decorative concrete maintenance: washing the surface occasionally with soapy water. Even in daylight, the particles offer designers creative potential: the choice of daytime colours differs from the colours glowing in the dark."

Fick says LuminTech® should ideally be used on exposed aggregate concrete in conjunction with Chryso's Deco Lav water-based surface retarder. The luminous particles are also suitable for polished concrete surfaces although this application is not widely used.

"For a building industry that is increasingly focussing on sustainability, LuminTech® is an environmentally-friendly light source as its particles are sourced from composite recycled material and natural mineral pigments. The new product's technology meets several French and European standards and strongly resists impact and friction. It is also not affected by freeze-thaw cycles," she adds.

The durability of LuminTech® is another strong positive factor as its luminosity does not deteriorate over time. ■

More information from Elrene Smuts,

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The LuminTech® border around a swimming pool.



The LuminTech® border around the same swimming pool at night.



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CDE's latest materials wet processing technology a resounding success

CDE has been rapidly expanding its footprint in South Africa since introducing the significant benefits of materials washing technology to the region's mining and sand and aggregates industries 15 years ago. CDE Africa is looking forward to installing the first all-in-one compact CDE Combo Alpha sand washing and water recycling unit in South Africa at a clay brick operation in Springs, Gauteng before the end of the year.

The company has designed, manufactured and set up over one thousand wet processing installations worldwide since its beginnings in 1992. CDE's materials wet processing technology provides the ideal solution to restrictions in the use of river sand, water and energy consumption.

By producing high quality manufactured sands with economical and environmentally-friendly washing solutions, CDE's South African customers are benefiting from an increase in tonnage per hour of quality sand that is ready for market straight from the belt, achieving a fast return on investment as a result.

Nicolan Govender, regional manager Africa at CDE, has been addressing the questions African operators still have about the viability of investing in materials washing technology rather than dry classification systems. He says: "While washing basically comes as a result of crushing and screening, it is a specialised



Nicolan Govender, regional manager Africa at CDE.

and niche market. Wet processing is much more specific than crushing and screening because it entails getting from millimetre to micron sizes.

"CDE is fast growing its footprint in Africa as sand and aggregates producers upgrade their installations to benefit from wet processing technology in terms of more efficient production and a higher product quality. CDE's best sellers include a wet processing plant – the EvoWash – and the AquaCycle thickener, which recycle up to 90% of waste water.

"With the respective successes of the EvoWash and the AquaCycle, more operators are now choosing the CDE Combo, comprising both plants. The Combo, with a capacity range of 30 to 200 tonnes, offers a unique modular design that combines the feeding, grading, washing, water recycling and stockpiling onto one compact chassis. The Combo is so efficient that the final product is ready to be sold directly from the belt. I am delighted to report that Combo customers have never looked back," says Govender.

One such Combo owner is Dar es Salaam-based Estim Construction, one of the largest civil and building companies in East Africa, with sister companies in Zambia and Mozambique. In 2014, the firm installed a CDE Combo x70, which produces



CDE Combo Alpha sand washing solution in Sri Lanka.

40 tonnes per hour of quality washed sand while recycling up to 90% waste water. As all CDE equipment is designed in collaboration with the customer, and manufactured and tested in its assembly facilities in Northern Ireland for guaranteed reliability, bespoke additions were applied to the plant to meet Estim's circumstances and requirements.

Estim Construction's Director, Darpan Pindolia, commented: "We could not be happier with the choice we made. Working with CDE Global, and especially their business manager and engineers, has been a crucial factor in our achieving the best final product.

"Thanks to our CDE Combo X70 we can now complete orders for various grades of concrete required for rafts, columns and slabs to produce paving blocks and other items knowing that we will always meet our clients' deadlines and produce consistent quality and output throughout the washing process."

Govender concludes: "South Africa is a natural bed of various mineral resources which can be exploited in a highly profitable and environmentally-friendly manner. The CDE cyclone technology and turnkey, high-tech and user-friendly wet processing solutions are perfectly adapted to meet the requirements for larger volumes of high-quality sand and aggregate with consistent gradings.

"If you buy the correct plant for your operations, reduced maintenance, reduced manpower, reduced slimes management and continuous operation with water control far outweigh any short-term savings."

"South African customers have adopted CDE's sand washing and water recycling as separate solutions until now, choosing one or the other, or adding one to the other, so we are

delighted to introduce the CDE Combo Alpha in the region this year and look forward to more exciting projects in the next few months." ■

More information from Fran Barlet,

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www.cdeglobal.com

About CDE

- CDE is the leading provider of washing equipment for quarries, mines and recycling operations on the global market.
- The CDE equipment range has applications across a wide range of materials and is delivering significant efficiencies in the construction and recycling, mining, specialist industrial sands and environmental sectors.
- Working across 5 sectors and 8 regions, CDE has been co-creating with customers for over 20 years to deliver collaborative, imaginative and unique processing systems.
- The CDE Global Design Headquarters are located in Northern Ireland. The company also has bases in Kolkata, India to serve the Asian market, Sao Paulo, Brazil to serve the Latin American market, Ormeau, Australia, to serve the Australasian market and North Carolina, USA, to serve the North American market.

Tile directly onto existing tiles with Renovate

The newest product from Saint-Gobain Weber is Renovate, a tile adhesive with a distinct set of benefits, one of which is that it allows renovators to tile directly onto existing substrates without priming – a first for South Africa.

Saint-Gobain Weber's product manager, Tiisetso Mokotjo, explains, "This exciting new development means that tiling upgrades can now be managed in ways that are simpler, cleaner and faster, providing more peace-of-mind for home, shop or office renovators during what is generally a stressful process."

Thanks to its exceptional strength, the product enables tiling onto existing tiles and other substrates without primer, eliminating the need to chip out tiles – significantly reducing dust and mess, the bane of most renovations. Amplified by the fact that it sets in only six hours, Renovate saves significant time and money. It's also waterproof and is available in both grey and white to match with tiles.

This combination of many practical and aesthetic characteristics means an upside for homeowners or contractors doing tiling alterations from a convenience, time and cost saving perspective.

"Performed traditionally, tiling renovations are incredibly disruptive, but Renovate minimises downtime," says Mokotjo. "For example, a store owner can now lay tiles

immediately after closing shop and leave the product to dry overnight, in time to trade the following morning.

"The same principle can apply to office managers who need to maximise productivity in the workplace, despite renovations. For homeowners, the project can also be timed to be more orderly and convenient, a necessity for busy households especially those with young children and pets."

Not only does Renovate provide a more agreeable alternative to tiling upgrades on a comfort level, but by eliminating surface preparation products like latex bond liquid, primer and waterproofing, labour costs are also reduced and an estimated 55% in monetary value is saved. It also saves about 87% in time, thanks to the reduction of preparation work like breaking out tiles and priming surfaces, as well as decreasing the setting and curing process.

"We're delighted to be launching a product that will make such a significant difference to modern renovators, and that can contribute towards alleviating pressures that can come with home alterations," concludes Mokotjo.

The product is now available from leading hardware retail stores and is typically found in the tiling section or contractors yard. It is available in both white and grey in 20kg, which covers a floor area of six square metres. ■



More information from Saint-Gobain Weber,

Tel: +27(0)11 617 8500 / www.weber-tylon.co.za

Sika smooths spectacular chapel roof

Challenges in achieving the smooth surface required of a dramatically undulating chapel roof were successfully solved by a high-performance fairing coat from Sika. The site was the 185-hectare, newly created Bosjes Resort in the Witzenberg district of the Western Cape where the dazzling Bosjes Chapel stands proudly at the foot of the Waaihoek Mountain on the rugged Zuurberg property.

Architecturally designed, the cast-concrete roof of the 430-m² chapel has deep undulations dipping down to just above the water of its reflecting pool and then rising to form huge wing-like structures above the four corners. Dissatisfied with the lumpy finish of the roof, the associate architect approached Sika's representative, Anthony Webster for a solution.

After testing a number of Sika products, it was determined that Sika MonoTop-620 would achieve the desired effect of a smooth and seamless surface. Sika MonoTop-620 is a cementitious, polymer-modified, one-component fairing coat mortar and pore sealer containing silica fume.

After mixing with water to the required consistency, the product is hand applied or is sprayable by the wet spray method and provides excellent adhesion to concrete mortars.

With good freeze/thaw resistance, Sika MonoTop-620 provides high mechanical properties as well as good resistance to water and chloride penetration.

Although the product provides an easy, user-friendly application, the highly technical application required for the chapel roof necessitated contracting Willy Bodenham of specialist contractor, Able Sealing. The challenge was to gain suitable access to the steep sloping curves so that an optimum finish could be achieved. Scaffolding was strategically assembled to almost 'float' above the structure thereby allowing application onto the many difficult-to-access areas.

No training was necessary for the easy, user-friendly application of the system that was skimmed and trowel-applied at 1.5 mm to 5 mm in thickness. Upon completion of the project, 350 x 25-kg bags of Sika MonoTop-620 were used on the roof. A combination of input from Sika and the architect together with the skills and expertise of the contractor resulted in an outstanding smooth and seamless finish being achieved. ■

For more information on Sika products and systems, visit www.sika.co.za



Local ceramic adhesives to raise the bar

South Africa's building trade is set for a major shake-up as global construction chemical giant, Mapei, launches its advanced range of locally manufactured ceramic adhesives into the market.

Production is at its newly outfitted facility in Roodekop, Germiston, where the factory employs the latest manufacturing equipment and techniques to ensure consistently high-quality products throughout its product line. The efficiency and capabilities of the new plant enables more competitive pricing for the local market.

Even Mapei's new packaging is advanced enough to ensure longer shelf-lives for cementitious products, which is particularly relevant to the local market considering the rural areas of the southern African region where deliveries may be less frequent.

Resources aplenty

"There is more good news for the local market," says Mapei commercial manager, Tracy Harris. "Local manufacture ensures sufficient stock holding and easier distribution throughout the region. Engineers will also have access to our technical resources to specify or develop products to meet their special technical requirements.

"While our technical products are manufactured to suit specific applications, our standard products are also advanced in the way they are designed to substantially increase the speed and efficiency of installations on site.

"With less harmful volatile organic compounds (VOCs), they are also safe to use in confined spaces and contribute to an all-round safer working environment. What's more, all our products are manufactured to Mapei's own sustainable green standards known as The Green Innovation."

Technical niche

The Germiston facility spans 16,000 m², including modern liquid and powder production plants, a distribution centre and head office facility. Processes are largely automated to ensure efficiency and precision of products, while the special packaging plant ensures products maintain a shelf life of 12 months – three months longer than the South African standard.



Various MAPEI South Africa products in packaging.

Ceramic adhesive specialist, Zamaswazi Ntobela, adds that the timing of the Mapei's entry into the market could not be better. "There is a niche in the market for technical products that are easier to install and more durable than standard offerings.

"Our offering also provides technical support and backup for professionals to make the right decisions when specifying, buying and using our adhesives. Whether it is an off-the-shelf product they are using, or one of our technical products, we want to offer them assurances that ours will last as long as the tiling solutions they are installing.

Proving it

"We also realise that breaking into this well-established market will take something special as there are long-term relationships between other manufacturers and their clients, so we are putting our money where our mouth is and have built training facilities and a high-tech laboratory to show professionals the advantages of using our products.

"These facilities include auditoriums, training rooms and fully-calibrated laboratories capable of testing to strict international standards and will be used to share results and work with installers to shave days off their traditional installation methods. We will also be able to prove the performance and the long-term durability of every one of our products," concludes Zamaswazi. ■

More information from Geoffrey Green,
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www.mapei.co.za

Mapei's locally manufactured product range includes:

	Setting Time	Classification	Product Description
STANDARD ADHESIVES			
Mapeset	24 hour	NC	Ceramic tile adhesives
Keraset R	24 hour	C1	Ceramic and Porcelain tile adhesive
TECHNICAL ADHESIVES			
Kerabond T - R	12 hour	C1T	Fast setting tile adhesive
Kerabond T -R Express	6 hour	C1FT	Fast setting tile adhesive
Adesilex P9	12 hour	C2TE	Fast setting tile adhesive
Adesilex P9 Express	6 hour	C2FT	Fast setting tile adhesive
GROUTS			
Keracolor FF			Water-repellent grout

Why not all companies test for alcohol – and why they should.

By Rhys Evans, Director at ALCO-Safe

Alcohol and substance testing forms part of the health and safety policies and procedures in many industries. Some, such as the petro-chemical, mining, construction and rail sectors, are especially strict when it comes to testing for alcohol. However, there are still many organisations that do not employ the same cautionary practice, potentially resulting in significant loss to the business.

The Occupational Health and Safety (OHS) Act General Safety Regulation 2A states that every employer is obligated to stop persons from entering or remaining at work if they appear to be under the influence of intoxicating liquor or drugs.

Industries, such as those above, are subjected to annual and spot audits on their health and safety practices. Non-compliance can have serious consequences, so they generally adhere to regulation and ensure that regular, if not daily, testing is done. This testing should form a regular part of every business' health and safety policy.

Why are businesses so afraid to test?

Many organisations fear implementing alcohol and drug testing because they believe it is difficult and costly. Some worry about liability and legal ramifications should there be any positive testing on site, and prefer to avoid the process.

However, the benefits of testing outweigh any risks or costs. Not having and enforcing an alcohol and drug policy can result in severe consequences and potentially even operational shut down. In addition, the safety of employees is at risk from alcohol and drug related accidents.

Why is it so important for businesses to test?

Although a company is not necessarily held liable if an intoxicated person injures themselves while on duty, it could be held accountable if a co-worker is injured and the proper alcohol testing was not conducted. Furthermore, if a company is aware of the presence of an intoxicated person on site and

deliberately ignores it, they could face debilitating legal action in the event of an accident or injury.

