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Journal of the African Cement and Concrete Industry

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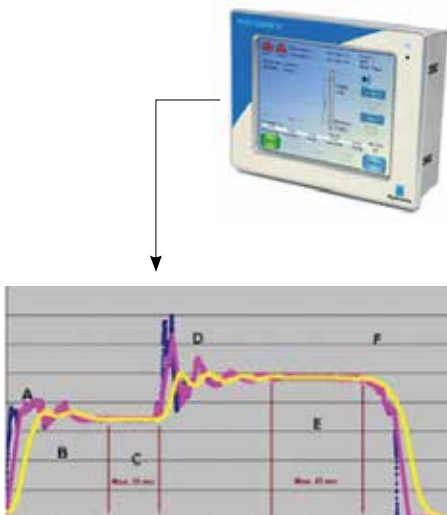
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CONCRETE trends

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A new dispensation promises a new way forward

With this issue of *Concrete Trends* going to print a little later than usual, I am able to share with you my new feeling of optimism – reflected very clearly by the markets – now that the quagmire that has been our shameful and embarrassing political reality seems to be clearing.

The new dispensation brings with it the promise of better, more transparent, less corrupt way for our country to be run. Perhaps too, our new President Cyril Ramaphosa's State of the Nation declaration that this is the start of a new and hopeful future will herald the start of implementing the long-awaited infrastructure projects that will bring relief to our beleaguered construction industry.

If as promised, he puts the needs of South Africa's people first and works together with all stakeholders to stimulate and grow the economy, it can only bode well for the country and for our industry.

Speaking of things new, I am pleased to inform you that as of the start of 2018, Hyphenica's construction and transport events now form part of the dmg events portfolio.

dmg events – which have their headquarters in Dubai – are one of the largest trade show organisers in the world. The read-

ers of and advertisers in *Concrete Trends* will probably be more familiar with their series of successful Big 5 Construction events.

What does this mean for *ConcreteTrends*?

It means that dmg events will offer a much bigger international footprint with a strong, widely recognised Big 5 brand and we will now be able to tap into a much more extensive international network.

This will mean that the Totally Concrete shows with which *Concrete Trends* is aligned, will attract more exhibitors, and with more exhibitors comes greater attendance, wider exposure and a bigger and better return on investment for our advertisers and exhibitors.

Essentially, nothing will change – the *Concrete Trends* team will still stay the same. The only thing is that now, with dmg events behind us, we are able to take the events and magazine to the next level.

Your support has always, and will continue to be greatly valued and we invite you to stay with us and be part of this exciting new journey of growth.

Gill Owens, Editor



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First to 50! Aurecon achieves 50 Green Star ratings in South Africa

The Green Building Council of South Africa (GBCSA) confirmed that global engineering and infrastructure advisory company Aurecon was the first company to have 50 Green Star-rated buildings certified in South Africa. Aurecon fulfilled the role of green building consultant on all of these projects.

Executive director for Certifications of the GBCSA, Manfred Braune, said: "Aurecon has been a leader in delivering successful Green Star certifications, collaborating with the GBCSA on developing various rating tools and guiding property developers, clients and built environment professionals towards a greener future."

While Aurecon offers ESD solutions for clients, the company's green credentials extend to its own offices. Opening in 2011, their Tshwane office at Lynnwood Bridge Office Park was the first office building in Tshwane to receive a Green Star rating and the company's first Green Star-rated project in South Africa. Aurecon's Cape Town office opened in August 2011 and delivered the country's first 5-star rating.

"Achieving Green Star ratings for our own buildings shows that we walk the talk, and that we have a culture committed to innovative thinking and to making a difference. We are privileged to have been



involved with so many projects with like-minded clients," says Aurecon's technical director – Buildings, Martin Smith.

"Aurecon's ESD team was established in 2011 and since then we have worked on various projects undertaken by developers who aspire, like ourselves, to transform the industry. We are continually learning and co-creating sustainable solutions for the greater benefit of all. All team members are Green Star Accredited Professionals and many are also pursuing further qualifications in sustainable design, engineering and real estate" says Aurecon Associate, Yovka Raytcheva-Schaap.

Green design has now become the standard among tenants and property

developers and it is transforming the way engineers design buildings, as well as the way that clients approach their projects.

"Aurecon's engineers design according to green building standards because it has become best practice within the sector. Green Star rated buildings are no longer rare and tenants have come to expect the buildings they lease to be energy efficient and sustainable. We have gone from promoting the importance of green building to our clients, to now being brought in to share our expertise during the concept phase of projects,

which is testament to how the industry has changed over the past six years," says Raytcheva-Schaap.

"In celebrating this achievement, we reflect on work done since the beginning of the team's journey and, at the same time, we are excited about future opportunities to innovate, to expand our knowledge and to be part of this dynamic industry," adds Smith.

Upon publication, the GBCSA has confirmed that Aurecon had achieved 52 Green Star ratings in total. ■

**More information from
Danielle Bond, Tel: +61 3 9975 3138
www.aurecongroup.com.**

Bryan Perrie honoured for "tireless work in concrete industry"

Bryan Perrie, MD of The Concrete Institute, has received the Concrete Society of Southern Africa (CSSA) Inland Branch's 2017 Chairman's Award for his "tireless work in the concrete industry for more than 30 years".

Naming Perrie as the 2017 recipient of the prestigious award at a function held in Johannesburg, Johan van Wyk, chairman of the Branch, said apart from leading The Concrete Institute, Perrie is a global authority widely consulted on concrete floors and pavements.

"Bryan was also a judge for the CSSA's 2017 Fulton Awards for Excellence in the Use of Concrete, and in taking the lead for the judging of this very important event in the concrete industry, spent more than

a month travelling throughout southern Africa to ensure that the very best projects were honoured by the CSSA.

"Furthermore, Bryan's regular input and investigations into various industry-related disputes has made him the 'go-to concrete technologist', always approachable when assistance is required. He is a member of various national and international bodies and notably the chairman of the TC81 SC01 committee of the SABS where he has been leading the way in reviewing, writing and setting concrete standards," the CSSA citation adds. ■

**More information from Bryan
Perrie, Tel: +27(0)11 315 0300 / www.
theconcreteinstitute.org.za**



Bryan Perrie, MD of The Concrete Institute (right), receiving the CSSA Inland Branch's 2017 Chairman's Award from the Branch chairman, Johan van Wyk.

CSSA recognition for “preacher of the concrete gospel”



Michelle Fick, executive relationship and project manager for the Chryso Southern Africa Group, receives the CSSA Inland Branch's Concrete Achiever for 2017 award from Branch chairman, Johan van Wyk.

The very popular and well-known Gauteng concrete industry personality, Michelle Fick, was recently named Concrete Achiever of the Year for 2017 by the Inland Branch of the Concrete Society of Southern Africa (CSSA).

The recipient of this annual award is selected by the CSSA Inland Branch following nominations from its members.

In announcing Fick as their Concrete Achiever for 2017, CSSA Inland Branch chairman, Johan van Wyk, said she had been a valuable member of the CSSA Branch for many years.

“Michelle has organised and/or assisted in every event that the Inland Branch

presented during 2017 and her input has always been enthusiastic, constructive and noticeable. She not only markets concrete incessantly, but also promotes with great success both CSSA and her employers, the Chryso Southern Africa Group, for which she is executive relationship and project manager.

“Michelle is unmissable in every team she forms part of and is indeed a ‘poster child’ in preaching the concrete gospel,” Van Wyk added. ■

**More information from Elrene Smuts,
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www.chryso.com**

World's first commercially available concrete sunglasses!

The South African architect Handre de la Rey won the 2017 PPC Imaginarium Awards Industrial Design Category with concrete sunglasses, entitled CS Project. Since then, he has launched the design, along with his studio 20 EIGHT, for commercial retail, making it the world's first pair of concrete sunglasses available to the public for purchase.

Although some other examples of concrete sunglasses exist, from studios such as XYZ Integrated Architecture and from artists such as the UK's Daniel Sinsel, this is the first pair that has successfully been brought to the market.

CS Project is the latest concept by De La Rey, who set out to explore the possibility of creating a pair of ultra-thin sunglasses that push the perceived boundaries of cement as a material.

CS Project has gained recognition due to being showcased at a number of prestigious galleries and events throughout the year as part of PPC Imaginarium's travelling nationwide exhibition. The PPC Imaginarium is South Africa's most supportive art and design competition and challenges emerging creatives to express their talents by incorporating Portland cement-based concrete as the primary medium in their respective categories.

CS Project was inspired by the work of Japanese architect Tadao Ando, whose use of bold geometry, clean proportions and concrete informed the design process.



Production of the current sunglasses design is limited to 1,000 units, with each pair being meticulously handcrafted and individually numbered. Manufactured out of cement, stainless steel and 3D printed metal, the sunglasses weigh only 100 grams, making them lightweight and functional.

“Developing CS Project has been a challenge, albeit one that we have thoroughly enjoyed. We're extremely happy with the finished product and are currently shipping our first batch of sunglasses to Canada. We're also in the process of developing a Nylon version.

“Being announced as the Industrial Design Category Winner in the 2017 PPC Imaginarium Awards has given our design studio incredible exposure. CS Project has been on display at numerous esteemed galleries and has been featured widely in the media – we're now

receiving an influx of inquiries regarding our work. The awards pushed us to work hard on a design that is unique and out of our comfort zone”, says De La Rey.

The concrete sunglasses are available in stone grey and black. They recently went on sale at the GUILD, a design destination that is located at the new mixed-use Silo District at the V&A Waterfront in Cape Town, South Africa. The sunglasses can also be purchased on the 20 EIGHT website. ■

To learn more about CS Project, visit www.20eight.co.za



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Dangote partners with Jumia to sell cement online

In a new move designed to reduce price and ease logistics inherent in the purchase of its products, the management of Dangote Cement Plc has signed a pact with the foremost e-commerce platform Jumia Nigeria to offer its cement for sale to customers online.

At the unveiling of the deal in Lagos, Dangote Cement, key account director, Chux Mogbolu said Dangote Cement was happy to partner with Jumia, in a bid to make Dangote cement available with ease to customers.



According to the deal, Nigerians and corporate bodies wishing to purchase a minimum of 300 bags of 50kg of Dangote Cement and above can now order on Jumia at N2,500 per bag and have them delivered to any place of their choice with no extra cost for transportation.

However Mogbolu said: "For now, the pilot scheme is live in Lagos, Abuja and Port Harcourt, but we can extend to other cities depending on the level of demand and the performance of the new deal."

"With the deal, Nigerians in need of seamless supply of cement from Dangote can now place order, pay online and have delivery in record time from Dangote's nearest cement plant to Lagos, Port Harcourt or Abuja.

"We are starting with a Minimum Order Quantity of 300, 600 and 900. We may increase these quantities depending on demand," Mogbolu explained.

CEO of Jumia Nigeria, Juliet Anammah said she believed the deal would be beneficial to all parties and further online shopping in Nigeria. She said the 2017 Black Friday Festival had attracted over 14 million visits since November 13 – 85% made from mobile devices.

"This year's explosive Black Friday numbers demonstrate the increasing capacity and flexibility of the online retail space in Nigeria," Anammah said. ■

More information from www.dangote.com

PPC appoints Johan Claassen as CEO

Cement producer PPC has appointed Johan Claassen as CEO and executive director of the company.

Claassen has served as interim CEO for a number of months, with PPC chairperson Peter Nelson noting that he has overseen a number of important milestones, including the successful stabilisation of the business, an improvement in efficiencies following the completion of key projects and the strengthening of PPC's financial position.

In addition, he notes that Claassen has developed strong relationships with a number of important stakeholders, not least the PPC board, executive team and the company's broader management team.

"He has demonstrated that he has the right set of skills to effectively lead the company by balancing operational and financial considerations to leverage our quality assets across the continent, improve our profitability and deliver sustainable long-term returns for our stakeholders. After due process and all considered, the board confirms the appointment and looks forward to working with Claassen," Nelson commented.

Claassen was previously PPC Cement RSA MD and has served as a member of the group executive team since January 2013.