Low productivity and increased absenteeism are common issues linked to alcoholism. Alcohol not only impacts the immune system, but people also commonly take 'sick days' to recover from hangovers, negatively impacting the employee's operational efficiency.

Lastly, intoxicated people are more accident-prone and could damage company assets. Unnecessary repair and replacement of damaged equipment can be expensive, and are avoidable with procedures and protocols to prevent alcohol related incidents from occurring.

How can an alcohol and drug testing policy be implemented?

Drafting a policy around substance abuse in the workplace, or adding one to an existing health and safety policy, is not difficult. Reputable providers of drug and alcohol testing equipment will usually assist organisations, clarifying the relevant OHS Act regulations and working them into the company-specific policy. Even without assistance, the process is less complicated than many people think.

A typical Alcohol and Drug policy should list the relevant OHS Act clauses around alcohol and drugs at the workplace, the company's specific stance – a zero-tolerance policy or one allowing alcohol to the legal limit. Some companies allow alcohol at a work function, but still ensure that the legal alcohol driving limit is maintained if staff must drive home afterwards.

The policy should also clearly state what testing measures will be implemented, and the testing frequency. Testing can be done based on suspicion of alcohol consumption, on entry to the premises, following an incident or accident, or even only on entering high-risk areas within the business.

The consequences of positive testing must also be included, outlining what is reasonably expected of both the employee and employer. Disciplinary action need not be specifically stated, however the procedure for disciplinary action should be advised.

It is strongly advised that businesses include full educational information explaining the reason for their policy, and the potential risk of alcohol and substance abuse at the workplace. Employees who are aware of the risks to themselves and others are less inclined to infringe on policy.

As to the cost and initial capital outlay of purchasing testing equipment? Well, companies typically recover this within a few months of initiating testing. The reduction in absenteeism and alcohol related incidents almost immediately brings about a return on investment. In our experience very few organisations, and certainly none with more than a handful of employees, don't have someone in their workforce who functions under the influence of alcohol. Usually, these numbers reduce dramatically on implementation of a policy, and always on implementation of testing. ■

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Rhys Evans, Director at ALCO-Safe.

Occupational hazards among Nigerian sandcrete block makers

By Kolawole Adisa Olonade (Engr., PhD)

Sandcrete block is a common material used for walls of buildings in most countries of the world, especially in developing countries like Nigeria. It is a mixture of sand, water and cement, and moulded into shapes.

During the production of sandcrete blocks, many workers are exposed to health risk activities because they do not wear protective clothing. According to Smallwood and others^[1], the construction industry is highly dangerous because of the disproportionately high number of health hazards associated with it.

A study was conducted, involving 500 sandcrete block workers in a State in Nigeria, to determine the variety of health challenges facing local block makers. This figure represented about 45% of such workers in the State.

Structured questionnaires and personal interviews were administered to retrieve information on health related challenges of their job. 90% of the respondents barely use safety clothing such as face masks, gloves, boots, and hearing guards.

Due to exposure to high levels or long duration of noise from sandcrete block vibrators, 75% of those who have been working in the industry for over five years complained of hearing problems and hand-arm vibration diseases.

Palm dryness, scaly and thickened skin were observed in most of the respondents (95%), of whom 85% complained that during the last national election, the electronic machines could not read their fingerprints due to scaly and thickened palms.

Problems associated with respiration, such as catarrh and asthma were very common among the respondents (80%) because of inhaling the dusts and exhausts from their machines. It is quite likely that similar situations are common in other countries in Africa.

The study observed that the main cause of these health effects was failure of the workers to use protective clothing or safety equipment.

It is expected that if government were to enact policy and enforce the use of safety equipment among sandcrete block workers in the state and other states in the country, these risks would be prevented, or at least substantially reduced. ■

[1] Smallwood J., Haupt T. and Shakantu. (2008). *Construction health and safety in South Africa: Status and recommendations*. CIDB report.

More information from the author at the Department of Civil Engineering, Obafemi Awolowo University, Ile-Ife, Nigeria, Tel: +2347036439726 email: olonade1431ah@gmail.com



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Think outside the BIM box

By Vaughan Harris – executive director, BIM Institute



Building Information Modelling (BIM) is the new backbone to digitised construction. BIM increases productivity and improves the quality of work across the construction ecosystem from design, through construction and into operation.

Although BIM is gradually integrating into contracts and processes, South African uptake and confidence among contractors remains low. This can be attributed to a limited knowledge of BIM processes and too much emphasis having been placed on design software in the past. We recently witnessed one of South Africa's largest contractors sending out request for proposal (RFP) invitations for vendor software

application partners to facilitate its BIM adoption strategy, sparking renewed interest among other contractors to follow a similar strategy.

BIM is not software

Many people mistakenly think that BIM is software, when it is actually a process of working. Software tools are the technological core of BIM, but this makes up only 10% of the system. The remaining 90% centres around the sociological and collaborative practices that the software enables.

BIM allows all stakeholders to collaborate on a single model to design, construct and operate a building. The technological base of BIM consists of 3D design, intelligent models and information management; social components include synchronous collaboration, coordinated work practices and a cultural or institutional framework in which BIM is incorporated in a company's processes – workflow, for example – and business plan.

The design stage also includes conceptual design, detailed technical design and analysis (including energy analysis), working closely with the Professional Quantity Surveyor (PQS) to provide detailed estimates and pricing documents based on design information provided in the 3D model.

In the build stage, contractors can re-model the Bill of Materials for resource levelling, accurate cash flow projection purposes using quantification from the models provided, including automatic updated quantification provided by the PQS. The contractor can also use this information for fabrication, planning and simulation purposes. Once the facility is built, the contractor and owner can use the model to manage defects and operate and maintain the building, as well as renovate and finally demolish, if necessary, far into the future.

Understand the basics

The traditional design, bid and build (architects, engineers, contractors, subcontractors and clients) delivery project processes still work in silos. Modelling and coordination is handled in the design offices and only the 2D drawings and information is sent to the contractor. Requests for information pass from the site to the design office and revisions get sent back. Quite often, the information is still on paper or in electronic pdf format – not in the cloud – and is duplicated many times.



In the traditional coordination process, the communication between stakeholders peaks in the construction documentation phase, affecting progress on site.

BIM alters workflows, so communication peaks in the design and design development phases. At this stage, changes are easier to make without slowing or halting construction. Costs are easier to control and litigation (due to cost and schedule overruns) is reduced or eliminated. Under this new approach, contributors cannot work in silos. Instead, all parties collaborate as the model develops, working together to eliminate clashes.

Solving coordination issues virtually in the design phase is more efficient and cost effective. It also improves safety and reduces labour onsite. With the client, design team and professionals involved from the outset, knowledge and awareness increases through each phase of a project – there is minimal loss of knowledge between phases.

Step up to the plate

The BIM Institute has worked with commercial streams and software vendor experts over the past three years to define South Africa's BIM awareness. Now for the first time it is giving the industry a National BIM guide and enabling it to use its BIM skills to produce a better outcome. The BIM Institute currently also engages with various large contractors (locally and across Africa) on best practice.

It's now your responsibility – as a contractor – to demonstrate your 'BIM-readiness.'

This involves detailing your proposed processes to meet with the project's BIM requirements. This does not only require refining your in-house software systems, but rather aligning internal processes with BIM and then identifying and addressing any software gaps.

Getting started

If you are just becoming familiar with BIM, the **National BIM Guide** is an essential tool for you to understand:

- Data information
- Guide to global standards
- The practicalities of BIM
- The processes required
- **Keep up with the industry** – register as a BIM Institute member.
- **Upskill** – through the BIM Institute's accredited courses or contact the Institute for an independent review.
- **Expert advice** – The Institute has a definitive listing of vendor experts on its BIM Vendor Directory. ■

More information from www.biminstitute.org.za

The future of making things

A review of Autodesk University, Cape Town, September 2017 by Vaughan Harris

It sounds like ‘Science Fiction, but it’s Science Reality,’” stated Callan Carpenter delivering the keynote address of the 2017 Autodesk University (AU) – an annual conference which is hosted by Autodesk.

From the outset, international and local speakers held the audience spellbound as they presented mind-bending case studies that led attendees through what the future of design, manufacturing and construction will look like, including the role that Artificial Intelligence (AI) and generative design will play in the built environment.

Keynote speaker, Callan Carpenter, VP of Named Accounts for Autodesk, highlighted how the global manufacturing and construction professions are dealing with major changes in:

- Consumer Demographics
- Demand
- Technology

The response to these changing landscapes lies in the disruptive technologies in:

- Production (physical and intellectual)
- Connectivity
- Machine Learning

Each of these disruptions represents opportunity as well as threat. “If you ignore these disruptions,” states Carpenter, “you can believe your competitors will not.”

Production: We are seeing major leaps forward both in the physical production (Google SAM, the bricklaying robot) and how we design. This also encompasses the connection between us generating the design and how we implement it.

“For instance, did you know that Boeing is now 3D printing titanium components for the 787 Dreamliner?” Carpenter asked his audience. “If you consider the tight regulation in the aerospace industry, if they are using 3D printed components, then this technology is REAL.”

Intellectual production is also keeping pace. “No major infrastructure project today is done in a single location.”

With teams working collaboratively thousands of kilometres apart, and in different time zones, Augmented Reality and Virtual Reality are becoming much more prominent as the tools to enable teams of engineers, designers and manufacturers/contractors to cooperate.

This form of collaboration is expected to lead to an ‘As designed; As built’ future where we will press the ‘make’ button on our design in the same way as we press the ‘print’ button today. Machine algorithms will then seamlessly integrate the phases of ideation, design, engineering and manufacturing. Digital streams of instructions will digitally configure factories to build whatever you have designed.

And according to Carpenter, “This future is far closer than you realise.”

Connection: Our expectations of products and buildings is changing rapidly. We expect them to be smart (be it a car or a highway) and get better and smarter with time, rather than growing obsolete the moment it rolls off the assembly line.

We expect our buildings and products to ‘speak’ to each other and deliver an experience unique to the environment in which it sits, and greater than the sum of its parts. This is ‘the internet of things.’



Machine Learning: This is the disruptor that is accelerating other disruptors using generative design, robotics and AI.

The concern here is that all this automation will cost jobs and replace human beings, but with every major disruption in the past (from the steam engine to the motorcar) we have in fact seen more jobs created than they have displaced.

Resources: We have to consider resources in everything we do. There are currently 7,5 billion people in the world. In 30 years there will be 7 billion people living in cities alone. Just to house these people we will need to build 1,000 buildings every day until 2050.

“Africa, more than most other continents, understands the challenge of building sustainable, effective housing for large populations.”

There is a trillion-dollar opportunity in sustainable goods and services in the next decade.

The cloud: Data is the next big disruptor and Carpenter says that Autodesk is working to feed the data from the Internet of Things (IOT) back into the design and manufacturing process. It promises to become an AI partner that offers you “experience, curiosity and the desire to go above and beyond.”

This next generation of cloud-based products includes:

- Autodesk Fusion 360 (manufacturing)
- Autodesk BIM 360 (AEC)
- SHOTGUN (Film)

The company also unveiled their new offering, Autodesk Forge – an open-source product that was available to software developers, infrastructure designers and professionals across the board, at the conference. ■

More information from www.biminstitute.org.za

Designers discover new potential of concrete piping

Fancy a peaceful snooze in an old drain pipe? Jan de Beer puts you in the picture.

Concrete pipes and underground conduits are said to be one of the earliest forms of concrete used in civil engineering construction, dating back to Roman times with some pipelines and aqueducts constructed around 2000 years ago still in use today.

The oldest recorded modern-day concrete pipe installation it would seem is a sanitary sewer constructed in 1842 at Mohawk in New York State, USA. It remained in operation for over a century. But nowadays concrete pipes are not only used to carry water but are also creatively employed by architects as residential facilities. Even more commendably, the capsule rooms are often sourced from old recycled concrete pipes.

The Tubo Hotel in Mexico opened in 2010 and tourists are flocking to stay in these recycled storm drain pipes. Located in the village of Tepoztlán, about an hour from Mexico City, the hotel offers rooms with a Queen-sized bed (with storage space underneath) that can accommodate two people and a view of the Cuernavaca Mountains from the glass doors. The modules are mostly arranged in stacked pyramids of three pipes to overlook the wooded site: the top pipe of each pyramid is accessible by a set of stairs.

Architects T3arc's specs took only three months to build. Targeting budget travellers, accommodation costs around US \$50 per night, and there are two ablution blocks, private showers and toilets on site. Local cuisine is provided by a celebrity chef. The hotel has 20 concrete pipe rooms, with a dimension of just under 9 m², scattered around a central courtyard.

Down Under, Australian architects, Techné Architects, have incorporated concrete piping all over the place for their acclaimed revamp of Melbourne's 'tired' Prahran Hotel. The designers' idea of adding 17 over-sized concrete pipes stacked to the skyline has drawn much attention from all over the world.

Designed to resemble a stack of beer kegs, the concrete pipes serve not only as external façade but are also featured inside the hotel's public spaces, including cosy, private dining spaces lined with leather banquette seating, recycled spotted gum tree slats, and acoustic absorption mats.

Groups from two to a special VIP party of 10 people can savour the hotel's cuisine in the comfort of circular concrete. Windows fitted into the pipes offer porthole views into the street. During the day, these allow for the entry of lots of

natural light while after dark the light emanating from inside transforms a not too spectacular part of Melbourne into a boulevard of beauty.

Techné Architects took concrete even further to rejuvenate the Prahran Hotel. The outdoor courtyard features a corrugated concrete wall and porthole windows, and the main bar is made from recycled concrete pipes with lighting by cast concrete lamps. Recycled gum is used for the flooring and table tops.

In Austria, the Das Park Hotel is also constructed with concrete piping, albeit on a less ambitious scale. The rooms in Ottensheim also have double beds and storage but only a circular skylight without any other windows. However, each unit does feature wall paintings by renowned Austrian artist, Thomas Latzel Ochoa, "to add warmth" to what are basically just overnight sleeping spaces.

The trend to bed down in pipes has now also spread to the Orient where a Chinese hotelier has built a low-cost lodge with industrial grade concrete piping. The 15 mini-rooms sleep two each, have a small 'rest area', and some luxury touches like air-conditioning. It also boasts soundproofing which, one would have thought, came naturally from the innards of a concrete pipe. But then you do get noisy neighbours.

The off-beat hotel is apparently popular with tourists as well as locals keen to escape from Henan Province's hectic pressures. Kids, no doubt, love to stay in a pipe and parents, also no doubt, welcome checking the young ones into separate capsules where there's not much they can break while Mom and Dad enjoy a peaceful night's sleep.

So, gone are the centuries when concrete pipes just carried water and nasty stuff. They're now also being used in all sorts of trendy ways in gardens as well: from seating, water features, to fire pits. And defective pipes are being dropped in oceans all over the world to boost coral reef growth.

Finally, in America, struggling web designer, Michael Janzen, facing a scary mortgage, decided to downscale. He created a 30-m² subterranean dwelling from large concrete storm drain pipes, using the 3.3 by 2.4-m-long concrete pipe sections as building blocks.

Perhaps more Americans would feel safer with such a tiny 'bunker' in the backyard while Trump and North Korea step up their verbal sparring. ■

Prahran Hotel, Melbourne.



Das Park Hotel, Austria.



Tubo Hotel, Mexico.



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64 | COVER STORY



Chryso's Fluid L high-range, water-reducing superplasticiser was used in the concrete for the prize-winning Nova Apartments. See page 64.

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China to build US\$5.8 billion hydropower plant in Nigeria

The government of Nigeria has recently announced the award of a \$5.8 billion contract to build the largest power plant in the country. The 3,050 MW Mambila hydroelectric power project in the state of Taraba will be delivered by various Chinese state-owned construction firms.

The mega project will feature four dams between 50 and 150 metres tall and will take six years to complete, the Minister of Power, Works and Housing, Babatunde Fashola, said.

The Chinese Export-Import Bank will finance 85% of the development, with the Nigerian government contributing the final 15%.

Minister Fashola claimed the project will deliver many far-reaching benefits. "Mambila will have a transformational effect on all of Nigeria's socio-economic development," he said. "It will have a considerable positive impact on the electricity supply nationwide and productivity, employment, tourism, technology transfer, rural development, irrigation, agriculture and thus on food production."

The Mambila hydropower plant has been in development for over 30 years. There have been attempts to revive the deal but without success. However, the crisis was broken by conversations that were held between the presidents of China and Nigeria in 2016. The conversation resulted in the creation of a consortium of Chinese companies to deliver the project. There was also an agreement that the Chinese government would commit finance to it.

Despite Nigeria being one of the largest economies in Africa, more than 40% of Nigerians live without access to electricity. Hydropower, one of the cleanest and cheapest forms of power, is a key target for development because Nigeria is currently exploiting just a fraction of its potential resources.

The country is also seeking to shift away from oil dependency, after plummeting oil prices triggered a recession. The clear need for the Mambila project could make



it more likely to succeed, some analysts have said.

Elizabeth Donnelly, deputy head of the Africa Programme at UK think tank Chatham House, said: "Nigeria continues, albeit slowly, with its complex power sector reform and badly needs to generate – and more importantly distribute – more power for its 180 million people. Hydroelectricity is an important part of this mix, particularly for rural electrification." ■

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

Uganda in need of US\$2.5 billion to build power infrastructure

Uganda has embarked on a massive power infrastructure expansion plan and, according to the Electricity Regulator Authority, it will require approximately US\$2.5bn by 2026 to invest in both the transmission and distribution system.

Fewer than 2% of the population in Uganda has access to the grid and

only 7% of rural areas are currently electrified. Uganda's electricity access rates are among the lowest by global standards. Under the country's Vision 2040, increasing electrification is a major drive to achieving national social and economic development objectives.

Sabine Dall'Omo, who is the CEO of Siemens Southern and Eastern Africa says that infrastructure and oil sector investments are likely to support growth in Uganda over the medium term. She adds that Uganda has potential to diversify its economy and create opportunities for industrialisation. This will then increase electricity demand, create sustainable revenue streams and opportunities for job creation.

She notes that the country has the potential to generate power from other renewable sources like Solar PV, wind, natural gas, peat and bagasse cogeneration. Uganda's energy mix is currently generated from three main sources: biomass, thermal and hydropower.

In recent years the country implemented the regulatory framework to boost private sector participation and also the investment in the generation and distribution space.

Dall'Omo said that Siemens wants to support sustainable development with solutions and projects in Africa. She also said that they are actively reviewing the requirements for the organisation to open an office in Uganda; of course taking into consideration business sustainability. ■

Source: <https://goo.gl/99PTsz>



Nigeria launches its first Concrete Mix Design Manual

Lafarge Africa Plc has become one of the key partners of the Council for the Regulation of Engineering in Nigeria (COREN) for the research and development of Nigeria's first Concrete Mix Design Manual, which was launched in Abuja recently.

Speaking at the launch ceremony, the director of marketing at Lafarge Africa Plc Vipul Agrawal said: "We commend COREN for ensuring that Nigeria now has a credible well researched Concrete Mix Design Manual that can be used for concrete works in buildings and infrastructure projects in the country.

"We call on all those involved in the manufacturing and use of concrete for infrastructure development in Nigeria to use the manual to make quality concrete in building durable structures."

Lafarge Africa is one of the stakeholders with whom COREN has partnered in the research and development of the manual, together with Nigeria Road & Building Research Institute, Julius Berger Nigeria Plc, and the University of Uyo.

On his part, the President of COREN Engineer Kashim Ali said: "I am glad that Nigeria now has its own Concrete Manual based on local environmental conditions and raw materials and no longer has to depend on the reference manuals of other countries."

He explained that the manual would be constantly upgraded to stay abreast of improvements in building technology.

The Deputy Governor of Bayelsa State, Retired Rear Admiral John Jonah said that the development was a big plus for engineering practice in Nigeria.

The new Concrete Mix Design Manual provides step-by-step guidelines on the selection and proportioning of concrete constituents such as cement, sand and aggregates, as well as the mixing and placing of concrete. This manual is a result of exhaustive research and testing with concrete materials in different parts of the country. ■

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



Rwanda wins global sustainable entrepreneurship challenge

The Rwandan start-up EarthEnable has won a €500,000 prize in the Postcode Lottery Green Challenge 2017 – a global competition in the field of sustainable entrepreneurship.

Thomas Pedersen (48) of Pond from Denmark was the runner-up with a prize of €200,000. His start-up has developed a method of extracting bio-resin from agricultural waste.



Three €100,000 prizes were awarded; one to each of the following: the Dutch green start-up Lightyear, Glowee from France and the Rwandan start-up African Renewable Energy Distributor (ARED).

This brings the total prize pool of one of the biggest sustainability competitions in the world to €1 million. This year saw 515 entries from around the globe.

EarthEnable co-founder, Gayatri Datar won the first prize for Rwanda after she had impressed the international jury with her sustainable alternative for cement to replace dirt floors – which reduces significantly the carbon dioxide emissions in homes.

She presented Rwanda's initiative of 'earthen floors' offered by EarthEnable to improve the lives of the world's poorest people and ensure significant reductions in CO₂ emissions, as they eliminate the need for cement floors.

The international jury was chaired this year by Leila Janah, founder and CEO of

Samasource, a social enterprise that helps underprivileged people from Africa find work in the digital sector.

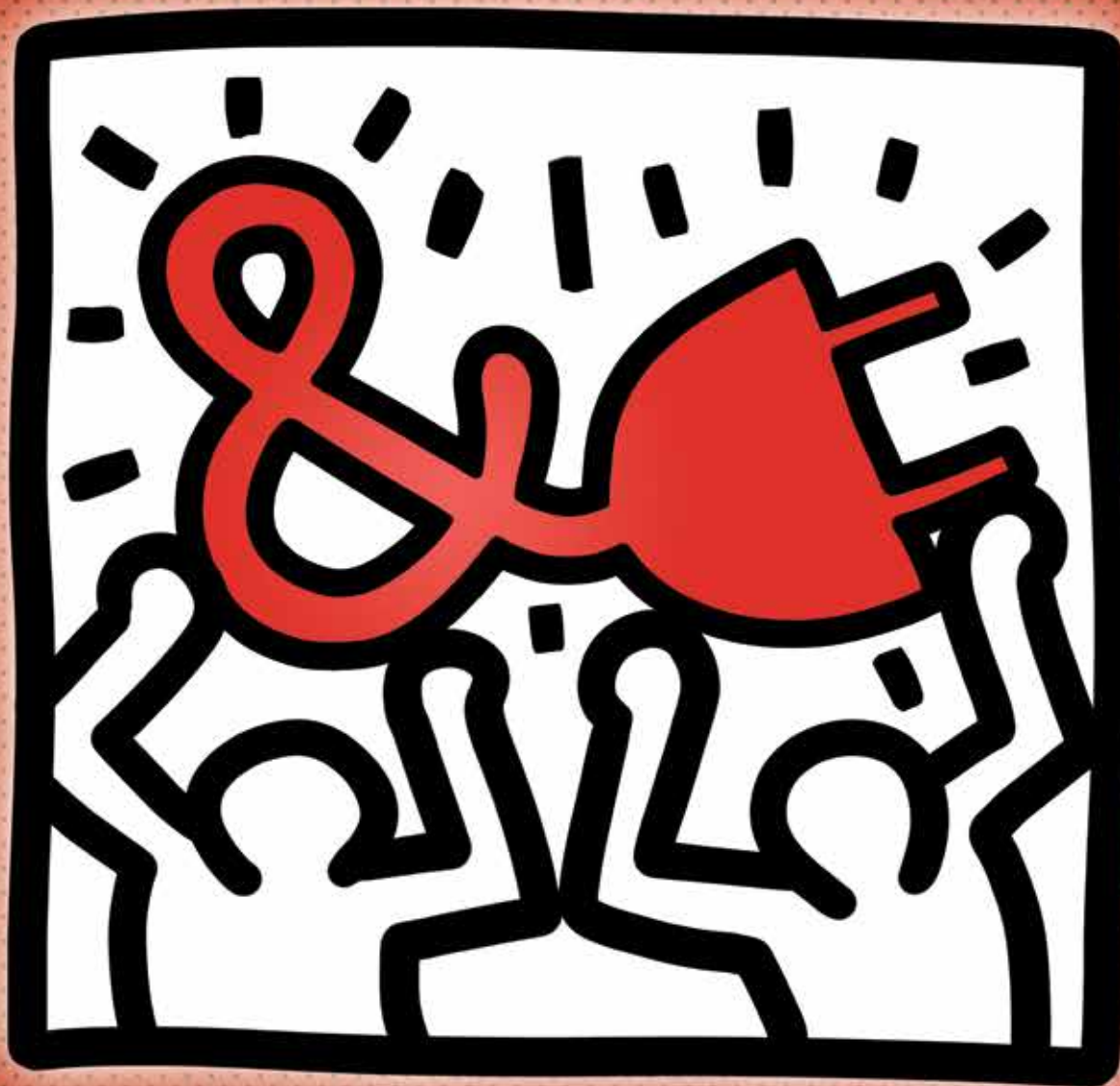
"The way in which Gayatri has been able to tackle two major issues at the same time with her start-up is very impressive. The innovative product improves the health of the world's poorest people and ensures an enormous reduction in carbon dioxide emissions. As such, she and her team are this year's deserving winner. I expect to hear a great deal from this start-up in the future," Janah said.

"With the prize money we plan to scale within Rwanda and likely in three other countries. The prize money gives us the opportunity to test a variety of scaling models to find a viable scale strategy to improve the health and lives of millions of people who are still living on dirt floors," Gayatri said. ■

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

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Kenya: Cytonn unveils Sh20 billion triple tower in Nairobi



Cytonn unveils Sh20bn triple tower in Kilimani, Nairobi.

Cytonn Real Estate has launched a Sh20 billion mixed-use development project named 'Cytonn Towers'.

This proposed development, which is to sit on a four-acre parcel in Nairobi's Kilimani area, is expected to host a sky bridge restaurant that will be Kenya's highest suspended restaurant, a ballroom, a Double Horizon fitness club and an observatory deck.



The 150-metres-high, 35-floor triplex towers will consist of offices, a hotel and serviced apartments as well as a number of residential apartments.

This includes three-bedroom duplex apartments and penthouse suites, 180 hotel rooms, 160 serviced apartments and 30 typical office floors.

Construction is expected to commence in Q4 of 2018 and it will be built in phases with the structure expected to be complete by December of 2022.

Cytonn Real Estate says it primarily targets the upper middle class, NGOs and embassies' personnel looking for prime and iconic space.

"I wish to congratulate Cytonn for such a high calibre development being done by Kenyans. As Nairobi County government we will fully support you in building a productive city which is what we are about; productive people and productive living," said Polycarp Igathe the Deputy Governor, Nairobi County, at the launch.

"A project of this magnitude is a very welcome development to the city as we anticipate job creation of more than 4,000 people and not to mention the economic development potential it represents," he concluded. ■

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

Ohorongo appoints new plant manager

Ohorongo Cement has appointed Estelle Alberts as the plant manager at the company's plant in the Otjozondjupa region of Namibia. Alberts becomes the first Namibian to hold the post – and, at the age of 30, the company's youngest plant manager.