Meanwhile, Njombo Lekula, who was previously MD of Rest of Africa Cement, has been appointed MD of South Africa Cement.



Mokate Ramafoko, in turn, succeeds Lekula as MD of Rest of Africa Cement. "These executive appointments are in line with our succession planning approach which is to promote experienced internal candidates with the right leadership pedigree to harness talent across the company and deliver on PPC's corporate strategy. The profile of our executive management team is further enhanced by these appointments, in line with our transformation agenda," Nelson concluded. ■

Source: <https://goo.gl/1HXiTY>



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New Nigerian Society of Engineers President explains his priorities

By Engr. Dr. Kolawole A. Olonade

In his inaugural address, the 31st President of the Nigerian Society of Engineers (NSE), Engr. Adekunle Olumuyiwa Mokuolu, envisages community engineering and rural infrastructure development as essential for national integration. The NSE is the umbrella body for engineers in Nigeria.

His view is that mega cities start from small cities, which originated in villages. In his words: "The way forward therefore, is going back. Let us start from the village and build outward or expand to a beautifully planned, energy efficient and environmentally conducive town, city and megacity. The time to start is now. Therefore, in a few weeks we will launch a pilot rural development scheme in collaboration with the Association of Local Governments of Nigeria (ALGON) and various Branches of NSE across Nigeria.

"Six villages, one from each geo-political zone, will be selected for intervention. We plan to provide infrastructure free for these villagers, and the cost will be borne by you and I," he stated.

Engr. Mokuolu acknowledged that the challenges were enormous and promised to institutionalise community engineering, which will be driven by Nigerian engineers.

To provide the required services more qualified engineers would be needed. Thus mentoring young people was critical. He said: "Under my administration, the NSE will engage in programmes to rapidly produce more engineers; there will be increased interaction with secondary school pupils about the benefits engineers deliver in the built environment.

"Starting with providing weather station in each school, special attention will be given to encouraging girls to study engineering and ensuring that the Women in Engineering (WInE) programme flourishes."

"To enhance three-dimensional perception, every engineering graduate will take a one-hour flight and visit the highest point in Nigeria. Engineering graduates will undergo supervised tutelage during National Youth Service scheme and the Supervised Training Scheme in Engineering (SITSIE) with the Council for the Regulation of Engineering in Nigeria (COREN)," he said.

"Logbook and mentorship will be standard instruments of training graduate engineers, who will work with senior members

to assist government in grassroots monitoring of engineering projects and volunteer time and knowledge to assist government achieve her Sustainable Development Goals programme."

Engr. Mokuolu promised President Muhammadu Buhari, GCFR, who is also an Honourary Fellow of NSE, that the Society will ensure the success of all the President's initiatives requiring engineering input. He also called on professional bodies to join hands and partner with President Buhari to "evolve a nation that we can truly call ours."

The investiture ceremony, on 13 January 2017, was preceded by a colloquium: "Strategies for Accelerated Development of Rural Areas in Nigeria".

The new President's first duty was to inaugurate his executive committee. They are: Deputy President, Engr. B Mohammed, Vice Presidents: Engrs. T. S. Wudil, J. Akinteye and Dr. Mrs. E. Y. Ishidi. Other exco members inaugurated were Engrs. A. F. Ibitoye, Mrs. H. S. Adeniran, Y. A. Graba, Prof. A. T. Abdurahim and Mrs. C. N. Igwegbe as well as Dr. A. Babalola. Engrs. O. A. Anyaeji and T. Olalekan were inaugurated as Immediate Past President and Acting Executive Secretary.

The event was attended by people from many walks of life: traditional rulers, captains of industry, academics, prominent political dignitaries, construction association luminaries and NSE Past Presidents, Chairmen and Fellows of the Society. The Abeokuta Branch was represented in large numbers led by Engr. M. I. Abbass.

The new President was born on 1st June 1954 in Lagos. He studied Civil Engineering at the University of Lagos and is a recipient of many awards.

He has contributed much to engineering practice in Nigeria and beyond. Until his voluntary retirement, he was Director in the Federal Capital Development Authority. ■

Contributor: Engr. Idowu Olumayowa

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Engr. Adekunle Olumuyiwa Mokuolu, FNSE, The 31st President of the Nigerian Society of Engineers.



The Nigerian Society of Engineers

The Nigerian Society of Engineers is the umbrella body for all engineering professions in Nigeria. It was established in 1958. The Society's objective is to promote the advancement of engineering education, research and practice in all its ramifications with a view to maintaining and enhancing the professional capabilities of its members to better equip them to fulfil the needs of the profession for the good of the public and the nation. Members are grouped under divisions, which are discipline-biased, and branches enable engineers in the same locality to network.

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Formidable 'red tape' to comply with on building projects

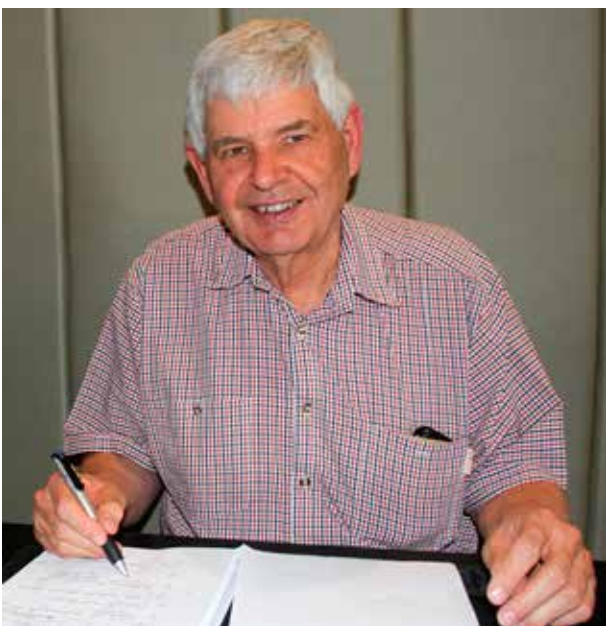
A formidable amount of 'red tape' in the form of official certificates and approvals, formal records and documentation apply from start to finish of a building project, says Uwe Putlitz, CEO of the Joint Building Contracts Committee (JBCC), who cautions that even a completed building needs written civic approval before a single tenant can move in.

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 (contracts) that portray the consensus view of the committee's constituent members.

"All standard building/construction contracts (SFC) stipulate that parties must comply with the law. In the contract data of the SFC, the law applicable to the project must be filled in: the law may apply to the country where either or both parties are based – which may not be the location of the project. All business entities must be registered to conduct trade where a project is located. Generally, this is an activity and cost outside the project execution."

Putlitz says assuming that a building/construction project is carried out in the "conventional manner" (where the employer undertakes feasibility studies including selection and/or purchase of a suitable site and/or existing building(s), obtains geotechnical information and applicable environmental approvals, and schedules project requirements), the employer then appoints professional consultants to prepare designs in accordance with the project brief.

"These consultants must apply for statutory approval from the local authority, including town planning and building plan approvals. Concurrently, the consultants must complete tender documentation as part of the procurement process. It is up to the consultants to guide the employer in the selection of a contractor with appropriate skills and experience at a just fee for the work. The selected contractor is appointed by the employer, using a recognised SFC to formalise the agreement.



A formidable volume of 'red tape' applies to building projects and all relevant documentation must be carefully stored, JBCC's Uwe Putlitz has advised.



"It is important that all design documentation and statutory compliance certificates are filed systematically and safely so that they can easily be retrieved and shared with members of the project team. Before the contractor can start work on site, the SFC and other documents comprising the agreement must be compiled, agreed and signed by both parties – including securities for performance, payment and advance payment, proof of appropriate insurance and a works programme.

"The employer must then also apply for and obtain a construction permit from the Department of Labour. The contractor in turn must submit his or her company's Health and Safety plan for approval by the employer. Usually SFCs allow about a month to comply with these administrative issues before the contractor can be given possession of the site – and the construction period can commence."

During the construction process, all members of the project team must comply with the administrative requirements of the SFC. This includes all notices, minutes of site meetings, contract instructions, etc, as well as compliance certificates as various trades are commissioned before such services or equipment can be put to use.

"Once the contractor's specified obligations have been completed, the contract administrator must issue a certificate of practical completion. Thereafter the employer must apply for an occupation certificate from the local authority before the completed building may be occupied. Occupation without such certificate is illegal and any damage will not be covered by insurance.

"It is generally accepted that a project is not complete until all relevant paper work has been done. This applies to as-built documentation, as well as all product or service warranties and operational information to use and maintain a building competently over its lifespan. Such information must be safely stored so it can easily be retrieved and passed on to successive owners," Putlitz adds. ■

More information and details of the JBCC training programme for 2018, Tel: +27(0) 11 482 3102 email info@jbcc.co.za.

Global Cement & Concrete Association launched

The Global Cement & Concrete Association (GCCA), a progressive new association, is dedicated to developing and strengthening the sector's contribution to sustainable construction.

According to a statement by the new body, "The association will focus on driving advancements in sustainable construction, working to enhance the cement and concrete industry's contribution to a variety of global social and developmental challenges.

"To this end, GCCA will promote the development of durable, resilient and environmentally sensitive buildings and infrastructure at global level.

"With concrete now representing the world's second most consumed product after water, issues at the forefront of the organisation's agenda include sustainable development and urbanisation, as well as climate change mitigation and adaptation."

The statement further noted that in addition, GCCA aims to foster innovation throughout the construction value chain, in collaboration with both industry associations and inspiring architects, engineers and innovators.



It pointed out that in this way the association aspires to demonstrate how concrete solutions can meet global construction challenges and sustainable development goals, while simultaneously showcasing responsible industrial leadership in the manufacture and use of cement and concrete.

The GCCA will be led by international cement companies and headquarters to be based in London, complementing and supporting the work done by existing associations at national and regional levels.

Membership of GCCA is available for cement manufacturers from all over the world that share the organisation's values, and partnerships will be developed with organisations that share its vision.

GCCA's founding members are CEMEX, CNBM, CRH, Dangote Cement, Eurocement, Heidelberg Cement, LafargeHolcim, Taiheyo and Votorantim. ■

Source: <https://goo.gl/aJu9T3>

Equipment suppliers gearing for 2018

CONMESA

Construction and Mining Equipment Suppliers' Association

Construction and mining equipment suppliers are preparing to meet changing customer requirements within the rapidly changing local political and economic landscapes.

Recent developments in Zimbabwe and South Africa will encourage renewed investment while commodity price stability and increased demand for raw materials promises to reignite the mining industry.

This is good news for equipment suppliers and the Construction and Mining Equipment Suppliers Association (CONMESA) is calling members to start actively engaging with markets to anticipate future demand. Trade shows like the upcoming Bauma Conexpo Africa are pivotal in forging communications between suppliers and users of construction and mining equipment.

"We believe Bauma is a good meeting point and this year's show in March 2018 is perfectly timed to provide guidance for our industry," says CONMESA chairman, Lawrence Peters.

"We hope that it will serve to exchange ideas, anticipate future demands, showcase new technologies and create new business opportunities. ■

More information from Jim Rankin,
Tel: (011) 453 7249 or <https://www.bcafrica.com>



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\$5bn rail corridor in Mozambique to “feed Africa”

The African Development Bank (AfDB) has arranged a \$300m loan to start the \$5bn Nacala corridor rail and port project in Mozambique and Malawi, of one of Africa's largest infrastructure schemes.

Designed to integrate the region and open trade in coal and agricultural commodities, the project will see a 912-km railway running from the Tete province in western Mozambique to Nacala port on the east coast, through a section of Malawi.

A deep sea port at Nacala is also planned.

Announcing the financing from Japanese and other banks on 20 December 2017, following “years of financial structuring”, the AfDB said that when the railway opens, coal exports would increase by 40%, generating crucial foreign earnings for the struggling economy of Mozambique.

The railway will also carry four million tons of other commodities a year, and give regional farmers access to world markets, the AfDB explained.

“By providing a rail link across Mozambique and Malawi with a possible extension to Zambia, it will help integrate Africa, and by



Artist's rendering of the new coal port at Nacala, Mozambique, from consultant Arcadis, which is advising on the scheme. (Image: Arcadis)

opening up markets for agricultural commodities it will help feed Africa,” said Pietro Toigo, AfDB country manager for Mozambique.

The AfDB is co-lead arranger in this transaction, which includes the Japanese Bank for International Cooperation (JBIC), and the Nippon Export and Investment Insurance (NEXI), as well as the Export Credit Insurance Corporation of South Africa (ECIC), including a range of commercial banks that are

providing finance to the Nacala project sponsored by VALE and Mitsui & Co.

The AfDB is also investing a million dollars in grants to help SMEs and agri-businesses along the new rail corridor in Malawi and Mozambique.

“This project can provide wider benefits to Mozambique, Malawi and Zambia, and allow Mozambique to fulfil its ambition to be a regional gateway to world markets,” said Mozambique's Minister of Transport, Carlos Mesquita. ■

Source: <https://goo.gl/3t21PA>

Sika opens concrete admixture factory in Cameroon

Sika is further expanding its presence in Africa by opening its first facility for concrete admixtures in Cameroon. Following the foundation of the national subsidiary in 2016 to address the developing market potential, this latest investment will enhance Sika's local supply chain footprint.

Sika will use the new concrete admixtures factory, located in the major city of Douala, to supply customers



Warehouse of Sika's new plant in Cameroon.

in this growing construction market by providing locally manufactured products and technical support.

The country's building industry is growing significantly under the stimulus of investments in infrastructure and housing construction. Important construction projects include the expansion of the Kribi seaport in the south of the country, the upgrading of the country's rail network and the construction of stadiums for the 2019 African Cup of Nations. Sika is already supplying its product solutions manufactured by Sika plants in neighbouring countries for these key projects.

Sika recently also commissioned new production facilities in Angola, Nigeria and Ivory Coast. With these investments the company continues to strengthen its position for further market penetration into the African continent, where the boom in the construction industry is driven by extremely high population growth combined with strong urbanisation trends and megacity developments. ■

More information from Dominik Slappnig,
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The top ten fastest growing African economies

By Sophie Chapman

10: Uganda, where the economy grew by 5.3% (GDP) in 2016 – a lower growth rate than during the 1990s and early 2000s when the average rate was 7%. Factors influencing Uganda's drop to number ten on the list include adverse weather, the civil unrest in South Sudan, global economic uncertainty and private-sector credit constraints. However, the World Bank expects increased growth over the next three years.

9: Sierra Leone, which reported 5.3% growth in its GDP in 2016 despite significant shocks to its economy during 2014 and 2015; at which time Sierra Leone demonstrated great resilience. The country experienced a real-term GDP swing of -20.6% in 2015 as the result of the collapse of iron ore prices and the Ebola epidemic, but the World Bank projects that Sierra Leone will continue to rebound with a 5.4% increase in future. This economic growth is expected to be fuelled by continued investment in agriculture, fisheries and mining. The International Monetary Fund also predicts that Sierra Leone will continue its upward trajectory of recovery.

8: Central African Republic, which reported growth of 5.7% in 2016. The nation is showing promising economic growth with the first democratically-elected president, Faustin Archange, at the helm. Though economic recovery within the Central African Republic has been slower than anticipated, the World Bank expects the next few years will see increased stability and growth.

7: Mozambique, which has a labour force of 10.1 million and its key economic sectors include manufacturing, agriculture, tourism and finance, all of which declined after independence from Portugal in 1975. The economy then picked up in the 2000s after the Mozambican Civil War. Mozambique reported growth of 6% in 2016 and a notable change in the economy was linked to the discovery of oil and gas in East Africa, but agriculture remains the mainstay of the economy, employing more than 80% of the workforce. Other key profitable industries for the nation include fertilisers, glass, cement, tobacco and textiles.

6: Kenya reported a 2016 GDP growth of 6.3% and is expected to continue on its path of economic growth. Located in East Africa, Kenya enjoys a stable currency, low inflation and reasonable fuel prices. When coupled with an increase within its construction and services sectors, as well as rising incomes and a burgeoning middle class, it's easy to see the drivers behind its upward trend.

5: Rwanda, located in East Africa, Rwanda is a landlocked country with a population of 11.61 million. According to the World Economic Forum, Rwanda is among the fastest growing economies on the African continent. Its 6.3% growth in GDP is expected to continue thanks to the country's development goals as outlined in its Vision 2020 strategy. These include rural development, economic transformation, youth employment and increased productivity.

4: Djibouti, a small port country whose economy hinges on services taking advantage of its strategic location at the Red Sea's southern entrance, as well as foreign investments and



financing. The GDP of Djibouti increased in 2016 by 6.5% as a result of construction, transport services and port development. The establishment of a free zone within the country, as well as the profits from a railway leading to Ethiopia, are also drivers of its growth.

3: Senegal, which experienced economic growth of 6.6% in 2016. This was fuelled, at least in part, by President Macky Sall's economic plan that includes major reforms for industries as diverse as tourism, education, financial services and energy. With a focus on improving Senegal's productivity and increasing the country's GDP, the plan also calls for 27 flagship projects to be undertaken.

2: Tanzania, where the economy grew by 6.9% in 2016. Despite slumping growth in many other parts of Sub-Saharan Africa, Tanzania is expected to deliver a 7% growth in its GDP in 2017. In addition to the service sector and agricultural production delivering strong results, Tanzania also demonstrated increased growth in quarrying and mining. Measures designed to halt corruption and tax evasion, and a relatively low interest rate, are factors fuelling its growth.

1: Ivory Coast, which reportedly grew its GDP by 8.5% in 2016. The nation is led by President Alassane Quattara, an economist and former director with the International Monetary Fund (IMF). According to the World Bank, the country boasts a sizable manufacturing base and is a major exporter of oil. It is also the world's number one exporter of both raw cashew nuts and cocoa. ■

Source: <https://goo.gl/jmrP6a>

Builders Warehouse opens second store in Zambia

Builders Warehouse has extended its roots in Zambia, recently opening a second store in the country, in Zambia's second largest city, Kitwe. Builders Warehouse, part of Massmart Holdings, has 100 stores in South Africa and has launched six stores outside South Africa.

The Kitwe store employs 54 people who reside in the Kitwe area: 44 of these are permanent, 10 on contract and approximately 15 indirect new jobs will be created from ancillary services like cleaning, security and maintenance. Builders intends employing only from the available local workforce.

Builders Warehouse encourages continuous engagement and participation within its local communities and has donated 20,000 ZMW (Kwacha) to the Luangwa Primary School. This is to assist with renovations of their premises.

Builders Warehouse is fully committed to supporting and promoting initiatives that focus on building and renovating projects, early childhood development and feeding schemes within the communities in which the stores operate. The new store's trading area is 2,439 m², the yard is 3,584 m² and the garden centre measures 305 m². There is a wide variety of products that include bathrooms, building materials, décor, electrical supplies, flooring and many more in-store.

Builders Warehouse believes that the secret to successful retailing is to give its customers what they want. Services



offered include: quotations, financial services, glass cutting, key cutting, paint mixing, pool water testing and board cutting.

Builders Warehouse offers four store formats that cater to the diverse and widespread customers in different locations: Builders Warehouse, Builders Express, Builders Trade Depot and Builders Superstore. ■

Source: <https://goo.gl/qG6dPR>

Nigeria: SON, stakeholders begin review of cement standard

By Chinedum Uwaegbulam

Four years after the Federal government approved the new cement standard for the producers, the Technical Committee set by the Governing Board of the Standard Organization of Nigeria (SON) is again reviewing the quality of the products.

The grade-strengths of cement production in Nigeria have been NIS 444-1, which was adopted as composition and conformity criteria for common cement in the country.

The committee had, in the wake of the widespread protest against collapsing structures across the country, blamed low-quality cement as a key factor. There were also fears that the misapplication of various cement strength classes also contributed to the problem.

Early in December 2017, a select group of professionals and experts, constituting SON Technical Committee met in Lagos and began the review of the NIS 444-1: 2014 cement standard.

The meeting attracted stakeholders and experts in the cement sector such as cement manufacturers, academics, research institutes, the Consumer Protection Council, the Block Moulders Association of Nigeria and a number of government establishments.

SON DG, Osita Anthony Aboloma who opened the meeting, said the exercise is "imperative as standards can be reviewed



after five years or at any time at the insistence of stakeholders or if found inadequate due to changes in technology, test methods and government policy."

The director, Standards Development, Chinyere Egwuonwu explained: "The cement standard is undoubtedly a very important one, as 80% or more of the buildings and other infrastructural development of any nation is carried out with the use of cement.

"Cement is a binder for all the components of the building and its poor application has been blamed for failures and collapses in the building and construction industry.

"The standard is a consensus document that promotes trade and ensure a positive impact on the national economy, if strictly adhered to," he said.

Aboloma also urged stakeholders to utilise their extensive knowledge and experience in ensuring global best practices in the final draft of the standard to be submitted to the standard council for approval

He believes that the proposed standard will help monitor the quality of cement in Nigeria as well as overcome the menace of incessant building collapses due to poor cement quality and incorrect application. ■

Source: <http://allafrica.com/stories/201712180481.html>



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The key competence of the company is the design and development of individual concepts for grinding and drying plants for the cement, steel and iron, power, ores and minerals industry. The service portfolio ranges from first concept to commissioning augmented by maintenance, repair, training as well as modernization of grinding plants and spare parts activities. After the acquisition of ETIG – Elektronische Industrie Automatisierungs GmbH in 2008, Loesche GmbH, Düsseldorf, founded Loesche Automation GmbH (now Loesche Automatisierungstechnik GmbH)

In April 2012, Loesche GmbH, Germany, has entered into a close cooperation agreement with pyroprocess specialist A TEC Holding GmbH, Austria. Loesche and A TEC will be partners for the realisation of plant improvement projects, environmental projects and will be in the position to offer complete process solutions. Loesche is a privately owned company with its headquarter located in Dusseldorf, Germany and is represented worldwide with more than 800 employees, subsidiaries in the USA, Brazil, Spain, Great Britain, South Africa, India, United Arab Emirates, Russia, P.R. China, Indonesia and Nigeria, as well as agents in more than 30 countries.

For more information please refer to:
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Zaha Hadid-designed research centre focuses on energy efficiency

By Adam Williams



Rising out of the desert landscape of Riyadh, Saudi Arabia like a giant insect, Zaha Hadid Architects' very unusual KAPSARC (King Abdullah Petroleum Studies and Research Centre) is a non-profit institution tasked with researching more efficient uses of energy. Fittingly, the building minimises its own energy use by means of solar power, water recycling and passive cooling systems.

KAPSARC measures a total floorspace of 70,000 m² spread over five buildings: the Energy Knowledge Centre, Energy Computer Centre, Conference Centre, Research Library, and finally the Musalla, a place for prayer.

With its sunlight-reflecting bright white facade and hexagonal prismatic honeycomb structure (photographed here by longtime Zaha Hadid collaborator Hufton+Crow), KAPSARC's form is clearly defined by the harsh desert conditions that surround it. Its layout is designed to block the sun's harshest rays, while remaining open to northern and westerly winds.

The buildings are interconnected and arranged around a large central courtyard that is shaded with canopies. That said, despite the careful layout and shading, underground passages are still made available for the hottest months of the year.

The prevailing wind is channelled by 'wind catchers' integrated into the roof on the southern sides of each courtyard area for passive cooling. Potable water is recycled and reused on-site, and 100% of irrigation water is derived from non-potable sources. A solar power array installed on the roof of the south-facing Conference Centre has a capacity of 5,000 MWh/year.

Almost all of the wood used during construction was certified sustainable by the Forest Stewardship Council (FSC), while 40% of construction materials were sourced from within 804 km. A large amount of waste was diverted from the landfill and 30% of the materials used include recycled content.