Ohorongo Cement is owned by German company, Schwenk Zement and is the only cement plant in Namibia. Alberts first joined the company in July 2013 as divisional production manager: Grinding and Burning, responsible for clinker and cement production at the plant.

"It has always been the Schwenk family's intention to one day hand over the plant operations to Namibians," said Gerhard Hirth, Ohorongo Cement Board Chairperson. "That is why we are not shy to



share expertise, knowledge and transfer of skills."

Alberts takes over her new role from Manfred Pirker, who has been appointed

as an executive advisor to the cement plant. Pirker managed the plant for three years and was one of the few expatriate employees remaining at Ohorongo.

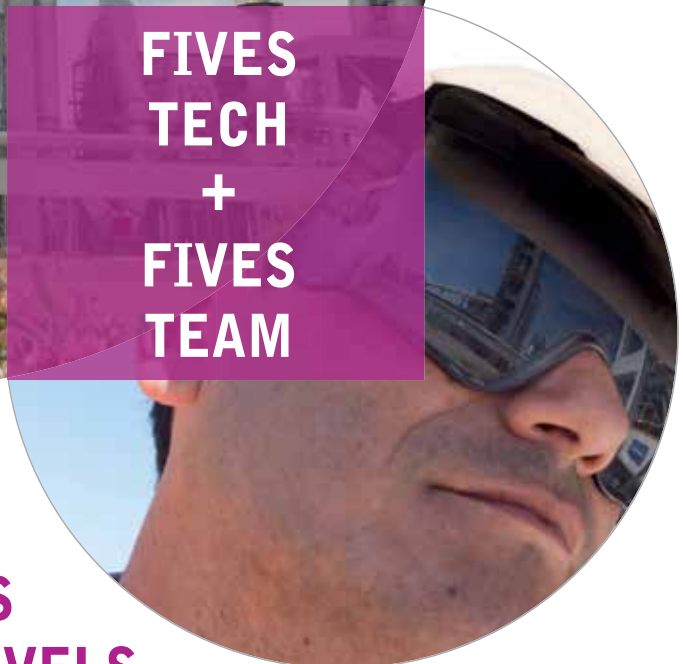
"We are extremely excited to have Ms Alberts as the new plant manager, we look forward to her continued impact on the Ohorongo family and the mining and manufacturing industry in this new role," said Hans-Wilhelm Schütte, MD of Ohorongo Cement.

"She has shown great potential in her previous capacity especially in the process of alternative fuel and we will greatly support her in every aspect for her to bring out the best for Ohorongo Cement and Namibia." ■

Source: <https://goo.gl/3KJMy4>



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Ethiopia: Institute aiming for optimal technology transfer

The Ethiopian Construction Project Management Institute (ECPMI) underlined the need to create a joint platform that would enable it to cooperate with other entities to carry out optimal technology and knowledge transfer into the local construction sector.

The Institute's communication director, Zenebe Tunu, was speaking at the 'Eighth Addis Build International Construction, Construction Materials and Technologies Exhibition', where over 105 companies from more than 12 countries participated.

One Institute objective is to introduce new technologies to improve the sector's efficiency. To that end, exhibitions and workshops create a platform for them to discharge this responsibility.

In addition, the Institute aims to create a joint venture to work closely with countries, institutes, stakeholders, and also professionals with extensive experience and proven capability in the construction sector. This would optimise technology transfer.

Emphasising the critical role the construction sector plays in a country's efforts to structurally transform the economy into an industrial one, the director opined that the sector will need to work together to promote technology and knowledge transfer in a systematic and organised manner.

Zenebe also indicated that the construction sector's management capacity will need to be strengthened and elevated given that the fate of the government's major projects and, in fact, most of the country's construction projects, are linked to the efficiency of the sector.

Furthermore, the Director indicated that the Institute is undertaking initiatives to bypass some of the gaps, and function more effectively, in terms of ensuring quality of services as well as delivering projects on time.

The Institute has identified some gaps in optimally utilising technologies at hand, and deploying the studies and research conducted by local and foreign professionals. The Director further said. "In the last year, for instance, we have introduced about nine applied research projects to the relevant stakeholders and we are planning to do more this year."

Zenebe also remarked that a capacity building strategy that would help in implementing the technologies in sync with the manpower, capital and the sector's capacity on the ground is set by the government.

The Institute's acting director, Dr. Argaw Asha, remarked that the construction sector is booming and there needs to be knowledge and technology sharing



from countries and enterprises that are more developed in order to advance the country's construction quality. "This is why platforms like exhibitions and workshops are important to introduce new technologies into the sector, before helping adopt them. There is cultural resistance, and we have to work on that," he noted.

The Acting Director also revealed that a 122-billion Birr, 10-year-long programme is being prepared by the government in a bid to modernise the sector by improving construction equipment, and building the capacity of the manpower involved in the sector. ■

More information from <https://goo.gl/qC4EXQ>

Tanzania launches new agency to improve rural roads

The Tanzanian Prime Minister, Kassim Majaliwa, has launched the Tanzania Rural-Urban Road Agency (Tarura), to address rural road challenges. He gave the directive while at The Institute of Rural Development Planning in the Dodoma Region.

He noted that, roads under Regional Administration and Local Government (Tamisemi) are the ones propelling the country's economy, explaining that such roads should be made a priority.

According to the Prime Minister, the roads had for long been affected by major corruption and embezzlement of funds so that some roads were built below standard and nobody is now taking responsibility.

"From now on, I do not expect to see the implementation of sub-standard road construction, while road rehabilitation still



has to be undertaken in the same areas," said Kassim Majaliwa.

However, the Minister of State in the President's Office (Tamisemi), George Simbachawene, appealed to the Prime Minister to allocate more funds from the Roads Fund. He said lack of sufficient funding was blocking the implementation of Tamisemi's road construction projects.

Alhaji Mussalyombe, Tamisemi's Permanent Secretary, said that Tarura now offers a solution to contractors' disputes, explaining that the latter now have the right place to present their claims. ■

More information from <https://goo.gl/zp6x2t>

Pockets of promise: seven African countries to watch

The Economist Intelligence Unit (EIU) earlier this year hosted a webinar – titled ‘Sub-Saharan Africa: At a turning point?’ – which analysed the region’s opportunities and challenges. Sub-Saharan Africa’s aggregate economic growth fell to around 1% in 2016 – the slowest pace in over a decade. This slump, according to the EIU, is due to three factors: the collapse of commodity prices, tighter international financing conditions, and the unfavourable weather across parts of the continent last year.

But despite the fact that some of the region’s biggest economies – including Nigeria, South Africa and Angola – are grappling with economic challenges, there are still reasons to be optimistic. The EIU has identified a number of mid-tier countries expected to continue to perform well over the medium term due to public investment plans, consumer demand patterns and trade dynamics.

Here are some of these “pockets of promise” for investors.



Côte d’Ivoire: According to the EIU, Côte d’Ivoire is a market that, in theory at least, has everything going for it – abundant natural resources, both mineral and agricultural; competitive transport infrastructure; and a government that makes the right noises about business reform. The country holds unexploited opportunities in the industrial and services sectors as the commercial capital Abidjan consolidates its role as a regional business hub. Last year, Serge Gnanjji, country manager of DHL Express Côte d’Ivoire said: “The annual growth rate is around 8.5% and it is expected to remain fairly constant over the coming five years. Growth in GDP is mainly driven by public investment, agriculture and the services sector. There are a number of infrastructure projects underway and many companies are moving their regional headquarters back to Abidjan.”

Ethiopia: As one of Africa’s fastest-growing countries, Ethiopia has a GDP expected to expand by an average of over 6% from 2017 to 2021. As part of its drive to transform the country into a manufacturing hub, the Ethiopian government has made impressive headway in developing industrial clusters and improving competitiveness. Foreign direct investment flows are anticipated to be driven by supportive government policies and a large consumer market. “I see a strong manufacturing sector, with its contribution to GDP further rising on the back of the development of industrial parks around the country and associated incentives to investors,” said Morgan Uloko, the regional director, East and Southern Africa, DHL Express, sub-Saharan Africa. “I also see improved energy generation with the potential to reduce production costs if the Grand Ethiopian Renaissance Dam is completed on schedule. Overall, indications are that the strong economic growth seen in the last decade will continue in the foreseeable future.”

Kenya: The EIU is optimistic about Kenya’s economic prospects, and forecasts average GDP growth in excess of 5.5% over the coming five years. Consumer demand is anticipated to remain robust, despite a recent cap on bank lending rates that will distort the financial sector.

Uganda: Notwithstanding Uganda being much further behind the reform curve compared to a country such as Kenya, the government’s focus on manufacturing and efforts to pursue its infrastructure projects will support growth over the medium term. Fatma Abubakar, country manager for DHL Express Uganda, believes the country is on a positive economic trajectory: “Uganda is a stable country and we are blessed with a favourable climate and abundant available land. It has attracted investors involved in the manufacturing of dairy products, as well as breweries and a variety of beverages.”

Tanzania: The EIU’s bullish outlook for Tanzania is premised on three factors: significant infrastructure development taking place across the country; improved power and gas supply which will support the manufacturing sector over the medium term; and a greater enthusiasm to seize the economic opportunities associated with being a member of the East African Community. Femi Olaiyi, country manager of DHL Tanzania, believes investors often make the mistake of only targeting the major cities. “Tanzania is a huge country, yet many businesses focus primarily on the cities of Dar es Salaam, Arusha and Mwanza. There are many underserved second-tier cities experiencing rapid growth. Companies should expand their footprint to these urban areas and take advantage of the untapped business opportunities,” he said.

Ghana: This country is a pocket of promise for a two reasons. One, short-term economic activity is buoyed by developments in the energy sector and two, ambitious infrastructure development plans support the medium-term agenda. While fiscal prudence from the Ghanaian government remains key, the EIU is fairly confident about the administration’s policy direction. The economy is expected to expand by an average of about 6% from 2017 to 2021.

Cameroon has compelling prospects to boost its industrial and agricultural output. The country stands out in the central Africa region because it is not as dependent on oil as some of its neighbours and therefore had less of a rocky time over the past two years. Another positive is the government’s readiness to embrace the structural reforms needed to boost private sector investment. ■

Source: <https://goo.gl/hGDM8Z>

Chryso Eastern Africa products for Nairobi's new landmark apartment block

Chryso Eastern Africa is supplying a vital admixture for the concrete mix used for the construction of Nova Apartments, a new R180-million luxury apartment block in Nairobi, by the main contractor, Aggregate Construction.

Trevor Sawyer, country manager for Chryso Eastern Africa, says that waterproofing products from a.b.e. Construction Chemicals – part of the Chryso SA Group – will also be used for the construction of the new landmark building in Muthangari Drive in Westlands, Nairobi.

Sawyer says the Chryso Group products selected for use on the new prestige Elmridge Developments project are:

- CHRYSO Fluid L – a high-range water-reducing, super-plasticising admixture;
- a.b.e. duraflex – a cementitious flexible waterproofing slurry; and
- a.b.e. ecofelt – a polypropylene saturation membrane, used to reinforce the a.b.e. duraflex waterproofing.

Chryso Eastern Africa is supplying a total of about 60 000 litres of CHRYSO Fluid L admixture to Aggregate Construction for the concrete required to build the multi-storey apartment block, scheduled for completion in October next year. Sawyer and Aggregate Construction's Paresh Hirani worked in close collaboration to optimise the content and performance of the concrete mix for the project which was started in August last year. Sawyer was on site right from the first cast and Chryso Eastern Africa also supplied the main contractor with a Chryso dosing system to ensure consistency in the concrete mix. CHRYSO Fluid L offers several benefits to a concrete mix. Included are:

- Substantially reducing the water content without negatively affecting the mix's consistency; and
- Significantly increasing the slump/flow of the concrete mix and its workability.



CHRYSO Fluid L is compatible with all types of cement on the Kenyan market, including the mainstream Pozzolanic cements.

The technical representative who is assisting Mau West Ltd for the waterproofing part of the project is Geoff Dagger, a.b.e. technical sales representative at Chryso Eastern Africa.

For the waterproofing of the swimming pool, the podium, balconies and bathrooms, a.b.e. duraflex together with ecofelt reinforcement to cover a total area of about 5500 m² will be supplied to the specialist waterproofing contractors, Mau West Ltd. Both the main contractor and specialist waterproofers are leading Nairobi-based companies.

Dagger says a.b.e.'s duraflex is a ready-to-use flexible slurry based on a special synthetic resin dispersion and a blend of selected cements, mixed with carefully selected graded aggregates. duraflex is non-toxic, self-curing, and effective on both the negative or positive side (positive-side waterproofing applies to sides with direct exposure to water, while negative-side waterproofing applies to the opposite or interior side from which water occurs.) The product has high bonding strength, and offers strong resistance to abrasion as well as to chloride ion penetration.

Dagger says the ecofelt reinforcement will maximise duraflex's performance because ecofelt has internationally proved to be one of the best saturation membranes in waterproofing. "ecofelt has a highly porous fibre structure, manufactured by needle-punching the fibres to form a uniformly structured sheet," he explained.

The architects for Nova Apartments are Beglin Woods Architects Kenya, which have already won an Architectural Association of Kenya (AAK) 'Best Concept' award for the luxury residential apartments and penthouses of the spectacular new development. The Beglin Woods acclaimed design for the 17-storey Nova Apartments includes an indoor/outdoor swimming pool, spa, gym, cinema, convenience store and an expansive open grassed area with water features and a jogging track. ■



The impressive new Nova Apartments in Nairobi, which have already earned an award for architect, Beglin Woods.