KAPSARC recently opened to the public and has been named Saudi Arabia's smartest building by the Honeywell Smart Building Awards programme, which awards scores on environmental sustainability, safety, and productivity. ■

Photographs by Hufton+Crow

Source: Zaha Hadid Architects
<https://goo.gl/Pqd6KT>

Jean Nouvel's Louvre Abu Dhabi opens to the public

Following a full 10 years of multinational collaboration between France and the Emirate of Abu Dhabi, Jean Nouvel's Louvre Abu Dhabi recently opened to the public. Located on Saadiyat Island and surrounded by the sea, 23 permanent galleries and exhibition spaces, a Children's Museum, an auditorium, and a research centre are connected by waterfront promenades which weave beneath the building's iconic dome.

"It is rather unusual to find a built archipelago in the sea," Nouvel suggests. "It is even more uncommon to see that it is protected by a parasol creating a rain of light." The project was conceived as a 'museum city (medina),' combining traditional Arabic inspiration with contemporary design and state of the art energy-efficient engineering.

The double dome – 180 metres in diameter – comprises a horizontal and perfectly radiating geometry; a randomly perforated woven material, providing shade punctuated by bursts of sun. Built from 7,850 unique metal stars, the structure creates a moving 'rain of light' when the sun shines through. According to Nouvel, these are "reminiscent of the overlapping palm trees in the United Arab Emirate's oases."

He continues: "Louvre Abu Dhabi embodies an exceptional programme in the literal sense of the word. Its vocation is now to express what is universal throughout the ages. Its architecture makes it a place of convergence and correlation between the immense sky, the sea-horizon and the territory of the desert. Its dome and cupola imprint the space with the consciousness of time and of the moment through an evocative light of a spirituality that is its own."

All climates like exceptions. Warmer when it is cold. Cooler in the tropics. People do not resist thermal shock well. Nor do works of art. Such elementary observations have influenced Louvre Abu Dhabi.

It wishes to create a welcoming world serenely combining light and shadow, reflection and calm. It wishes to belong to a country, to its history, to its geography without becoming a flat translation, the pleonasm that results in boredom and convention. It also aims at emphasising the fascination generated by rare encounters.

The Louvre Abu Dhabi represents the first universal museum in the Arab world. As an independent institution it will use the Musée du Louvre's name for the next thirty years. ■



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





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Kudos for Zeitz MOCAA

The Zeitz Museum of Contemporary Art Africa (MOCAA) designed by Heatherwick Studio has won the Cultural Architecture category in the ArchDaily Building of the Year Awards. ArchDaily is the world's most popular and frequently visited architecture website.

The announcement read: "With nearly 100,000 votes cast during the first weeks of 2018, we are happy to present the winners of the 2018 ArchDaily Building of the Year Awards. This peer-based, crowdsourced architecture award showcases projects chosen by ArchDaily readers who filtered thousands of projects down to the 15 best works featured on ArchDaily in 2017. Neither ArchDaily nor the Building of the Year Awards would be possible without the continued generosity of the firms that choose to publish their projects with ArchDaily every year, or without the engaged readers who enthusiastically take part in the voting process."

The Zeitz Museum of Contemporary Art Africa (Zeitz MOCAA) at Cape Town's V&A Waterfront opened to the public on 22 September 2017. It will be the world's largest museum dedicated to contemporary art from Africa and its diaspora and was designed by the internationally acclaimed designers, Heatherwick Studio, based in London.

The museum, housed in 9,500 m² of custom designed space spread over nine floors, is carved out of the historic Grain Silo Complex. Disused since 1990, the silo stands as a monument to the industrial past of Cape Town, and was at one time the tallest building in South Africa.

The galleries and the atrium space at the centre of the museum have been carved from the silos' dense cellular structure of forty-two tubes. The development includes 6,000 m² of exhibition space in 80 gallery spaces, a rooftop sculpture garden, with state of the art storage and conservation areas, a bookshop, a restaurant, bar, and reading rooms. The museum will also house Centres for a Costume Institute, Photography, Curatorial Excellence, the Moving Image, Performative Practice and Art Education.

The R500-million development of Zeitz MOCAA has been created in a partnership between the V&A Waterfront and Jochen Zeitz, as a not-for-profit public cultural institution in the heart of Cape Town, one of most visited cultural and historical hubs in Africa. ■

Architects: Heatherwick Studio

Location: Cape Town, South Africa

Design Director: Thomas Heatherwick

Local Project Architect: Van der Merwe Miszewski Architects (VDMMA), Jacobs Parkers Architects, Rick Brown + Associates

Project Year: 2017

Photographs: Iwan Baan

The project was featured in: <https://goo.gl/JzTXa3>



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Demand soars for Chryso S.A.'s Centre of Excellence concrete technology input



The Chryso Southern Africa Group's Centre of Excellence management team pictured at a recent meeting. From left (seated): Warren Delaney (manager, a.b.e. Laboratory); Mpume Mlalazi (Chryso SA R&D manager) and Sthembile Hlubi (Chryso SA technical manager - cement). Standing at the back is Ronette Smit (Chryso SA laboratory development manager).

Leading admixture producer, the Chryso Southern Africa Group, has substantially expanded its laboratory testing facilities with the opening of its new Centre of Excellence at the Group's head office in Jet Park, Johannesburg.

The Centre of Excellence features ultra-modern equipment and temperature control systems to offer cement, concrete, and construction systems technology as an added-value service to customers.

Ronette Smit, Chryso Southern Africa's laboratory development manager, says the Centre of Excellence's testing and advisory service to customers is the most comprehensive of its kind available in the South African admixtures industry.

"The Centre can provide tailor-made solutions to match specific applications and customer requirements and also recommend the right cement additive, at the right dosage, to boost concrete mix performance and contain costs. This



Prism concrete crushing determines the flexural and compressive strengths of cement paste and thin skin liners (TSL). Here Warren Delaney is checking just how much pressure the prism sample can take.



Ithumeleng Mashigo doing concrete mixing to assist clients in formulating the correct concrete mix design for a specific project.



High-performance liquid chromatography (HPLC) testing can separate, identify, and quantify each component in a mixture. Donald Khoza is doing the necessary identification.

service is provided free of charge to Chryso customers. "The Centre of Excellence also plays a key role in the Chryso Group's new product formulations. Most are based on customer needs but some are the result of new technology developed either at the Chryso Group's head office in France or in-house in South Africa," she explains.

"Local new developments are handled by Chryso SA's R&D manager, Mpume Mlalazi. The Group has established special precast and readymix forums, comprising both the sales and technical staff, that regularly report on customer needs and new market conditions. The Centre of Excellence is then called on to provide specific assistance when necessary and possible."

Smit says the Centre of Excellence also tests and, when required, modifies new products developed by the Chryso Group's French headquarters. "This is to ensure that Chryso's French-formulated admixtures would perform equally satisfactorily in a concrete mix with South African aggregates. Local sand, for one, is vastly different to sand aggregate used in Europe."

The current emphasis at the Centre of Excellence is on wet concrete products but the service will soon be extended to include testing and recommendations on dry precast products such as concrete roof tiles, as well as brick and block making. A special block press will be installed to handle this new service.

Sthembile Hlubi, Chryso Southern Africa's technical manager – cement, says the Centre of Excellence at Jet Park currently accommodates the operations of five specific laboratories: Cement; Concrete; separate Research & Development units for both Chryso and its subsidiary, a.b.e. Construction Chemicals' products; and a Quality Control laboratory.

"The Cement laboratory section of the Centre of Excellence is able to evaluate cement in terms of ISO global standards. We can even produce cement in sample form in-house, and devote much time and attention to the evaluation of Chryso SA's range of grinding aids to ensure that our products match customers' requirements. Grinding aids are added to the mill during cement grinding and help reduce the energy required to grind the clinker to a given fineness. At a time of rising energy costs, cement producers demand optimum performance from grinding aids," Hlubi elaborates.

The Cement laboratory's range of services are soon to be augmented by the importation of a cement ball mill. These mills grind crushed materials and are widely used in production lines for cement powder. Chryso SA hopes to have the new mill fully operational by the beginning of next year.

Warren Delaney, a.b.e. Construction Chemicals chief chemist, previously based at the a.b.e. lab in Boksburg, now manages the a.b.e. R&D lab at the Centre of Excellence.

"There are many benefits in working under one roof at the Centre. The Cement lab, for example, supplies us with detailed information on changes in cement performance. This assists a.b.e. in making batch adjustments or modifying products when required to incorporate any possible benefit from such changes in cement. The a.b.e. R&D lab at the Centre of Excellence deals specifically with a.b.e.'s and Chryso Mining's cementitious powder products," Delaney explained.

Chryso SA's Centre of Excellence has recently added testing of micro-concrete, bleed water, absorption, methylene blue, and maturity to its range of services.

The volume of demand for services from Chryso SA's new Centre of Excellence has, since it opened about six months ago, soared continuously and staff numbers have quadrupled since then. "The market clearly values the Centre's complementary role to specialist testing laboratories. We face a very busy 2018," Ronette Smit predicted. ■

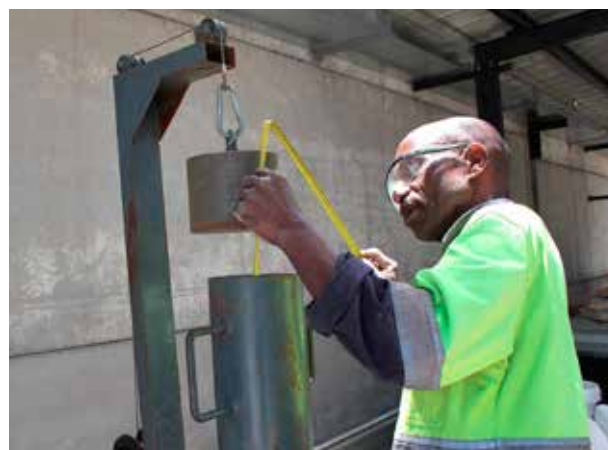
**More information from Elrene Smuts,
Tel: +27(0)11 306 9000 / www.chryso.com**



Tumiso Makhubedo doing micro concrete testing at the Centre of Excellence. Micro concrete, unlike a normal concrete mix design, is devoid of all larger particles. It is to simulate concrete workability retention as in ready-mixed concrete applications.



The Centre of Excellence's Owethu Mbeje testing the compressive strength of concrete via the tried and trusted cube crushing method.



Compacité measurement being undertaken by the Centre's Stanley Mashego. The test assesses compaction properties of sand and stone for use in the innovative Beton Lab pro software.

Barlow Park to be redeveloped into a 130,000-m² mixed-use precinct



"The opportunity to develop this precinct at the gateway to Sandton Central is hugely exciting," says Atterbury CEO, Louis van der Watt.

In a ground breaking real estate transaction, Barloworld, Atterbury and African Rainbow Capital have partnered as co-investors in the redevelopment of the prime Barlow Park Campus, situated at 180 Katherine Street, Sandton.

The joint venture property investment and development deal was signed recently. The next step is the rezoning of the property, which is expected to take at least a year.

The initial property transaction involves each party holding one-third of the landmark site currently housing Barloworld's corporate offices. The investment value will eventually climb to well over R3 billion as the total redevelopment of this sprawling corporate park is rolled out into a 130,000-m² vibrant multi-billion-Rand mixed-use precinct.

"The redevelopment of Barlow Park is part of our strategic focus to maximise the use of and unlock value in all our assets. This will not only contribute to the achievement of our bold ambition, but will be a legacy that will deliver value over the long term. The relocation of the Barloworld head office from Barlow Park is a symbolic major shift in our ethos and perspective of managing for value. Our Equipment and Logistics head offices will also relocate closer to their operations. This development is one of the pivotal steps in setting the tone for our growth going forward," says Dominic Sewela, CEO of Barloworld Limited.

Atterbury will develop the project for the joint venture and lead all aspects of the development. Atterbury will also lease the development and are the appointed asset managers of the completed property.

Louis van der Watt, Atterbury CEO, says: "The opportunity to develop this mixed-use commercial precinct at the gateway to South Africa's financial capital, Sandton Central, is hugely exciting. We look forward to creating a new chapter for this exceptional legacy asset by unleashing its extraordinary potential, which was first identified by the founding family of Barloworld.

"We are confident that this iconic South African company will continue to benefit richly from its foresight and new joint venture. We are also incredibly proud to make this investment with esteemed South African business African Rainbow Capital."

"Two of African Rainbow Capital's founding principles are alignment and partnering with the best. With this project we are proud to partner with esteemed, experienced teams from Barloworld and Atterbury on this enormously exciting and ground-breaking opportunity."

"It also subscribes to our mandate of investing in property opportunities where value can be unlocked for all stakeholders, and the community at large", says Johan van der Merwe, Co-CEO of African Rainbow Capital.

This trailblazing development will optimise the full potential of its unique site and coveted location in line with the very latest in world-class modern, efficient and high-quality multi-use developments.

The property occupies a prime site, nestled between the M1 highway and the main road of Katherine Street. It has excellent access and superb visibility on both major arterials. This also positions it ideally to benefit from Sandton's new road upgrades – for private and public transport, which are focused directly around the property.

Subject to zoning, the development could include around 55,000-m² of offices, over 780 residential units, a roughly 10,000-m² community retail centre, as well as a hotel and a gym. It is being meticulously planned so each property use will enjoy peak functionality, access and visibility, with painstaking attention to detail, thereby ensuring that it is designed for unparalleled quality.

The development will be phased, and will roll out in response to tenant and market demand. The entire project should take about 6 to 8 years to develop, after it obtains zoning approval. The Barlow Park development project is ideally positioned for a positive impact on its immediate community, being located at a key connection point with the nearby Alexandra township to create local economic and job opportunities. ■

**More information from Zahn Hulme,
Tel: +27(0)12 471 1600 / www.atterbury.co.za**

Concor Buildings secures Phase 1 of Oxford Parks



Concor Buildings has secured the contract for the construction of Phase 1 of Oxford Parks.



Being developed by premier property development company Intaprop, Oxford Parks is set to become a vibrant mixed-use precinct.

Concor Buildings recently secured the contract for the construction of Phase 1 of Oxford Parks. Situated at 199 Oxford Road, the whole of Phase 1 and also Phase 2 of this prestigious project will comprise four buildings totalling approximately 34,000-m² and will include the new Johannesburg head office for BPSA.

Being developed by the premier property development company Intaprop, Oxford Parks is set to become a vibrant mixed-use precinct, comprising upmarket green star rated offices (A & P Grade), apartments, penthouses and hotels, as well as niche supporting retail and cafés.

Rui Santos, managing director of Concor Buildings, says that the current contract includes the construction of three basement levels and BPSA's six office levels as part of Phase 1.

Work has now begun on site, and he says Concor Buildings, formerly Murray & Roberts Buildings, is proud to be associated with this project which has been selected as a pilot project for the Green Building Council of South Africa, to create a green precinct rating tool for public environment projects. Significantly, all buildings within the Oxford Parks Precinct will be designed to a minimum standard of 4 Star Green Rating in terms of the GBCSA standards.

Concor Buildings has a well-established track record of delivering high-quality fast-track projects, and the contractual completion is set for November 2018. ■

More information from Concor Buildings (Formerly Murray & Roberts Buildings), Tel: +27(0)11 590 5500 www.concor.co.za

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A place of rest in Mjejane Private Game Reserve

When a client approached Johannesburg-based Architects Of Justice and commissioned an avant-garde retreat, a journey began which would culminate in a Commendation in the Mpumalanga Institute for Architecture (MPIA) Awards for Architecture 2017.

The project site, within the Mjejane Private Game Reserve – a private Big 5 reserve incorporated into the Kruger National Park – opens onto a view of the Crocodile River on the north boundary with a green belt on its eastern edge.

The retreat was designed to maximise the connection to nature and wild game while ensuring privacy between the five en-suite bedrooms and also from neighbouring lodges. Rigorous estate guidelines required the architects to design around existing flora on the site, leading to a freeform design which necessitated the replanting of only three trees.

One of Architects Of Justice's early projects, the SEED Library, a shipping container structure for the MC Weiler Primary School in Alexandra, Johannesburg, completed in 2010, led to the client approaching the practice for the Mjejane project.

The library had won a number of awards, including a SAIA Award of Merit, the Afrisam SAIA Award for Sustainable Architecture and an international award for architects under the age of 35. While visiting his daughter in Hong Kong, the client saw the library featured in an architectural magazine.

After meeting with Architects Of Justice and requesting an unconventional and innovative retreat, the client immediately approved the concept created by project architect Granicki. "It was a meeting of minds," says Granicki. "And the original model is satisfyingly close to the completed project."

The home, beautiful from every angle, is fully site and context driven, meeting the client's requirements to be able to connect with nature. However, nature, provided its own unique challenges; there could be no openings or entries into the roof void, as these would provide an ideal habitat for a myriad of animals, and measures had to be taken to prevent warthogs from living underneath the suspended wooden deck on the north of the site.

Standout feature

The crowning jewel of the house is a floating steel roof that overhangs the house on every side with a minimum overhang

of 1,6 m. At its maximum, the roof overhang extends in an impressive 13-m butterfly cantilever creating a seemingly unsupported roof over a boma. The total roof area for the 450-m² residence totalled at an impressive 900 m² enabling inside spaces to blend effortlessly with the outside.

"Initially the roof was to be concrete and planted," notes Granicki. "After the client decided against using a green roof due to maintenance concerns for what was intended to be a low-maintenance holiday home, the concept was redeveloped with a steel roof that would be lighter and quicker to erect. With this construction methodology, we still managed to obtain cantilevers all round on the roof and an open-span lounge/dining room of more than 100 m², with no columns to obscure the view over the pool and surrounding bushveld."

The steel roof overhangs helped design a passively cooled home which mitigates heat gain by shading the exteriors throughout the day in an area of the country that often reaches 30°C in winter and well over 40°C in summer.

The steel roof arrived in four parts, which was logistically possible as the manufacturer, Quality Steel, was located just over an hour away from the site. A four-phase Lego-set type erection obviated the need to clear and disturb the bushveld to store building materials. Ingwe Construction was chosen to undertake the building due to their proven track record of constructing large-scale private bush lodges sensibly and sensitively in this part of South Africa.

The interiors

In the interior, the idea was to not obstruct the user from the surrounding nature, and as such, huge glass windows, doors and fin walls constantly connect and direct the user to the outside bush. The window placement facilitates a constant flood of light on the hand-polished concrete floors and simple plaster walls, while angled ceilings facilitate natural airflows and complement other sustainable features (such as rainwater harvesting from the extensive roof structure).

"As the client comes from a mining background, aesthetically the home reflects a 'from the earth' narrative, and an almost industrial approach of using crushed rock, gabion walls and steel I-beams was embraced," explains Granicki. "While the home is definitely a modern take on architecture, there is still an earthen





quality to its finishes as a result of some of the techniques employed by the local contractor.

After a twelve-month construction period, Architects Of Justice delivered a successful project, not only by understanding the environment and designing around it, but also by working extremely closely with the client.

"Our dream of embracing the bushveld, inside our home, has exceeded our expectations. The architects' design allows for large openings that let the remarkable landscape be enjoyed from every part of the house. The ambitious overhangs and cantilevers, made possible by the steel roof, ensure that we can live harmoniously with nature as the lines blur between inside and out. We are incredibly proud of our home which is a stunning piece of contemporary architecture," exclaimed the satisfied client.

The recent Commendation from MPIA is another feather in the cap for this young practice, which is currently working on a host of office, warehouse and high-density residential projects.

The MPIA judges' commented: "The design concept is brave, original and is befitting of the site and the brief. The judges loved the three dimensional 'origami' roof which floats as a sculptural object, seemingly emulating the typography of the surrounding landscape. The spatial qualities are sculpturally impressive and sensory experiences are manipulated through impressive angled ceiling spaces which guide the eye outward towards the surrounding landscape. The cantilevered covered patio roof is a structural feat. The massing and siting of the building is successful within the confines of its site, and achieves the key objectives masterfully."

Project team

Architects: Architects Of Justice

Project Manager: Condor & Co Project Management

Structural Engineers: Professional Consultants Corporation

Contractor: Ingwe Construction

Steelwork Contractor: Quality Steel

Structural Steel Detailer: Orbit Steel/Quality Steel

Cladding Supplier: Chromadek

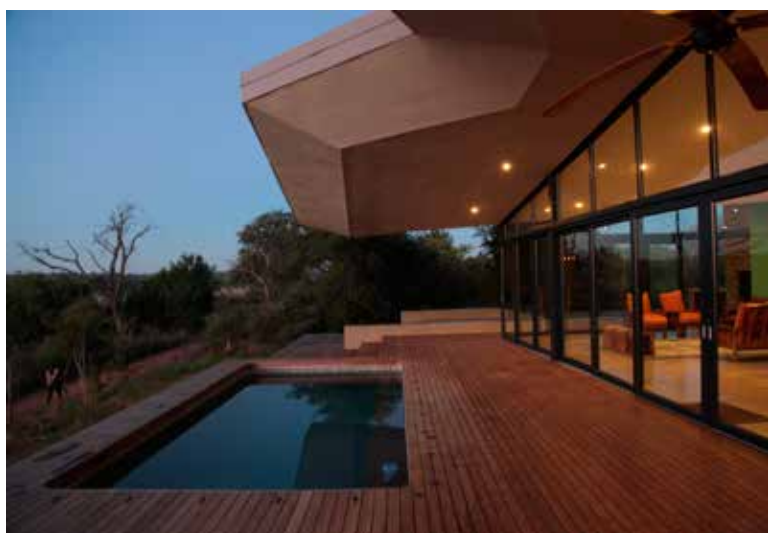
Energy Consultants: Structatherm Projects

Quantity Surveyor: Build Aid

About Architects Of Justice

The partners in Architects Of Justice, Mike Rassmann, Kuba Granicki and Alessio Lacovig, formally established their practice in 2009 after working in other architectural practices. "Our main reason for starting our own business was that we wanted to do architecture in a way that all the projects we touched would be unique and exciting," explains Rassmann. The partners' goal is to make a positive impact on the built environment by doing justice to their clients, their sites and architecture in all their projects. ■

Website: www.architectsofjustice.com



Aleem Manji Architects' award-winning Rumaisa in Nairobi

Rumaisa high rise in Nairobi, Kenya, when complete in 2019, will be made up of 66 three- and four-bedroom duplex apartments, to provide a superior housing and lifestyle solution. Being described as 'the epitome of modern living', it will incorporate swimming pools, children's play areas, a fully equipped gym as well as an indoor entertainment area.

The architects, Nairobi-based Aleem Manji Architects, won the Residential High-rise Architecture Award and the top honour, a 5-Star Award for Rumaisa at the Africa & Arabia Awards, part of the International Property Awards, in September 2017.

The project, which is currently under construction, was designed for a client who wanted an apartment scheme on 1.5 acres in Nairobi's Riverside neighbourhood. A fundamental design principle that immediately catches the eye is the open interior courtyard space.

"The courtyard helped us to create a cooler interior environment central to the overall scheme. It creates a through-flow of cross ventilation within the apartments into the courtyard, in addition to maintaining a green centre, complete with its landscaped water features, trees and shrubs," explains Aleem Manji.

Also notable is the iconic rooftop structure which ties together the individual blocks of the scheme. This structure features a host of lifestyle facilities for residents while ensuring stunning views of the surrounding suburbs of Nairobi.

The Riverside neighbourhood has recently undergone a rezoning exercise which allowed multiple residential units and high-rise commercial units. There has therefore been a proliferation of high-rise building over the last five years, and the typologies of structures tend to vary fairly drastically, ranging from single-family units to low-level commercial developments (2-3 storeys at most). "As would be expected, the area is still looking to develop its own character," explains Manji. "Various distinct design languages have been implemented within a kilometre radius of the site, leading to a vibrancy of design languages, but unfortunately without a distinct vernacular style. The absence of any distinct vernacular language enabled Rumaisa's design



to adopt its own language – a more modern design, in line with most of the newer apartment developments in the vicinity."