New range of eco-friendly road dust suppressants from Chryso S.A.

Chryso Southern Africa has launched a new range of dust suppressants locally developed by the company specifically for the sealing of dirt roads on the African continent.

The new Chryso Eco Dust range consists of four products:

- Chryso Eco Dust 100: an emulsified road surface lubricant with particles that bind together to form a dust-suppressing film. This 'top of the range' poly-adhesive surface sealer, with ultra-fine dust-binding particles, offers exceptionally long water resistance;
- Chryso Eco Dust 200: a vinyl acetate emulsion surface sealer that can be used on its own on non-maintained roads or, for longer service on maintained roads, as a second application following pre-sealing with Chryso Eco Dust Primer;
- Chryso Eco Dust Oil: an emulsified surface lubricant ideal for users with a regular maintenance programme; and
- Chryso Dust Primer: a light brown surface primer, ideally used in conjunction with Chryso Eco Dust 200.

Michelle Fick, the Chryso Southern Africa group executive relationship and project manager, says the new Eco Dust range will ideally complement and expand the wide range of dosing products and equipment already supplied by the company locally.

"The eco-friendly, UV-resistant and VOC-free Eco Dust range will be particularly welcomed by mines and quarries that have to comply with increasingly stringent health, safety, and environmental regulations all over Africa. Because of the long-lasting effect of the Eco Dust range, the fuel consumption and carbon dioxide emissions of water tankers spraying the dirt roads will be drastically lowered. It is easy to apply, in prescribed diluted form, with any water tanker fitted with a rear-mounted liquid distribution bar, and the roads can be used immediately after being sealed," Fick states.

The sealing process, basically, consists of applying the slurry evenly over the road surface followed by compaction with a vibratory roller. The road is then swept with a mechanical broom, and compacted again without vibration.

Fick says reductions in water consumption, road-grading labour, as well as vehicle maintenance are additional benefits. Increased visibility and road gripping for all vehicles adds to the Eco Dust safety advantages.

"The new range's applications are extremely varied as well. Apart from mines and quarries, dusty gravel and dirt roads that require sealing and maintenance can be found at cement plants, precast yards, building sites, farms, game reserves, rural airfields, paddocks, and less developed residential areas.

Country sandy football pitches could also do with regular sealing. Agricultural co-ops and dust-sensitive sections of the forestry industry are other potential applicators.

"The Chryso Eco Dust range created tremendous interest when it was recently launched at The Concrete Conference in Johannesburg. Its low cost of application and reduced maintenance costs compared to paving or tarred roads are seen as major benefits at a time when many industries, especially mining and agriculture, are experiencing difficult times," Fick adds. ■

More information from Elrene Smuts,

Tel: +27(0)11 395 9700

email: elrene@chrysosa-abe.co.za / www.za.chryso.com



Chryso Eco Dust is easy to apply to road surfaces with a water tanker fitted with a liquid distribution bar.



The forestry industry is just one of many potential sectors that would benefit from Chryso's new Eco Dust road sealers.

Swahili Dreams, Lamu, Kenya by Urko Sanchez Architects



Urko Sanchez.

Swahili Dreams is a luxurious, eco-friendly building fusing contemporary architecture and lifestyle, along with Swahili tradition. Taking the scheme of condominiums, the project sits in the heart of the town of Lamu and consists of nine living units, each with one or two bedrooms. It adopts the old flavour of the Island, while being innovative in its all-modern facilities and environmental design.

Context: Lamu Town

Lamu Town in Kenya, is the oldest surviving Swahili town in East Africa, with a culture born from African, Arab and Asian heritage. Its architecture still, to a great extent, is intact, and on the coast of the Indian Ocean, it is designated a UNESCO World Heritage Site. The Old Town, where the Swahili Dreams is located, is a maze of typical narrow, quiet, shady streets with twisted alleyways. Houses are distinct for their courtyard configuration, surrounded by thick coral stone walls and accessible through elaborately carved wooden doors.

Swahili Dreams is part of the ongoing Lamu Corridor development and offers modern, secure, eco-friendly living.

Integration to context

By articulating the project around, Urko Sanchez Architects created an ensemble born from the morphology of the townscape and perfectly integrated to it. Through offsets and setbacks, the volumes are simple and harbour a clean, white geometry. Material distinction, between plaster finish and coral stone walls, amplifies the variation of the project while using local materials and know-how. The aim, overall, was to create a building with a fragmented geometry at the scale of Lamu.

The houses are oriented for optimal views: from strategically-positioned windows, and ample but private terraces, including ones on the rooftop, the building frames views over Lamu Town, the Indian Ocean, and the neighbouring Manda Island.

Swahili inspiration

Evocative of the palaces of the ancient Sultans, Swahili Dreams blends design with artisanal crafts. Local artisans hand-designed all finishes, exterior and interior, starting with Lamu-style plaster work throughout the project. Main living areas are enhanced with intricate Swahili ceiling designs, beamed ceilings and polished floors. Wooden joineries complete

the spaces, with hand-designed lattices and patterns: from wooden shutters on sunny façades to fixed wooden lattices on windows and railings on full-height openings, they embrace tradition and participate in the passive climate-control for filtering sun and letting wind through.

Contemporary lifestyle: environment and sustainability

The architects wanted to create homes in perfect harmony with their context, and which adopt sustainable lifestyles. A Roman-inspired pool and spa occupies the ground floor, divided with walls and partitions that give it intimacy, shade and freshness. Two ventilation shafts take off from there and go up to the roof terrace of the building. These wind-catch towers 'catch' the wind from overhead and allow it to enter the depth of the building; this way, all apartments have cross-ventilation, with all sides able to open up. Like a reduced patio, they also allow for filtered light to come through.

Load-bearing walls, made of locally sourced coral blocks, and reinforced concrete slabs, were designed to reduce heat in the interiors by being a big enough mass for thermal absorption. The exterior finish is of Lamu plaster with anti-fungal treatment, allowing it to protect the building and last over time; its white colour reflects the sun and further reduces heat absorption. Water is managed by means of a 30,000-litre underground rainwater catcher that allows near-sufficiency and good use of natural resources, while solar-power water heating is installed to initiate clean energy.

The project won the Best Residential Building Project prize in the AAK Awards of Excellence in Architecture 2016.

About the architects

Urko Sanchez Architects is an award-winning Kenya and Spain-based boutique architectural firm renowned for excellence in design. Their projects range in size, complexity and function. In all cases, however, the focus is on the client and the context, with a tailor-crafted approach to each unique project. Commercial projects include hotels, office buildings, industrial spaces and residential developments amongst others.

The firm is deeply committed to environmental stewardship, and for each project, the team considers the cultural roots of the structure, and how the building will be best integrated into its environment. Hallmarks of Urko Sanchez projects include contemporary twists on traditional architecture; a green aesthetic that harnesses wind and solar power and recycled water; and leveraging architecture to showcase natural light. ■



PROJECT DETAILS

Project:	Swahili Dreams (Lamu Apartments)
Location:	Lamu, Kenya
Year:	2014
Client:	Swahili Dreams Ltd. Kenya
Area:	1,600 m ²
Team:	Blanca Sánchez-Balgoma, Verónica García Iguaz

Photo credits: Javier Callejas/Corrie Wingate

More information from www.urkosanchez.com

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Tudor Apartments, Mombasa: harmonising the past, present and future

Designed by Urko Sanchez Architects, the project consists of 14 apartments in Tudor Creek, Mombasa, Kenya. Characterised by a moucharabieh structural shell, it is distinct in its search for privacy and optimised natural ventilation and light.

Context: Mombasa

Located on the east coast of Kenya, Mombasa is the second largest city in the country. A multicultural and strategic centre known for trading and skilled craftsmen, it is characterised by a savanna tropical climate and a land crossed by creeks.

Tudor, the architect's intervention zone, is situated on the creek's waterfront – a privileged location north of Mombasa Island with lush vegetation and a serene neighbourhood.

Urko Sanchez Architects worked very closely with the client to create a building with minimal environmental impact, by adapting to the land's natural slope, and by using locally available materials and know-how.

Requirements

The client wanted a project which maximised the scenery from within and outside the apartments, notably via terraces and balconies. It was also required to be environmentally friendly, integrating the following into the project:

- Naturally aerated spaces: passive cooling.
- Well-lit spaces, a challenge, as light must come in without the sun's heat.
- Rainwater collection, driven by water scarcity.
- Solar-heated water for energy saving.
- Local, long lasting materials



Finally, the design had to ensure privacy regarding proximity to the road and the neighbours in adjacent plots: an apartment building and a private house. This was the inspiration for creating the filtering shell.

Proposal

Tudor Apartments prides itself in its innovative architecture, showing its attachment to Mombasa's history by borrowing inspiration from the rich traditions of Swahili design, harmonising Mombasa's past, present and future.

The plot's narrowness and slope guided the design to minimise the building's impact. The steep drop towards the creek, on the lower part of the plot, was saved with three distinct and unique patio houses, stepped one into the other. As well as filtering light, the patios allow ventilation via permeable wood lattices facing the water. They are accessible via lateral stairs that descend towards the creek, passing by an integrated gym, and arriving at an infinity pool. A measured distance from the neighbours and the road give the building a well-weighted impact, for it to be present but not overwhelming in the scenery. This way, the apartment block, enveloped with its protective skin, rises facing the road, overlooking the creek, and topped with a penthouse.

Environmental features

Mangroves and other trees were left intact on site. In addition, natural, passive ventilation was a guiding design theme. In the apartments, cross ventilation is possible from the sea, through the shaded terraces, to the interiors, via the wooden lattices and through the surrounding envelope.

Without sufficient connection to the sewage system, a bio-digester was integrated for treating grey water before releasing it into the creek. Rainwater collection provides water for the garden.

Structural skin: contemporary muchrabiah

Urko Sanchez Architects designed the muchrabiah skin following a study of different traditional patterns. It offers privacy in relation to the surroundings, and for filtered, natural light for the houses. This skin wraps itself around the apartment block, leaving its northern façade free, with balconies facing the sea and the breath-taking scenery.

Moreover, the skin was also rendered entirely structural thanks to the engineering team. A novelty to Kenya, such structural skin was possible thanks to local and international engineers working hand by hand, and to the steel workers on site who managed, by dedication and care, flawless bar bending work without access to any technology.

Spatially, this skin also redirects people's local tendency to put bars on their windows, becoming itself the border and the filter. Sometimes the direct limit of the internal house spaces, the shell is at other times a first filter of sunlight and heat, doubled by internal handcrafted wood-lattice shutters. In this way, light is generous and heat is broken down.

Crafts, techniques and team work

In addition to the white plaster finishing, the project uses mtomo finish, a coral stone cladding technique original to Lamu that helps keep thermal capacity thanks to the porosity of the coral stone. Wood work was accomplished through outstanding hand carving by local artisans from Mombasa and Lamu. Furthermore, artisans produced in-situ terrazzo for the flooring of the patio houses.

In 2013, the project received an Honourable Mention at the AAK-Awards of Excellence in Architecture: Best Residential Project. ■

Photo credits: Javier Callejas

More information from www.urkosanchez.com



PROJECT DETAILS

Project: Tudor Apartments
Location: Mombasa, Kenya
Year: 2017
Client: Swahili Gem Ltd. Kenya
Area: 4 000 m²
Team: Estrella de Andrés, Marcos Velasco, Ahmed Shamuty

Shigeru Ban to design up to 20,000 new homes for refugees in Kenya

By Patrick Lynch

Pritzker Prize-winning architect Shigeru Ban has signed an agreement with UN-Habitat, the United Nations agency tasked with guiding sustainable development, to design up to 20,000 new homes for refugees in Kenya's Kalobeyei Refugee Settlement. Currently home to more than 37,000 refugees, the settlement is quickly outgrowing its original capacity of 45,000 – over 17,000 have arrived this year alone, with numbers expected to continue to increase.

“The key thing will be to design and construct shelter where no or little technical supervision is required, and use materials that are locally available and eco-friendly. It's important that the houses can be easily maintained by inhabitants.”

Ban will draw on his wealth of experience in designing humanitarian architecture, including over a dozen displacement-related shelter projects in countries including Rwanda, Italy, and Nepal, using unconventional building materials like cardboard and paper tubes. On a recent visit to the Kalobeyei Settlement, he also explained the importance of drawing from local construction traditions to provide familiar living spaces that are tailored to their environment.

“The shelter designs have to comply with the national regulations for housing while responding in a responsible manner to local climatic conditions and challenges, providing replicable sustainable solutions to shelter.” Yuka Terada, UN-HABITAT project coordinator, agreed. “UN-HABITAT's approaches are strongly participatory and the relevant county officers as well as the representatives from refugee and host community will have an input in the design process.”



Shigeru Ban-designed housing on the coast of Sri Lanka, following the destruction caused by a 2004 tsunami. Image © Dominic Sansoni.

Designs will be tested first on 20 prototype shelters. If successful, they will then be gradually rolled out to replace existing structures, many of which are already deteriorating. ■

Source: <https://goo.gl/EHWs8N>

The Elegance: a striking landmark on Nairobi's skyline

The Elegance, a new commercial building in Nairobi, Kenya, designed by Aleem Manji Architects, broke ground in February 2016 and has already garnered the attention of the architectural world with two prestigious award nominations. The design principle of The Elegance is fairly simple; the office floor level plates rotate at the centre by around 5 degrees clockwise with every additional floor, akin to a deck of cards being fanned out from the centre. A challenge with this system was the sheer length of the cantilevers at the upper floors, which led the architects to rethink the structural, and in the process, the building itself, and how it could be made better and more efficient. This led to the practice working with systems which are new to the Kenyan market

The brief

The client, M/S VeePee Developers, required a commercial building that was initially expected to house a ground floor and mezzanine showroom space of around 10,000 square feet; office space of approximately 70,000 square feet; and parking facilities able to accommodate three cars for every 1000-square-foot of commercial space.