Defining spaces

The apartments have been set into nine separate towers organised around the central atrium, and connected at the rooftop level. The orientation of the apartments was such that the major spaces within all the apartments face towards the central atrium. Exceptions are those apartments that front the river, which are oriented to the river to maximise the views. Each block is separated from the next by a minimum spacing of 6 m, which serves as a noise buffer as well as an avenue to permit cross ventilation within the entire Rumaisa scheme.

The central atrium also serves as a thermal control and a social space. The central, well-shaded area will create a temperature difference between the external space and the atrium, thereby enhancing cross ventilation, as well as ventilation from within the apartments – reducing the need for artificial cooling. The atrium will contain both hard and soft landscaping as well as a water feature that starts as a waterfall from the reception area, and traverses the entire courtyard as shallow pools of running water. Furthermore, the space within the atrium will allow for social gatherings as well as smaller pockets for secluded contemplation.

The rooftop serves to connect all the apartment towers, thereby creating a connection point, not just for ease of movement, but also in case of fire.

It will house three swimming pools, a curved sun deck, a pool bar, an entertainment area doubling as an indoor games room, rooftop gardens, a fully equipped gym, four jacuzzis, changing and showering facilities, a secure kid's playing area, bonfire seating space and landscaped seating areas for small groups. The rooftop also provides for the placement of solar panels to heat water for use in the apartments, while the rooftop gardens and swimming pools will reduce slab heat gain from the sun on the rooftop.

"The apartments themselves were designed as duplexes and the final design focusses on the double-height

lounge as the anchor space, lit by floor-to-ceiling windows. The space also allows interpenetration of the two levels from the family room, which overlooks the lounge, thus unifying the duplex floors. Additionally, the open-plan kitchen enables further linkage, creating a flowing lower floor plan with an airy, open feeling.

Material palette

The language of design for Rumaisa was intended to be modern, with clean bold lines and large swathes of glass. The effect is subtle on first look, but intricate upon deeper analysis. To achieve this, cementitious plaster finished with textured render is the predominant finish in the project. The use of textured render on the plaster varies; the two tones used are charcoal grey and soft white, both with slightly different textures, with white being the smoother finish to enhance the contrast created by the different colours.

The structural design allowed for shear wall elements, which Aleem Manji Architects opted to expose to the exoskeleton and opted for a fair-face concrete finish on these elements, thereby creating a subtle contrast with the textured render finish, as well as allowing for bold, clean lines in the exterior facade. Stone chip cladding will principally be used in areas needing to highlight or accentuate certain elements, such as in the rooftop design as well as the interior of the apartments. Glass railings serve to provide safety and reduce the number of distractive lines on the elevation. The glass railings also enable unobstructed views from within the apartments.

Reduction of energy consumption

Nairobi's temperature through the year is fairly moderate, although there is a slightly high diurnal range, especially during the summer season. Within the apartments, the architects have maintained channels for cross ventilation via strategic placement of windows and by opting for an open-plan kitchen and double-volume lounge. The spacing between apartment towers further allows air flow through the entire development. Overhangs and extended lintels provide sun shading to prevent direct absorption of sunlight into the windows.

To reduce energy requirements for lighting, large windows were strategically placed to minimise the use of artificial lighting during the day and reduce direct solar incidence. All apartments, common spaces and facilities, will have LED light fittings, thereby reducing up to 75% of the energy requirement of artificial lighting. To reduce energy consumption for water heating, all duplexes will be fitted with individual solar water heaters, the panels of which will be mounted on the rooftop.

Project Team

Client: Globe Developers Ltd

Project Managers: Villapoint Company Ltd

Architect: Aleem Manji Architects

Quantity Surveyor: Tower Cost Consultants Ltd

Structural Engineer: Abba & Wandu Engineers

Services Engineers: Aruna Patel & Associates

Interiors Designer: Studio Aurora

Landscape Architects: Urban Green



Safety and security

To enhance the security of the building users, video intercoms will be installed in all duplexes, with camera feeds from the gate house and reception, ensuring that all visitors will have to be verified at two points prior to accessing Rumaisa. Additionally, there will be a further camera located at the door of the duplex, so the duplex resident will be able to communicate with the visitor prior to allowing access to the duplex. Access into the apartments will be via magnetic locks with fingerprint and facial recognition technology.

All common areas will be covered by 24-hour CCTV, monitored in the control room and recorded on DVR. The glass railings in the balconies (laminated safety glass) serve to enhance the aesthetic value but will also prevent young children from climbing over them. A railing height from FFL of 1200 mm has been specified as opposed to the standard 900 mm. The infinity edge of the swimming pool is designed to have a buffer area between the infinity edge and the lower edge of the outer wall (this buffer will also serve as the overflow drain for the pool). "We will also put up a glass railing on top of the infinity edge to enhance the safety without compromising the view," says Manji.

Although the show apartment for Rumaisa was only completed at the end of 2017, the interest already shown by homeowners, as well as the architectural fraternity, indicates that Aleem Manj Architect's vision for Rumaisa will become an iconic apartment block in Nairobi. ■

The race to zero: 78 Corlett Drive

As one of the first projects in Africa to be certified Net Zero, 78 Corlett Drive, Johannesburg is leading the local green building sector into a new phase. The project was awarded a Net Zero Carbon (Pilot) Level 1 Certification in November 2017, as well as a 6-star Green Star Office V1.1 Design certification in January 2018.

Developed by Legaro Properties with Solid Green Consulting as green building specialists, the project, on a brownfields site, aims to set a new standard for co-working office space in a new development along Corlett Drive close to Melrose Arch. The site is an easy walking distance from six bus and taxi stops linking to alternative mass transport routes. Extensive amenities are also within walking distance.

Net Zero Certification

GBCSA executive director for certifications, Manfred Braune, says: "Net Zero certification helps industry understand the ultimate environmental goal for property owners and developers. Rather than our simply doing 'less bad', we can neutralise the impact of developments or even have a net positive impact. Congratulations go to Legaro Properties for environmental leadership, and achieving a net zero carbon rating."

GBCSA's Net Zero/Net Positive Certification awards projects which go beyond the reductions recognised in current GBCSA tools, and take the initiative to reach the endpoint of completely neutralising or positively redressing their environmental impacts. Projects can achieve Net Zero/Net Positive Ratings in Carbon, Water, Waste and Ecology.

Reducing Carbon Emissions

Roger Brookes, projects director of Legaro comments, "We are committed to driving green building innovation in the property sector, leading by example with projects like 78 Corlett, 41 Melville Rd and 54 on Sixth Rd Hyde Park."

The upper ground floor of 78 Corlett will accommodate a mix of open co-working spaces and cellular offices, interspersed

with social and formal meeting spaces organised around a central coffee bar in the triple-volume day-lit atrium. The first floor has additional co-working spaces and larger offices, catering to a variety of tenants.

"The design incorporates strong minimalist geometries, with shading louvres acting as a dynamic facade element and passive shading device," says Robert Dos Santos of Daffonchio & Associates Architects.

Energy strategies which contributed to the Net Zero Carbon Level 1 Certification included generating an energy model of the building in the design stages, comparing 78 Corlett to a notional building model. The building design showed an improvement of 100% over a SANS 10400 notional building, successfully demonstrating the reduction of Greenhouse Gas Emissions associated with the building's operational energy consumption, which reflected carbon emissions that were reduced to 92 kgCO₂/m²/yr.

The building's peak electrical demand will be reduced with a photovoltaic array on the roof with an annual output of 92,000 kWh, which will tie in to the grid. All enclosed spaces are individually switched, making it easy to light only occupied areas; and the project saves energy by providing office lighting that achieves an average maintained illuminance level of no more than 400 Lux.

Hot water is provided by small high-performance electric under-counter geysers in each bathroom, obviating long runs of insulated hot water pipes. Geyser electric requirements will be supplemented by the rooftop PV array.

Separate energy sub-meters are provided for lighting and power to accurately monitor energy consumption. The behaviour of building occupants and users is critical to reducing consumption, and the owners are targeting an overall consumption of 75 kWh/m²/year, far less than the 200 kWh/m²/year SANS10400 XA requirement.

The project promotes the use of electric cars by providing charging facilities and dedicated bays for electric, hybrid and fuel-efficient vehicles. Motorbike parking spaces are located close to the building entrance and there are facilities for cyclists.



78 Corlett Drive incorporates a multitude of features that contribute to its Net Zero certification.

Indoor Environmental Quality

The design optimises natural daylight indoors. Excellent thermal comfort has been ensured by addressing the internal operative temperatures through modelling and ensuring they are within the ASHRAE Standard 55-2004 Acceptability Limits for at least 98% of occupied hours.

100% of the Usable Area is mechanically ventilated and provides good-quality outside air, achieving a 66% improvement on the SANS 10400-O:2011 requirements. Air-cooled chillers obviate the need for the use of water to cool the building.

Managing Waste

A project-specific Waste Management Plan was developed to minimise waste to landfill during construction and operations. A 40% reduction of portland cement was targeted across all concrete mixes, together with a 60% recycled content of all steel by mass on the project; and 50% (by cost) of timber products used were specified to be Forest Stewardship Council (FSC) Certified Timber, re-used or recycled timber.

The building's design includes a Waste Recycling Storage area to encourage building users to recycle all waste where possible and minimise their waste footprint.

All selected gaseous and fire suppression systems and thermal insulants have an Ozone Depleting Potential (ODP) of zero, to eliminate any contributions to damage to the earth's stratospheric ozone layer.

Water efficiency

Sub-metering of major water systems, low-flow fittings and xeriscape landscaping are designed to minimise consumption of potable water. The building does not use a fire sprinkler system, helping to reduce potable water wastage.

2018: The Race to Zero

By setting ambitious targets for more sustainable construction practices and operations throughout the building's lifecycle, 78 Corlett demonstrates sector leadership in considering context and environment, occupant health and wellbeing, and tenants' bottom lines.

"Net Zero is such an exciting tool for the Green Building market," concludes Annelide Sherratt of Solid Green. "We are proud to be associated with the initial projects to be submitted under this certification, and aim to complete more Net Zero certifications before the GBCSA's Green Building Convention 2018, thereby contributing to the theme 'The Race to Zero'." ■

More information from www.solidgreen.co.za

Artificial nests a breeding success for Tasmanian albatross

By Stephen Pigram

Artificial mud and concrete nests are proving a possible saviour for vulnerable Tasmanian shy albatross on a remote island in Bass Strait.

Over 100 specially built artificial nests were airlifted onto Albatross Island in July 2017. And since there has been a jump in the number of albatross chicks hatched in the new nests.

They are part of an innovative plan to help the species that is currently listed as vulnerable under the Threatened Species Protection Act. The artificial nests were placed in areas where the naturally occurring nests were typically of lower quality.

Recent monitoring revealed that the birds were accepting the nests and personalising them with mud and vegetation.

Tasmanian parks department wildlife officer Dr Rachael Alderman, who has studied the birds since 2003, said birds struggle to find and keep sufficient nesting material resulting in a poor-quality nest.

"Shy albatross lay a single egg in late September and those eggs have now hatched. At this stage in the trial, the breeding success of pairs on artificial nests is 20% higher than those on natural nests."

The birds face multiple threats: from climate change, plastic ingestion, habitat loss and feral animals.

Shy albatross are endemic to Australia and only nest on three islands off the coast of Tasmania — Albatross Island, Pedra Branca and Mewstone.

The artificial nests have been made of mudbrick combined with aerated concrete.

Darren Grover from the World Wide Fund for Nature, who visited the site with Dr Alderman in December 2017, said the benefits of the pre-constructed nests were evident.



Wildlife biologist Dr Rachael Alderman says there's been a 20 per cent increase in chicks in the artificial nests. (Supplied: Matthew Newton / WWF-Aus)

"Albatross Island gets hit with wild weather. That's not the best start to life for a chick and good-quality nests keep eggs and chicks safe and sound," Grover said.