The architects were tasked with paying particular attention to creating a potential landmark in the area. The area itself (General Mathenge Drive in Westlands) is fairly close to the CBD area of Westlands, which teems with commercial office space. The client required a building that would set itself apart from the other office spaces and give top of mind awareness with any potential buyers.

The final client-approved design came as a result of market analysis and consultation with the local County Council, resulting in two additional floors of office space. Consequently, there was a need for additional parking space, and the decision

was made to increase the parking ratio from three per 1000 square feet to four (for enhanced sales appeal), leading to an additional two floors of mezzanine parking.

The site

The site of the project is located in the Westlands area of Nairobi, which is fast becoming an extension of the main CBD in as far as high rise offices and apartment blocks are concerned.

The area is primarily associated with mid- to upper-income dwellings and offices.

With the revised zoning by the County Council, the area is expected to see prolific growth in high-rise apartments and offices. The development itself has been located centrally on the site, leaving room for the building line, as well as the requisite by-law requirements for siting.

The location of General Mathenge is somewhat unique as the road itself has and will have a mix between commercial and residential properties. As a result, the absence of any distinct vernacular language allowed the architects to select a language to fulfil the client's brief of creating a unique design that would, hopefully, become a landmark in the burgeoning neighbourhood.

Key areas of the project

The scheme has two key areas: the parking areas and the office/showroom areas. The parking areas are split into basement parking and mezzanine parking. The provision of ample parking spots formed a critical aspect of the client's sales plan. As such, the parking solution took on added importance to the overall design. The provision of a stacked parking solution led to the creation of higher ceiling heights in the mezzanine floors and basements.

Commercial space comprises: the showroom space (ground floor and ground floor mezzanine), and the office spaces. The first floor is a dedicated floor for eateries/restaurants, principally fine dining, coffee shops and/or lounge bars to target the residents and office users. They have also made use of the slab that covers the uppermost mezzanine parking floor by converting the top of the slab into an outdoor garden seating area that will serve individual food outlets.

The offices occupy the 2nd-10th Floors. They are arranged around a central core comprising a staircase and three lifts. The main reception for the building is located on the ground floor, immediately before the circulation lobby. The design language used was an earthy mix of timber boarding on the backdrop and skirting of the desk itself, black slit stone cladding which tied in with the massive entry wall on the external facade and frosted glass on the desk.

Energy Consumption

In Kenya using air-conditioning to regulate internal temperatures, especially in summer, is prevalent. Artificial heating in the form of electric heaters is also used on cooler evenings. The architects worked on mitigating these by attempting to maintain channels for through flow of cross ventilation for each floor plan; incorporating sun shading elements to prevent direct absorption of sunlight into the windows; use of materials with a high thermal mass; and the use of a modified stack effect (the central void around the circulation core has vents along the roof level to allow hot air to escape).



To reduce the energy requirement for lighting, there are strategically positioned large windows to reduce use of artificial lighting during the day. LED light fittings are standard in all common areas. The most abundant available natural energy source around the equatorial region is the sun. The design utilises solar water heating PV panels for lighting in the common areas: lobbies, staircases, circulation spaces, fire exits etc.

Glazing

The glazing solution was a most important aspect of the overall design. Because glass formed the primary external finishing component of the building, the efficiency of the glazing solution would determine the overall efficiency of the building, both aesthetically and environmentally. An additional benefit of the double-glazing solution was its acoustic performance, considering the proximity of the building to the busy General Mathenge Drive.

Innovative technology

The majority of construction of multi-storey structures within the region is based on reinforced concrete frame structures with masonry infill.

In this context, the architects have incorporated elements of Innovative technology. These elements may be considered the norm in more developed countries, but are not yet widely used in Kenya. Currently, steel structure construction is mainly limited to warehousing and industrial projects where long uninterrupted spans are and short erection times are required. The Elegance will be one of the first projects in Nairobi to adopt a steel structural system for a building over 10 storeys.

Recognition

The Elegance was recognised as the second runner-up in the AAK Awards of Excellence in Architecture 2016 in the category of Best Concept/Ongoing Project. Furthermore, Aleem Manji



Architects was also named as a recipient of two Africa & Arabia Property Awards 2017-2018, and was honoured at the Africa & Arabia Property Awards in Dubai in September 2017. They were also recognised in the Commercial High-rise Architecture category for The Elegance, and the Residential High-rise Architecture category for another project, Rumaisa. ■

More information www.ama-kenya.com

Tanzania: Turkish firm to construct US\$1.92bn railway line

Yapi Merkezi, the Turkish construction firm, has been awarded a second project to build a 422-km high-speed electric standard gauge railway line in Tanzania. This is the longest section of the project, which has been divided into four phases.

Tanzanian President John Magufuli had asked for funding from Turkish President Recep Tayyip Erdogan earlier this year; and the project has eventually been awarded to Yapi Merkezi, beating 15 competitors.

Yapi Merkezi, has already embarked on the first 205-km phase between Dar es Salaam and Morogoro. The company will also construct the second phase between Morogoro and Makutupora. The contract is worth US\$1.92bn.

"After assessment of the bids, Yapi Merkezi met the technical and financial requirements. It will now design and construct the railway line," said Tanzanian state-owned railway infrastructure authority Reli Assets Holding Company Ltd.

According to Erdem Arioglu, the vice president of Yapi Merkezi, the agreement is the largest ever signed by a single Turkish firm abroad. "We will singlehandedly build this project, complete with accompanying technology and infrastructure. We will deliver within the agreed timelines," Mr Arioglu said.

Tanzania divided construction of its railway into four parts, and put out separate tenders to design it. The three remaining



sections are Makutupora to Tabora (294 km), Tabora to Isaka (133 km) and Isaka to Mwanza (248 km).

The Tanzanian state-run railway firm Railway Assets Holding Company is expected to award at least one more contract before the end of the year, with the others slated for early next year.

However, Tanzania plans to spend US\$14.2bn over the next five years to build the 2,561-km standard gauge railway connecting its main port of Dar es Salaam to its land-locked neighbours, including the Democratic Republic of Congo, Zambia, Rwanda and Uganda. ■

Source: <https://goo.gl/HkV2KW>

Corefil™ Speciality Fibre: reducing plastic shrinkage cracking in slabs

Concrete continues to be the most widely used engineering material in the world due to its versatility, easy availability and its durability. Concrete is especially strong in compression, but not in tension. To overcome this, concrete is often reinforced with steel bars to resist tensile stresses caused by applied loads such as wind, traffic, self weight as well as by restrained shrinkage. However, these steel bars are only effective once the concrete has hardened, leaving the concrete vulnerable to any tensile loads while it is still in the plastic phase.

The plastic phase only lasts for a few hours after the concrete has been cast. During this phase the concrete is often exposed to conditions with high evaporation rates which are mostly associated in South Africa with warm, sunny, dry and windy conditions. The evaporation of pore water from the still plastic concrete causes a negative capillary pore pressure within the concrete which results in shrinkage of the concrete. If this shrinkage is restrained, by for example the same steel bars added to provide tensile strength in the hardened concrete, cracks are likely to occur and are typically referred to as plastic shrinkage cracks.

These cracks mainly occur in concrete elements with large exposed surfaces such as slabs, bridge decks and pavements. In most cases, plastic shrinkage cracks also interact with plastic settlement cracks. These cracks occur if the uniform settlement of solid particles in the fresh concrete mix is disrupted by inclusions such as reinforcing steel bars or a non-uniform

slab depth. This results in differential settlement which causes both a shear and surface crack above the restraint as shown in Figure 1.

The surface crack is often only visible from the side and not at the surface, while the shear crack is only visible from the side. These cracks can therefore be present even if not visible at the surface and when present in combination with plastic shrinkage cracking can lead to sudden and severe cracking. Figure 2 shows the plastic shrinkage cracking that occurred when tested with and without a reinforcing steel bar with a cover depth of 20 mm and therefore with and without the influence of plastic settlement cracking.

Preventing these plastic cracks from forming remains a problem in practice due its complexity, even though there are several very effective precautionary measures that can be taken. These measures are mostly external and aimed at reducing the water loss due to evaporation by for example using a fog spray above the concrete surface, or applying a curing agent and even by erecting sunshades and/or windbreaks.

Although effective, these measures are often expensive, impractical and also difficult to apply at the appropriate time, especially for large slabs that are placed over several hours. Furthermore,

these cracks are often hidden or closed at the surface due to finishing operations such as floating and trowelling as shown in Figure 3. The figure shows a plastic shrinkage crack that was closed at the surface by trowelling, while the crack remains present below the surface. This crack appears at the surface after a day or two, often leading to confusion regarding the

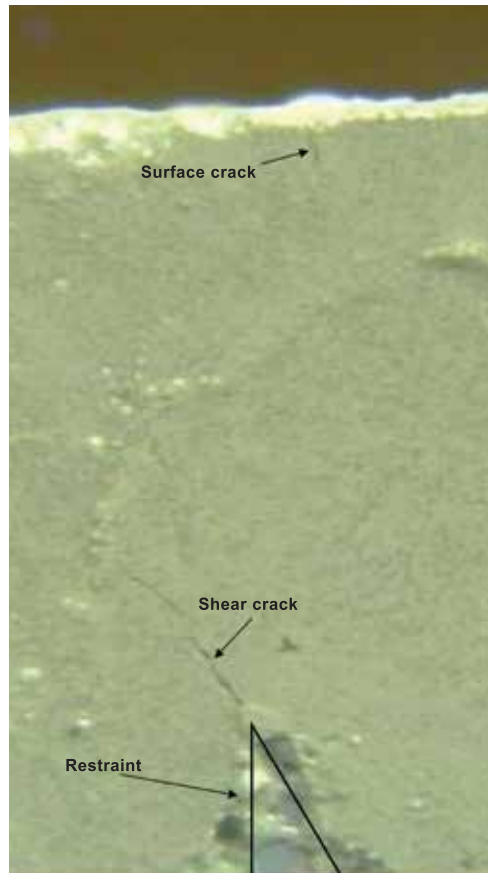
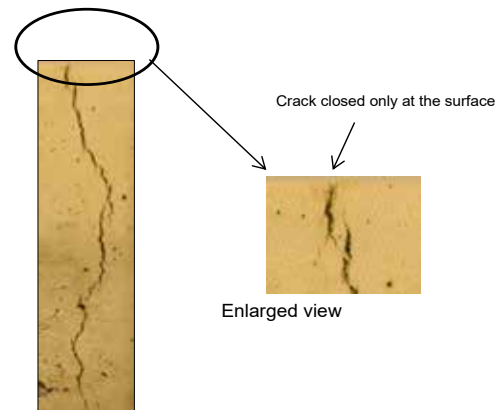
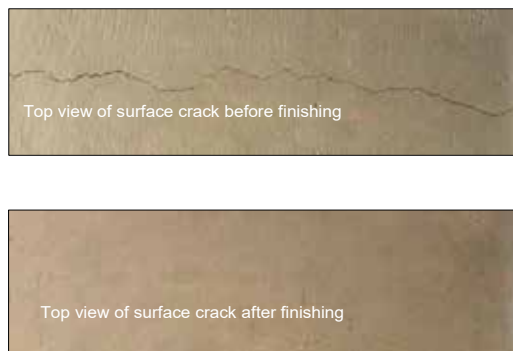


Figure 1: Plastic settlement cracks above restraint as viewed from the side.



Side view of crack below surface after finishing

Figure 2: Crack widths without the influence of plastic settlement cracking.

origin of the crack due to its apparent appearance in the hardened concrete.

The only current internal preventative measure that has proven to provide protection against plastic shrinkage cracking is the addition of a low volume of polymeric micro fibres to the concrete. These fibres reduce the crack widening by both increasing the strain capacity of the concrete as well as by bridging the crack once formed.

A typical dosage of 0.6 to 1 kg/m³ is added and proved to be effective in minimising plastic cracks. Higher dosages can also be added, although this could influence concrete properties such as workability and therefore trial mixes should be made and tested. It should also be noted, that fibres do not provide 100% crack reduction and therefore do not justify neglecting the application of external preventative measures.

In conclusion, although plastic shrinkage cracking remains a problem with concrete slabs, the addition of a low volume of polymeric micro fibres has proven to be an effective method to reduce the severity of these cracks. ■

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This article was supplied by SAPHY (Pty) Ltd. in conjunction with Dr Riaan Combrinck and Prof Billy Boshoff, Unit for Construction Materials, Stellenbosch University.

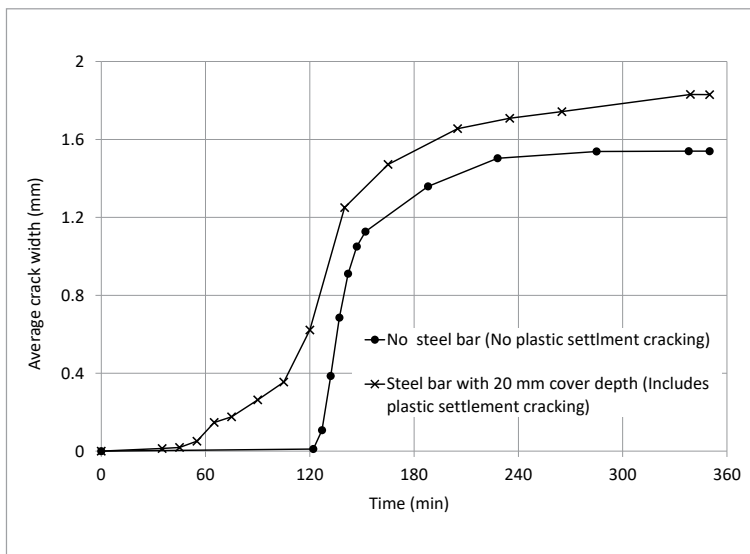


Figure 3: Influence of finishing operation on cracking.



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Creating jobs with Rubble Masonry Concrete construction

By John Roxburgh, Lecturer: The Concrete Institute's School of Concrete Technology

Rubble Masonry Concrete (RMC) is a building material that has been used throughout the world for thousands of years – as far back as AD 122 when Hadrian's Wall was built in Britain, and 1679 when the Castle of Good Hope was constructed in Cape Town.

Although RMC has been used extensively over the centuries very little was known about the properties of the material. Pioneering in-depth research work by Dr. Rod Rankine, when employed by TCI's forerunner, the Portland Cement Institute, and released in his doctoral thesis in 2000 has led to a much greater understanding of the mechanical properties of RMC. Pretoria consulting engineering firm, ARQ, has been involved in the design of several RMC dams in southern Africa and has reported that the performance of these dams during several significant floods bears testimony to the durability and effectiveness of RMC for the construction of major dams.

RMC is a composite material, derived from placing uncut stone randomly in a bed of mortar. It is often used in mass gravity and arch buttress dam construction. The recent completion of the 30-m-high multiple-arch buttress Mndwaka Dam in the Eastern Cape is a typical and noteworthy example. The impressive dam, which won an Infrastructure Commendation in the Concrete Society of Southern Africa (CSSA) 2017 Fulton Awards for Excellence in the Use of Concrete, was built to supply the basic water needs of about 40,000 people living in 63 villages on the Eastern Cape's Wild Coast.

Situated in a particularly remote location close to Hole in the Wall, between Elliotdale and Coffee Bay, construction of the 30,000 cubic metre dam – the largest of its kind yet built in southern Africa – called for careful planning in terms of design, construction and materials procurement. In their submission for the Fulton Awards, the contractors, Zana Manzi Joint Venture, stated that the construction of the dam provided abundant employment for residents of the villages surrounding the dam.

Back in 1995, the Bakubung multiple arch RMC dam in the Pilanesberg National Park in North West Province, was also very labour intensive, calling for 9,000 person-days of employment for its construction.

Another very important advantage of RMC is cost. Savings of between 30% and 60% can be realised compared to other dam building techniques. A lesser known, but very useful application for RMC, is the construction of culverts and small arch bridges.

The typical construction method for RMC would involve spreading a layer of mortar 100 mm to 200 mm thick. Rocks are then pushed into the mortar until bedded against underlying rocks. The largest possible rocks – ranging in size from 10 kg to 40 kg – are placed first and packed as closely together as possible to reduce the amount of mortar required. Smaller stones ('spalls') are then pushed into the larger gaps between the large stones to reduce the mortar volumes even further. When this is complete, the next layer of mortar is placed.

The construction material is self-supporting so there is no need for pressure-resisting shutters. Formwork is sometimes used to shape the structure, but the outer leaves of masonry are generally built by more skilled masons, using stiffer mortar. These leaves contain the layer of more workable mortar laid by less skilled labourers who can be employed to build the inner section.

The cost savings are due to locally-sourced sand and rock: either naturally occurring boulders or quarried rock. Without a need for formwork, cement is the only imported material and, with careful construction, the cement content can be reduced to well below 300 kg/m³. In more rural areas, this cost saving would be even higher.

The massive advantage offered by RMC is the use of unskilled labour. Any municipality looking to increase the labour content on civic infrastructural development should consider using RMC where possible. Experience has shown that for a given structure the person-days for construction using RMC are between five to nine times higher compared to using alternative construction methods and materials. ■

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Construction of Rubble Masonry Concrete dams and bridges is very labour intensive. (Photo: Dr. Rod Rankine).



The construction of the RMC Mndwaka Dam provided abundant employment for residents of the isolated Wild Coast villages surrounding the dam. (Photo: CSSA).

Chryso Group products for largest rubble masonry concrete dam

The Chryso Southern Africa Group supplied an extensive range of products for the construction of the Mndwaka Dam, the highest and largest Rubble Masonry Concrete dam constructed in southern Africa to date.

Both Chryso SA and its subsidiary, a.b.e. Construction Chemicals' products were used to build the new dam on the Eastern Cape's Wild Coast. Mndwaka Dam – which provides the water supply for 63 remote rural villages – was awarded a Commendation in the Concrete Society of Southern Africa's 2017 Fulton Awards.

AfriSam, which also supplied the cement as well as formulating the concrete mix for the construction of the dam, incorporated CHRYSO Plast Omega 136 water-reducing plasticiser in the mix that the cement producer supplied to the main contractor, Zana Manzi Joint Venture.

Chryso SA's Eastern Cape Area Manager, Patrick Flanagan, says the admixture has in the past often successfully been employed in concrete mixes by AfriSam.

CHRYSO Plast Omega 136 allows for a significant reduction of water in the concrete mix without negatively affecting consistency while also increasing the slump/flow of the mix.

"Furthermore, it makes concrete more workable, reduces the rate of bleeding, improves cohesion and lowers the viscosity of the concrete. By reducing the need to add extra water, the admixture lowers the overall cost and increases durability in an environmentally-friendly manner," Flanagan stated.

Nick Pike, the a.b.e. Construction Chemicals Technical Sales Consultant in East London, says the company supplied the following range of products for the building of the multiple arch-buttress dam:

- brixéal, a bitumen emulsion waterproofing product used to seal concrete surfaces while also acting as a curing agent;
- duragrout, a cement-based grouting compound with graded siliceous aggregates and chemical reagents that prevent shrinkage during curing. "The compound was used for dowel grouting, ferule holes, and repair work," Pike explained;
- epidermix 344, a structural wet-to-dry adhesive used to bond fresh concrete to existing concrete. The product can also be used to provide a damp-proof barrier within the concrete matrix;
- durarep FR, a fibre-reinforced cement-based structural repair mortar that is chloride-free and ready to use; and
- epidermix 318, a general purpose epoxy for the repair of minor defects.



The curving lines of the Mndwaka Dam blend into the rolling hills of the Wild Coast. The Chryso SA Group provided several products for this Fulton Awards commended structure by Zana Manzi JV.

The Mndwaka Dam, which is almost 30 metres high with a 30,000 cubic metres volume – is situated in a particularly remote location close to the Hole in the Wall, between Elliotdale and Coffee Bay. The dam's construction in such an isolated setting called for careful planning in terms of design, construction and materials procurement.

In their submission to the Fulton Awards judges, the contractors, Zana Manzi Joint Venture, stated that the construction of the dam provided abundant employment to residents of the villages surrounding the dam and will be a vital source of water to about 40,000 people living in relative isolation. "The Mndwaka Dam has successfully illustrated the applicability of RMC technology for use in the rural context, and provides a successful precedent for future application in similar circumstances across southern Africa," the contractors stated in the submission.

"RMC dam construction offers advantages in terms of lower cost but it is the high utilisation of labour, with associated skills development, and the insensitivity to floods during construction that make this particular type of dam so attractive in rural southern Africa," the submission added.

Zana Manzi JV built the dam for the Amathole District Municipality. The principal agents were Sontinga Consulting Engineers in association with ARQ Consulting Engineers.

The Mndwaka Dam was entered in two Fulton Awards categories: Infrastructure and Innovation in Concrete. The Fulton Awards are presented every two years by the Concrete Society of Southern Africa (CSSA) for 'Excellence in the Use of Concrete' on the African sub-continent. ■

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The Plug&Grind®: the new trending topic in the cement industry

By Moisés Rodríguez Núñez, Sales Manager, Cemengal

Cemengal, a well-known company which has served the cement industry worldwide for the last 30 years, has been selling a World Patented, portable and modular grinding station for five years. The aim of reaching isolated or small markets led to the development of a grinding station built inside containers or modules.



A Plug & Grind® installation for a client in Guatemala.



A Plug & Grind® installation operating in Uganda.

Plug&Grind® Classic was launched to the market on 2012. This model is able to grind up to 100,000 tpy of cement. The delivery time is only six months FOB, from the contract signature.

Plug&Grind®XL – Although the Plug&Grind Classic was well received, clients wanted greater capacity. One year later, Cemengal launched the XL model which enables clients to produce 225,000+ tpy of cement. Like the original Plug&Grind®, the small footprint, and short delivery time are key to its success. Many units have been sold all over the world to date.

VP&G® – Together with FLSmidth and drawing on its extensive knowledge of vertical mill development and production, Cemengal has manufactured the Vertical Plug&Grind®, with an OK mill 37-3. This OK™ vertical roller mill is manufactured by FLSmidth under license from Earthtechnica Company Ltd and Taiheiyo Cement Corporation. Production reaches 500,000+ tpy of cement and this model is designed to satisfy an increasing demand for grinding slags. The high moisture content and hardness of slags make the VP&G® ideal for those clients wanting to enter the slag-grinding market. Again, its small footprint and short delivery time contribute to its success.

Plug&Grind®X-treme – The latest model to be introduced by Cemengal, is the X-treme. This model is not only an enlargement of the XL that reached over 400,000 tpy of cement, but also includes the latest technology in classifiers with the XP4i from Magotteaux. All previous models have third-generation classifiers, but the new X-treme incorporates fourth-generation classifiers. This model also boasts the advantages of a small footprint and short delivery times.

Today, 30 units of the various models have been sold worldwide, and already more than 20 units are fully operational.

The company has a varied range of Plug&Grind® clients. There are cement industry newcomers in Kenya, Uganda and Mauritania and Cemengal also serves long-established traditional cement players on different continents.

Cemengal's five years of experience with this modular and portable grinding solution and the continuous improvement with every new model have made it a world leader. Several clients have already signed for a second and even a third unit. On the American Continent, 10 countries already have the Plug&Grind®. In Africa, six countries work with different models of our modular system, and right now, Asia has two countries and five units of the Classic and XL models.

When thinking about modular grinding solutions, there is only one name that comes to mind – Plug&Grind®, The One & Only. ■

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New technology for concrete pipes in Zimbabwe

Acsend Concrete (Pvt) Ltd. is a total provider of precast concrete solutions based in Harare, Zimbabwe. They manufacture precast concrete pipes and have their own fleet of trucks to deliver the products to site. They offer flexible after sales service and have highly skilled manpower to install their products on project sites.

In keeping with technological market trends and demand, Acsend Concrete in 2012 decided to expand their production capacity and to improve productivity with the strategic intent of exceeding customer expectations.

In a bid to explore different production technologies and to get inspiration from other concrete producers, managing director and owner Antony Benesi toured concrete pipe factories in Scandinavia. Based on the outcome and experience from this tour, he decided to invest in a VIHY Multicast SCV 120 production plant from HawkeyePedershaab.

Since installation, the new machine has significantly enhanced product quality and consistency to product specification which has ensured Acsend Concrete's customers reliable and high quality products. In addition to this, the VIHY Multicast SCV 120 with the unique vertical vibration system gives Acsend Concrete high flexibility and versatility enabling them to introduce new products to the market – products which Benesi had seen on his trip to Scandinavia and which he had no doubt would bring great value to the Zimbabwean market.

The plant was commissioned in 2014-2015 and Acsend Concrete now supplies concrete products of the highest quality to their markets.

Joint Project Development

Acsend Concrete and HawkeyePedershaab worked very closely together throughout the whole of the project. Antony Benesi explains: "I knew HawkeyePedershaab and their machines from previous experience, so I had no doubt they could supply the equipment I needed. But equally important they were a very valuable partner and an incredible source of information in the design phase of the whole plant.

"They assisted in the design of the batching plant, the design of the building, the logistics inside the building as well as the outside logistics around incoming materials and outgoing products. The cooperation with HawkeyePedershaab has given me a state-of-the-art production plant where we not only are able to supply today's products – but also the products of the future," he noted.

Benesi concludes: "A dependable precast product has its roots deeply embedded in an equally reliable production plant".

About HawkeyePedershaab

HawkeyePedershaab is one of the world's leading providers of innovative solutions for the concrete pipe and manhole markets. Since 1919, we have engineered and executed thousands of machine installations in more than 100 countries. Our long history and unrivalled experience allow us to merge local and global market perspectives in developing innovative, 'just right' solutions for customers around the world.

HawkeyePedershaab understands that in the rugged environment of the concrete factory, manufacturing equipment needs to be built to withstand harsh conditions and weather



Acsend Concrete managing director, Antony Benesi.



VIHY Multicast SCV 120 is a versatile vibration machine for production of manholes and short pipes up to 1200 mm diameter.

Plant Description

- VIHY Multicast SCV 120 pipe machine
- Mould equipment for 450-1200 mm pipes, L=1,25 m
- Mould equipment for 900-1050mm manhole rings
- Automatic concrete batching and mixing plant
- Concrete laboratory equipment

intense abuse – and we offer a full range of equipment and machinery designed accordingly. In addition to providing top-quality equipment, we are also serious about our service and strive to instill a service-minded, customer-centric philosophy in every employee of our organisation.

We strongly value establishing long-term partnerships with our customers in which we are continually seeking to anticipate their needs and delivering on the commitments we have made—whether they be in service, engineering, sales, consulting or project management. ■

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Fives FCB: Ultimate machines, Ultimate Factory

Fives FCB is a French engineering company dedicated to the cement and minerals sectors, part of Fives Group, an engineering company with a strong presence and major installations in Africa across multiple industries including Aluminium (Mozambique, South Africa), Sugar & Bio Energy (Senegal, Côte d'Ivoire, South Africa, Zambia, Kenya, Uganda), and Steel (South Africa, Algeria).