New threatened species commissioner Dr Sally Box said: "It's fantastic to see this project come to fruition. We all have a role to play in protecting our threatened species." ■

<https://goo.gl/gE4rfc>

Retaining wall controls large-scale erosion on the West Coast



Initiated by the Department of Public Works as custodian of state land, this large retaining wall is located on the West Coast, Pepper Bay harbour area, to stabilise existing eroded embankments in the interest of public safety.

The embankments consist of multiple layers of sedimentation up to 21 m in height and 2.5 km in length, where softer material has eroded leaving harder layers of overhanging and unstable rock. The Terraforce retaining wall system was specified by the consulting Engineer, Ulwazi Consulting Engineers, as offering practical, stable, and weather-resistant surface protection.

Before block installation could begin, all vegetation and loose material had to be removed to expose the underlying rock face of the embankments. Says Adriano Guerrini, of Guerrini Marine Construction: "These were swept clean and benched for slip prevention, so the extent of stabilising could then be determined and the angle (generally between 60 and 70 degrees to the horizontal) of the final face slope set out.

"Using soilcrete (sand:cement mix) the rock face was covered by backfilling in well-compacted layers, with depth of the backfilling being monitored and minimised to follow the natural contours of the exposed face. At the same time the block facings were built up and the blocks filled with soilcrete, stepping back towards the rock face where appropriate, to minimise the depth of backfill and reduce the visual impact of a sheer wall. Finally, the tops of the step-backs and the finished level are capped with a concrete slab."

Some of the challenges encountered and successfully managed during installation included the continual navigating and assessing of the steep, 15-m-high, heavily vegetated terrain with cranes and telescopic handlers. An estimated 180,000 blocks, supplied by Van Dyk Stene, a Terraforce manufacturer on the West Coast, along with 100 m² of backfill sand per 1200 blocks (100 m²) are being installed using 5 TLB loaders, a 20,000-litre water truck and 80 labourers. Ninety percent of the labour force comprises local untrained labour – all of whom underwent on-site training. Also, under the auspices of the Expanded Public Works Programme, 25 official learners were given basic construction skills training over a period of approximately three months.

On completion in March 2018, indigenous vegetation will be planted by a company specialising in establishing the sensitive flora of the West Coast. ■

**More information from Terraforce,
Tel: +27(0)21 465 1907 / www.terraforce.com**

CoreSlab: scoring points on municipal sports complexes



CoreSlab is helping municipalities in the country accelerate sport's complexes in the country

Precast concrete is helping municipalities accelerate the delivery of sports complexes in many poor outlying areas across the country.

These projects, under the Expanded Public Works Programme (EPWP), create many employment and skills-development opportunities during construction. Moreover, these projects are an important pipeline of work for emerging contractors.

Sports complexes also bring socio-economic benefits to poor communities and CoreSlab has been associated with some of these projects, working with municipalities and their professional teams to fast-track delivery.

The company supplies off-the-shelf precast concrete technologies for constructing the podiums, a stand-out feature of and one of the most complex facets of these sports stadium projects.

By outsourcing this aspect of the project to a specialist, the client and their professional team have eliminated much of the risk associated with constructing sports facilities. "Depending on the size of the structure, our standard modular system can be installed in under two weeks, while work continues on other aspects, ensuring timely delivery of the project," says Jaco de Bruin, MD of CoreSlab. "It also restricts working at heights to CoreSlab's specialist team, keeping other workers safe."

The system comprises precast concrete columns, raking beams and seating benches. They are transported on a 'just-in-time' basis to the site where they are installed by a small, efficient team of specialists. CoreSlab uses its own mobile cranes and operators from sister company, Corehire, during installation of the precast units.

Transportation of precast units from the factory is undertaken by Corefleet, also a

sister company, which has contributed to CoreSlab's growth in South Africa's construction market.

Once installation is completed, the emerging contractor will start the external brick works to complete the podium and internal works, with a basic structure usually comprising a changing room and ablution facilities.

The stadium roof is also usually let out to a specialist.

De Bruin says that these projects continue to demonstrate that precast concrete technologies complement labour-based construction practices. "Only a small component of the entire project is handed to a specialist, leaving ample opportunity for job creation and skills development on other facets of the construction programme."

As many as 50 locals can be recruited to work alongside the main contractor's core team.

"These opportunities are complemented by the numerous construction-related jobs that are created in the actual manufacture of the precast concrete items at CoreSlab's factory in Polokwane," states De Bruin. "Importantly, they are long-term employment prospects, with people working on multiple projects simultaneously."

Quality, precision and durability make precast concrete ideal for projects that require minimal maintenance – always important for municipalities. ■

**More information from Tel: +27(0)87 232 2462
email: info@coreslab.co.za / www.coreslab.co.za**



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Attractive functional and durable paving

Appearance is a key selling point for residential and commercial properties and for attracting customers to petrol stations and parking facilities. The choice of paving therefore plays a very significant role in the final design of developments.

Therefore it is no surprise that Technicrete's Conleaf smart and durable pavers are often specified by architects and developers in order to obtain the desired attractive finish on specific projects.

The Conleaf paving block offers attractive patterns and lines through its unique soft curved appearance and are available in a choice of colours that include autumn, terracotta, plum, grey, slate and tan.

It is a very functional and durable paver which enhances the final appearance of any petrol station forecourt, municipal tight parking area, pathway, commercial and residential development, factory roads or suburban streets.

The Conleaf is manufactured in a 55 mm or 60 mm thickness, with a 200 x 200 mm length/width. A larger 80 mm unit is available upon request.

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



Aesthetically pleasing retaining wall support blocks

The need for aesthetically pleasing yet practically engineered retaining wall support design is important in, amongst other applications, the construction of commercial and retail business parks where cut and fill methodology is generally always required. Employees and visitors to these centres do not want to feel 'entrapped in a concrete jungle', hence the current trend is to design such environments with more 'green' and environmentally friendly technologies, creating a healthier environment within which to work or visit.

The Florawall interlocking retaining wall block produced by Technicrete is one product that offers landscapers, horticulturalists and architects an earth retaining structure giving true plantability with an aesthetic fluted face. It is simple



to install and flora and deep-rooted plant life can be planted in each block to create a decorative finish to this highly effective retaining structure. Florawall provides an uninhibited root and water penetration system.

The interlocking method of construction makes it ideal for any retaining wall requirement, including both gravity and reinforced wall designs.

Granular backfill should be placed behind each successive tier of blocks and a fertile mixture used to fill each unit. Angles of between 51° and 90° against the vertical can be constructed by stepping back the units as required and horizontal curves following the site plan can be formed by simply rotating the units as they are placed.

Without engineering input, Florawall can be stacked up to six layers high (1.5 m), with the bottom block below ground level, provided the ground and backfill materials are suitable with no additional loads applied at the top of the embankment. When a higher wall is required, local bylaws and Engineering Codes must be adhered to and advice from site engineers and/or Technicrete's technical support team should be sought.

The interlocking blocks can be supplied in a length/width/height of 300 mm x 410 mm x 250 mm configuration, whilst the non-interlocking option can be supplied in a 410 mm x 355 mm x 250 mm sizing. Both are available in autumn blend and grey colouring.

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

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Precast concrete augments new V&A Waterfront properties



Devon cobble pavers grace the entrance to the prestigious Silo Hotel. (Photo by Lauren Rautenbach)



The Jura cobble walkway inside No. 5 Silo. (Photo by Lauren Rautenbach)



Revelstone's purpose-made coping flanks the eighth-floor swimming pool at No. 3 Silo. (Photo by Lauren Rautenbach)

Precast concrete has been used in the construction of three new buildings at Cape Town's V&A Waterfront, No. 3 Silo (apartment building), No. 4 Silo (gym and retail space) and No. 5 Silo (office space). These buildings front onto a circular plaza, which is paved with precast concrete cobbles and flagstone pavers, most of which were supplied by Revelstone.

Designed by Van Der Merwe Miszewski Architects and Makeka Design Lab, the buildings achieve a high degree of sustainability with no compromise in utility, comfort or aesthetics.

Built as three towers separated by lift shafts and stairs, No. 3 Silo's architecture echoes the adjacent Grain Silos redevelopment which encompasses the Silo Hotel and the Zeitz Museum of Contemporary Art Africa, which opened to the public in September 2017.

No. 3 Silo features two upper-floor swimming pools. One forms part of an eighth-floor sundeck and the other holds centre stage in the entertainment area on the 12th floor roof deck of the penthouse. Both pools command spectacular views over the Waterfront, City Bowl and Table Mountain, and both are fringed with purpose-made charcoal-coloured coping, which was post acid-etched to provide a non-slip surface.

Revelstone designed the coping with 120 x 100-mm lips which extend beyond and down the side of the exterior pool walls and create 50 x 50-mm channels between the lips and the walls. The channels were specified by the architects to



Revelstone's Jura paver was used extensively on the eighth and 12th floor sundecks. (Photo by David Beer)



Jura straight-edge pavers cut a path across a section of garden in the Silo's Plaza. (Photo by David Beer)

cover electrical cabling and water piping which were attached to the exterior pool walls. Although hidden, the pipes and cabling are easily accessible without digging or disruption to the coping or surrounding paving.

In addition, Revelstone's Jura straight-edge paver was used extensively at No. 3 Silo. It covers a path leading from the inside of the building to the sundeck on the eighth floor and the outer ledges which fringe the eighth and 12th floor decks. A smaller version of the Jura paver was also used as coping for a lily pond on the eighth floor.

The plaza was paved with a combination of Revelstone's York cobble and Devon cobble. The former has a rounded stone-textured finish which resembles traditional European granite cobblestones while the latter is ideally suited to heavy vehicle traffic. A larger version of the Jura straight-edge paver with a rough-textured surface was used to create a path across a centre-piece flowerbed feature in the plaza.

And, in a break with conventional paving practice, Revelstone's external Jura cobble paver was used at No. 5 Silo for both its external paving requirements and its internal public area flooring.

Lloyd Rubidge, a partner of Van Der Merwe Miszewski Architects, added that the intention was to create an ambience of 'external' street space inside the building's main atrium. This street-space design was accentuated by edging the tiles with high-grade non-slip porcelain tiles and by cladding some of the walls with exposed precast concrete masonry.

"Precast elements have formed a crucial element of the overall materials pool for these buildings and assisted us in extending the Waterfront's semi-industrial aesthetic," added Rubidge. "Moreover, we wanted to avoid monotony, which is



Inlaid with Revelstone's York cobble, this is one of several paved octagons outside the Zeitz Museum of Contemporary Art Africa. (Photo by Lauren Rautenbach)

why we varied our choice of materials in terms of design, size and colour. However, in the main, we opted for muted colours which would not detract from other plaza attractions such as boutique shops, plant life and open-air cafés, restaurants and public spaces." ■

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Early attention to spalled joints vital to prevent costly repairs

Spalling of joints in concrete floors should be regarded as an early warning of more serious potential long-term damage and the size and cost spalling repairs can be reduced if the damage is detected and repaired at an early stage, says Bryan Perrie, MD of The Concrete Institute.

Perrie says that spalling of joints is the cracking, breaking or chipping in the immediate vicinity of joints, usually within 100 mm of the joint. "A spall usually does not extend vertically through the slab but extends to intersect the joint at an angle," he explains.

Spalling at joints usually results from:

- Excessive stress at the joint, caused by accumulation of incompressible material in the joint and subsequent expansion of adjoining slabs in concrete pavements;
- Weak concrete at the joint;
- Poorly designed or constructed load-transfer devices or failure of such devices; and
- Poorly constructed joints.



Examples of joint spalling in concrete floor slabs.

"Early repair of spalling is needed to improve serviceability, deter further deterioration and provide proper edges so that the joints can be resealed effectively," Perrie advises. "Before any repairs are carried out, it should be determined if the spalling is due to a loss of load transfer at the joints. If this is the case, the load transfer needs to be restored before edge spalls are repaired. Reinstating load transfer generally requires full-depth, partial panel repair or reconstruction of the joint".