In Cement & Minerals, Fives has installations in Egypt, Algeria, Angola, South Africa, Mozambique, Tanzania, Côte d'Ivoire. This wide presence is locally supported by the Fives Representative Office in Johannesburg as well as by a local network of entities dedicated to providing client services.

With 75 years of experience in the Cement & Minerals industries and around 100 cement plants built worldwide, Fives FCB offers innovative, differentiating, and sustainable technologies to achieve the highest performances. The Fives FCB range of proprietary technologies and equipment covers crushing, grinding, pyro-process, gas treatment, and optimisation and control.

Of particular interest are the following innovative solutions.

The FCB Horomill®: this grinding technology provides the lowest energy consumption in the grinding process, zero water injection and unrivalled flexibility while achieving high cement quality. In addition, the FCB Horomill® is the only technology that allows owners to have one single set of spare parts for both the cement and raw grinding plants.

The FCB Zero-NOx Precal: the particular arrangement of our precalciner (hot spot calciner) is the pledge for a high fuel substitution rate with solid alternative fuels, and consequently a wider range of possibilities to reduce the energy bill of the plant, while keeping the NOx emissions at an extremely low level.



The FCB TSV™ Classifier: this high-efficiency classifier is a competitive asset for the production of high-quality cement with a high cement/clinker ratio as well as a decisive advantage for ore and mineral beneficiation.

The FCB plant design aims at reducing natural resource consumption and minimising emissions: for instance our kiln line arrangement is designed to avoid water injection for gas conditioning while our grinding technologies are operating and grinding cement without a drop of water.

All Fives FCB equipment and solutions are designed to meet the highest production level, from a quick production ramp-up to a maximised output. Proprietary software solutions such as FCB Opti-Kiln™ play a major role from the cold start of the kiln to the steady production, while the FCB Horomill® is operated in full automatic mode.

Besides, engineering rigorousness as well as high quality standards make our equipment and plants highly reliable. From quick ramp-up to steady production, selecting Fives FCB equipment and solutions, means selecting long-term profitability.

In addition, our organisation provides our customers with dedicated services, from staff training to technical assistance, including spare-parts supply. As part of our supplier corporate and social responsibility, training is aimed at providing our customers' staff not only the necessary skills to operate and maintain Fives FCB equipment but also a general know-how about the cement process.

The FIVES FCB Care™ programs are providing customers with preventive maintenance services, production optimisation audits, and continuous improvement plans. These are the Kiln-Care™ Program for preheaters, precalciners, kilns, burners, coolers and fans; Ball Mill-Care™ for mills, classifiers, dryers, and filters, and the FCB Horomill® Care Program for the FCB Horomill® plants.

Fives FCB's ambition is to deliver ultimate performance and be the most valuable enterprising partner through our know-how of high-quality key process equipment and machines together with our ability to integrate complete production solutions in the best possible way. ■

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Above and top right: Fives FCB installations in Mexico.

New Naivas Supermarket optimises flooring for shoppers and bakers

Flowcrete Africa has supplied the full flooring fit-out for a new supermarket in Nairobi's Ciata City shopping mall. The 3,250-m² Naivas store has been designed to offer an upmarket retail experience, with an in-store bakery, meat counter, dairy, hot food and pizza oven.

The designers required a floor that would tie into the new-build store's visual identity while providing a robust and easy to clean surface. These properties would ensure that the finish maintains its aesthetics despite heavy foot and trolley traffic, spillages of food and drink, frequent cleaning and the inevitable scuffs, scrapes and abrasions inherent to a large food retail space.

To achieve this, the floor build-up started with 3,000 m² of Isocrete K-Screed, creating a strong screed layer over which the floor finishes would be applied. This semi-dry cementitious screed incorporates a proprietary additive to produce an early drying, high strength screed.

Two different coatings were then applied: a decorative epoxy for the customer-facing areas and a hygienic polyurethane for the back of house spaces.

Throughout the shop front 2,500 m² of Peran STB was used in a light grey colour that matched the store's interior design scheme, in which complementary tones of grey have been used to infuse the shop with a relaxed yet contemporary style.

The decorative and durable epoxy resin floor coating Peran STB is made using colour stable quartz granules sealed within a

clear resin binder. This formulation is ideal for busy retail areas, as its colour and visuals won't deteriorate when faced with the practicalities of daily operations in a supermarket.

In Naivas' bakery, 500 m² of the antimicrobial enhanced, polyurethane system Flowfresh RT was installed. This HACCP International certified finish was chosen thanks to its ability to provide an ultra-hygienic floor that will be able to withstand the challenges of a bakery, which includes thermal shock from hot ovens, corrosive ingredients such as sugar and oils, point loading from heavy equipment, as well as intensive cleaning chemicals and more.

The entire flooring project was completed in only three weeks, delivering a high-performance, fully optimised floor area well in advance of the supermarket's opening. ■

Project data

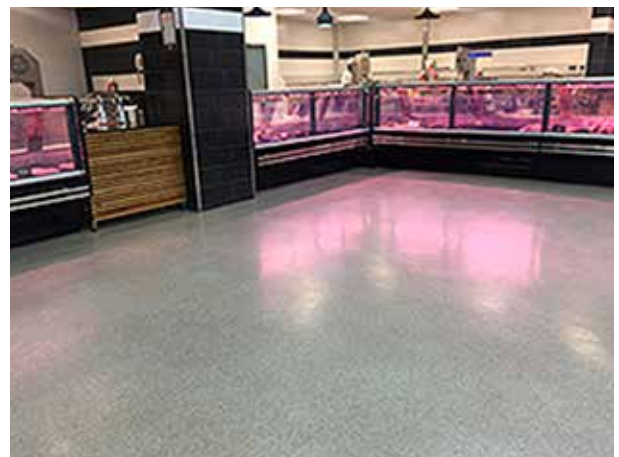
Products:	Isocrete K-Screed, Peran STB, Flowfresh RT
Market:	Retail
Location:	Nairobi, Kenya
Client:	Naivas
Date:	2017

More information from Verity Hunter,

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www.flowcretesa.co.za



Flowcrete products ensure that the Naivas Supermarket floors are aesthetically pleasing while being extremely robust and easy to clean.



From fluffy pillows to concrete: The uses of captured CO₂

By Gabriella Mulligan

Carbon dioxide (CO₂) emissions are contributing to global warming, so could technologies removing some of the gas from the atmosphere help slow the process?

When you tuck yourself into bed tonight – curling up on your memory foam mattress and fluffy pillows – consider this: you could be helping to reduce climate change.

This is because CO₂ can now be captured from the air and stored in a range of everyday items. It can be used to make plastics for a whole host of things: the insulation in your fridge-freezer; the paint on your car; the soles of your shoes; and the binding of that new book you haven't read yet.

Even the concrete your street is made of could contain captured CO₂.

UK-based Eonic Technologies has invented a method of encouraging CO₂ – a typically unreactive gas – to react with the petrochemical raw materials used in the making of many plastics.

In this catalysed form, the CO₂ can make up to 50% of the ingredients needed for making plastic. And recycling existing CO₂ in this way reduces the amount of new CO₂ emissions usually resulting from the process.

"Our aim is that by 2026, the technology will be used to make at least 30% of the polyols [the units making up plastic] made globally, and that would reduce CO₂ emission by 3.5 million tonnes each year," explains Rowena Sellens, chief executive of Eonic Technologies. This is equivalent to taking more than two million cars off the road."

Canadian company CarbonCure Technologies is recycling CO₂ and putting it into concrete. CarbonCure takes waste CO₂ from industrial emitters, such as fertiliser producers, and injects controlled doses of the liquid gas directly into the concrete truck or mixer.

The reaction that then takes place creates calcium carbonate particles that become permanently bound within the concrete – and make the concrete up to 20% stronger.

Today, CarbonCure's technology is installed in more than 60 concrete plants across Canada and the US, supplying hundreds of construction projects.

Another company, Carbon Engineering, captures CO₂ and uses it to make diesel and jet fuel. While Carbon Clean Solutions, in the Indian port of Tuticorin, captures CO₂ from a coal-fired



power plant and turns it into soda ash, an ingredient in fertilisers, synthetic detergents and dyes.

But will such carbon capture efforts really make much of a difference?

At the 2015 Paris climate conference, 195 countries agreed to try to keep global temperatures to within 2°C of pre-industrial times by reducing emissions.

But to achieve this target by 2030, the world needs to cut emissions – CO₂ accounts for about 70% – by 12 to 14 gigatonnes per year, says John Christensen, director of a partnership between the UN Environment Programme and the Technical University of Denmark. (A gigatonne is a billion tonnes.)

Eonic, hopes that by 2026, its technology will be responsible for reducing CO₂ emissions by 3.5 million tonnes each year and CarbonCure has demonstrated that its technology can help a typical medium-sized concrete producer reduce CO₂ emissions by 900 tonnes a year. Globally, the concrete industry could reduce CO₂ emissions by more than 700 million tonnes a year, the company believes.

Doug Parr, chief scientist at Greenpeace UK says: "Research into new technologies and approaches that can help reduce carbon emissions is vital, but it must not become an excuse to delay action on tackling the root of the problem – our dependence on fossil fuels,"

"A process that appears to reduce emissions or increase efficiency can lock us into maintaining industries that could be replaced with much greener options."

In addition, Christensen points out, these carbon capture technologies tend to be very costly because they are so small-scale.

Another challenge is what to do with the recycled carbon. Some have suggested burying it in the ground or deep under the ocean, but the consequences of this are not fully understood.

So it's better to reduce the amount of emissions we produce in the first place through increased use of renewable energies, such as wind, hydro and solar power, environmentalists argue. This could reduce emissions by up to 50% of the amount needed.

"Use all the technologies available to bend the [emissions] curve down. Then carbon capture can come in," says Christensen. "It could have an important role to play." ■



CarbonCure's Robert Niven thinks his firm's concrete is far more environmentally friendly. Image copyright CarbonCure .

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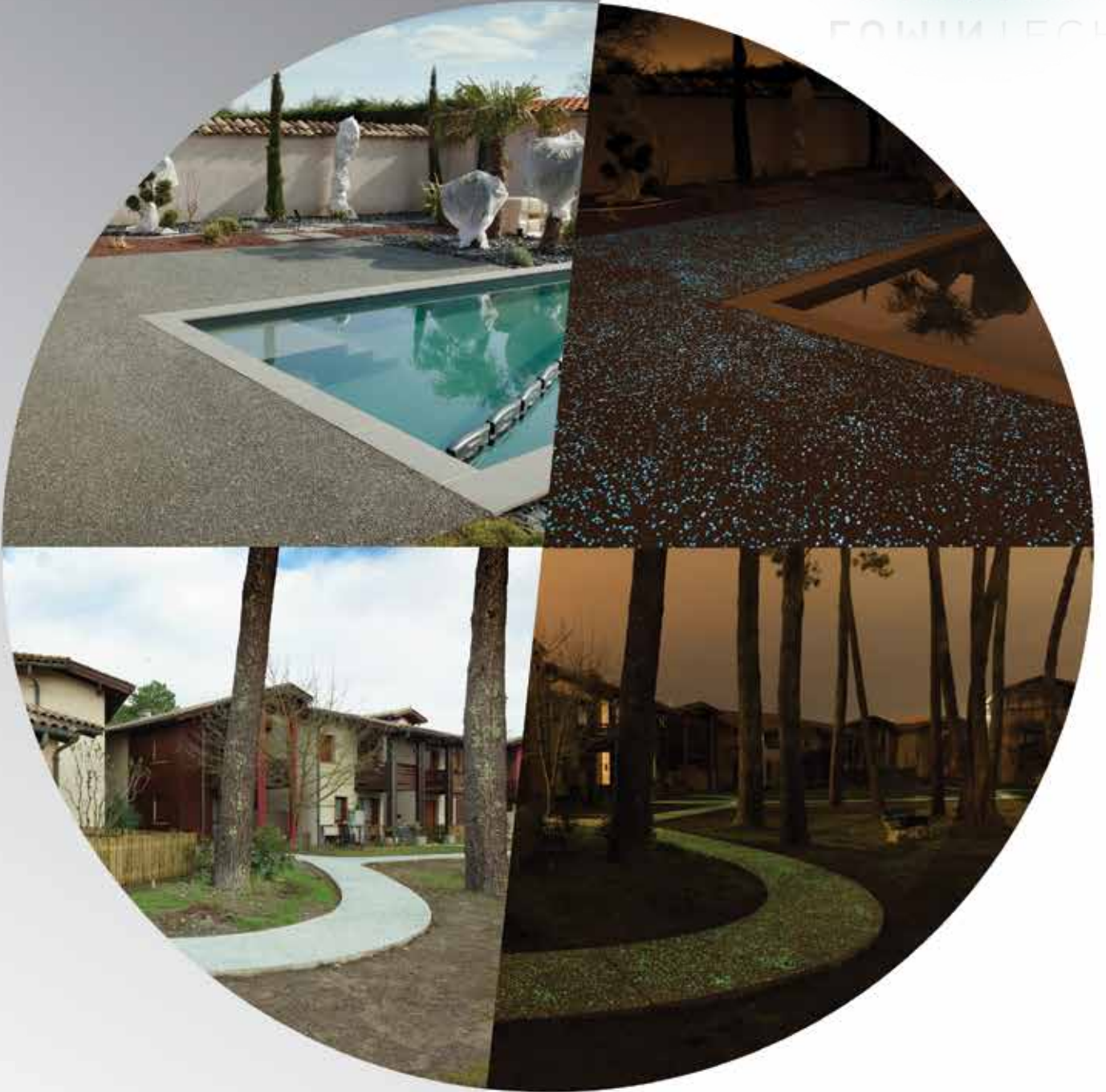
Reveals concrete
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BY CHRYSO

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