If there is adequate load transfer at the joints, The Concrete Institute recommends the following repair method:

1. Carry out a survey to determine the actual repair boundaries: all areas of delamination should be determined using a sounding technique. This may be done by striking the existing concrete surface with a steel rod or by tapping lightly with a hammer. A sharp metallic ring will indicate undamaged concrete, while a dull or hollow sound will indicate delaminated areas.
2. Using a concrete saw, cut around the perimeter of the patch area to a minimum depth of 35 mm. This will provide a vertical face at the patch edges and provide sufficient depth to give integrity to the patch.
3. Remove the concrete inside the patch area to a minimum depth of 35 mm with a hammer and sharp cold chisel or light pneumatic tool until sound and clean concrete is exposed and the patch area is uniform in thickness. "It is important that tools of the appropriate size are used. Using a pneumatic hammer which is too large will cause damage and fracture the concrete below. Under no circumstances should heavy jack hammering be used: the maximum allowable pneumatic hammer size should be 12 kg," Perrie cautions.
4. Insert bond-breaking compressible joint filler (such as expanded polystyrene foam of density 16 kg per cubic metre) into the existing joint against the existing slab to fill the saw cut.
5. The required minimum compressive strengths are 30 MPa for vehicles with pneumatic tyres, and 40 MPa for vehicles with solid tyres. The recommended minimum strengths should be achieved with a cement content not exceeding 500 kg/m³. A water reducer may be used.
6. Preferred stone size is 9.5 mm or about a quarter of patch thickness. Where circumstances do not permit a designed concrete mix, trial mix proportions may be used. These proportions will permit opening to traffic with pneumatic tyres after three days, and to traffic with solid tyres after four days, provided that the joints can be sawn and sealed within this time.
7. Advice regarding sealant installation should be obtained from the supplier of the sealant proposed for use. Small poker vibrators (maximum diameter of 25 mm) should be used for compaction. The repair area should be slightly over-filled to compensate for compaction.
8. Finish the patch flush with the level of the surrounding slabs. The recommended finishing procedure is to screed from the centre of the patch out to the patch boundaries to promote good bond with vertical concrete faces.

9. Hand steel trowel to match the finish on the adjacent floor surfaces and carefully round off the edge of the repair area adjacent to the joint to 3 mm radius.
10. Cure immediately by covering the patch with polyethylene sheeting sealed at the edges and maintained in place until removal of the polystyrene filler.
11. Remove the polystyrene filler in the joint opposite the patch by sawing.
12. Reseal the joint using liquid or preformed joint sealant and follow the recommendations of the manufacturer of the sealant. Aspects to be observed include the need for clean and dry joint interfaces prior to sealing; prim-

ing of joint sides for certain liquid sealants; provision of the proper joint shape factor for liquid sealants; provision of a bond-breaking cord (consisting of closed-cell expanded polyethylene foam); and a bond breaker for liquid sealants, plus the desirability of undersealing joints (usually 3 to 5 mm).

13. When all work has been completed the floor should be swept clean. ■

For details of the recommended concrete mixes and mixing procedures, consult *The Concrete Institute leaflet, Repairing spalled joints in concrete floors*, at www.theconcreteinstitute.org.za

Ultra-thin, curvy concrete roof is a monument to digital design

By Michael Irving

Concrete has been around for millennia, but that doesn't mean we haven't cooked up new ways to build with the world's favorite construction material. It's been electrified to melt snow and used as an 'ink' in 3D printers to quickly print entire buildings. Now, engineers at ETH Zurich have developed a more efficient method for building with the material, erecting an ultra-thin, curved prototype roof that is 5 cm thick on average, and designed to support energy-saving systems in the building.

Although it's since been dismantled to make way for other test structures, the prototype stood 7.5 m tall and was ultra-thin, measuring 12 cm at its thickest and just 3 cm at the edges. It had a surface area of 160 m² and covered an area of 120 m², and that discrepancy was down to the fact that the roof arched over, forming shapes that concrete normally wouldn't be capable of without complex support structures.

Instead of using custom-built, single-use wooden or foam scaffolding, the engineers tested a new technique of their own design. A net of steel cables was stretched into the desired shape, and a polymer textile was laid over the top to create a flexible formwork. The shape was controlled by algorithms that distribute the force evenly between the cables and determined just how much concrete needed to be applied to each section. Afterwards, the cable net can be dismantled, reused and reshaped as needed.

Altogether, some 20 tons of wet concrete were supported by 500 kg of steel cable and 300 kg of textile. Further tweaking



went into how the cement was made and applied to the support structure. The mixture needed to be just right – thick enough that it would stick to the vertical surfaces, but runny enough that it could be sprayed on, using an application method that was specially designed for the project.

The prototype concrete shell was designed to cover a residential rooftop apartment called HiLo, which will be built next year on the top floor of the NEST lab in Dübendorf, Zurich, Switzerland. The roof is designed to help support HiLo's energy-neutral goals: inside the ultra-thin covering, insulation and heating and cooling coils were sandwiched between two layers of concrete, and that's capped off with thin-film photovoltaic solar cells.

After four years of prep work, this practice run took over six months to set up, and next the researchers are shooting to build the same structure at NEST in eight to 10 weeks.

"We've shown that it's possible to build an exciting thin concrete shell structure using a lightweight, flexible formwork, thus demonstrating that complex concrete structures can be formed without wasting large amounts of material for their construction," says Phillippe Block, lead researcher on the project. "Because we developed the system and built the prototype step by step with our partners from industry, we now know that our approach will work at the NEST construction site." ■

Source: ETH Zurich
<https://goo.gl/kHVzVE>



READYMIX CONCRETE



AfriSam's readymix capacity enables the company to deliver on large projects even when tight deadlines require working 24-hour shifts and pouring concrete through the night.



AfriSam's readymix concrete contributed towards the 4-Star Green Star rating of the Rosebank Towers.

Expertise and capacity underlie AfriSam's value offering

The varied range of projects tackled over the past year by AfriSam is testament to the company's capacity to work in close collaboration with contractors, developing and supplying each contract with specific mix designs while meeting other demanding project conditions.

A recent highlight for AfriSam has been its contribution to the PwC Tower in Midrand, which was recognised in the specialist supplier category at Construction World Best Projects in November 2017. As the concrete supplier to this complex project, AfriSam designed nineteen project-specific and special-application mixes – conducting extensive trials and testing at its Jukskei laboratory.

According to Amit Dawneerangen, AfriSam's GM readymix, the company's technical capability is based on the depth of its expertise combined with its extensive plant footprint and logistics fleet.

"This capacity has allowed us to deliver on a number of large projects between 2014 and 2017, even when tight deadlines required 24-hour shifts and pouring concrete through the night," says Dawneerangen.

At the PwC Tower, each slide concrete mix had normal and retarded versions to satisfy the different applications. The mix designs had to be both pumpable and suitable for slip forming, including specialised retarded mixes that were continuously

pumped up into the moving slide around the clock. The concrete mixes ranged in strength from 50 MPa for columns at basement level up to level four, to 40 MPa at mid-levels 5 to 14, and 30 MPa for levels 15 to 26.

To assist the client in reaching Silver Green status as a Leadership in Energy and Environmental Design (LEED) building, AfriSam ensured that the concrete for the superstructure was specified to reduce the absolute quantity of portland cement. Through the use of supplementary cementitious materials – often industrial by-products – the cement content in the mixes was reduced by an average of 60% for in-situ concrete, 40% for precast concrete and 30% for stressed concrete.

"One of our strengths is our plant configuration, which enables us to make up any blend of concrete specified by the client," Dawneerangen says. "In our central cluster, for example, we have multiple silos – so we can accommodate AfriSam High Strength cement, slag, fly ash and other cementitious products, if required. Any may be specified in a mix, and we are in a position to blend whichever is required, giving us exceptional flexibility that is not shared by many competitors."

Another factor setting AfriSam apart is its ability to deliver large volumes on time and without disruption. This was recently tested on the fast-track Alice Lane Phase 3 project, and the Discovery head office, both in Sandton.

The company's technical capability is based on the depth of its expertise combined with its extensive plant footprint and logistics fleet.





One of the company's strength is its plant configuration. Multiple silos give AfriSam the capacity to make up any blend of concrete specified by the customer.

Close by in Rosebank, the company was, over the same period, working on the Rosebank Towers contract, rated as a 4 Star Green Star building by the Green Building Council of South Africa. Also a fast-track project, one of the key elements related to the early strength requirements of the post-tensioned slabs.

At Group Five's Saldanha tippler project, AfriSam poured the concrete for the large base of the iron ore facility at the harbour. This pour had to be done continuously, and amounted to some 2,550 m³. The concrete was supplied by the commercial batch plant in Saldanha, about 10 km from site and was completed in 52 hours.

"We were able to complete this large pour in just over two days," says AfriSam multi-product solutions account manager Mervin Govender. "In a project like this, planning and logistics are all-important to secure the constant supply of input materials. Our systems make this possible, ensuring the same high level of service wherever we operate. We even had technicians on standby to ensure that everything would run smoothly."

Superior consistency of the concrete was assured by AfriSam's wet batch plant at Saldanha, which gives better consistency of the final product. Due to the depth of the base being poured, the mix was designed to avoid thermal cracking due to differential cooling. The product technical department – based conveniently in AfriSam's Cape Town region – was able to work closely with the consulting engineers on this mix.

In another large pour project, AfriSam is supplying the readymix for the glamorous Infinité apartments in Bedfordview, Johannesburg. This project includes the supply of readymix for over 110 pile-caps – each taking between six and nine cubic metres of concrete – and the foundations for the building.

In one of the largest pours on this contract, AfriSam delivered and poured 590 m³ for the basement slab. Each slab of this 10-storey building will take about 500 m³, and the whole project will consume some 17,500 m³, supplied from the company's Prolecon and Spartan plants. The concrete specified for the 1,5 m x 2,0 m beams is 50 MPa while the columns demand 40 MPa strength.

The eye-catching BRT bridge in Sandton over the M1 highway has also been on AfriSam's list of projects, where it provided 600 m³ of W150 durability-class self-levelling concrete mixes for the 3-m bridge base. The depth of the base and the confined space required that the concrete would have to settle without added vibration, while still meeting the durability index criteria.

AfriSam's readymix has also been going into residential developments in the Clayville area of Midrand. Here the Olifantsfontein plant delivered and poured 7,000 m³ of 20-MPa readymix for the raft foundations of 822 homes; for a nearby RDP development of flats, a further 1,100 m³ of 20-MPa concrete was provided for raft foundations, and about 500 m³ of 25-MPa concrete for the rib and block slabs. In a

READYMIX CONCRETE



Another factor setting AfriSam apart is its ability to deliver large volumes on time and without disruption.

second phase of the RDP development, another 2,900 m³ of readymix will be poured by March 2018.

"The vertical integration within AfriSam works in the customer's favour, as we can draw in the various materials we need from in-house sources, which makes procurement quick and seamless," says Govender. "The main readymix constituents – cement, aggregates and slag – are all in-house and this enhances the flexibility of our logistics and makes it easier for us to stockpile and deliver after hours." ■

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AfriSam supplied 19 project-specific and special-application mixes for the construction of the PWC building in Midrand – conducting extensive trials and testing at its Jukskei laboratory.



Bye bye potholes? University of Michigan lab creates ultra-strong concrete

By David Jesse

There are two KitchenAid mixers on the counter and next to them, a mixer that looks like it's been on steroids for more than a decade.

Into that giant mixer go the dry ingredients. The mixer whirs to life and stirs for five minutes. Then, the liquids go in and the mixer whirs back to life and the recipe is done.

This is happening in a lab in the basement of a University of Michigan building and the material inside the mixer bowl is concrete – ultra-high-performance concrete.

And while it has existed before, a team of U-M engineers has come up with a non-proprietary formula that has all sorts of potential uses.

It could be used to create better roads that don't turn into a pothole maze as fast; help build super-strong, super-tall buildings and even have uses in making blast-proof buildings.



Yu-Shio Tai, a visiting professor from Taiwan and resident expert on concrete materials, adds bronze coated steel fibres to the batch of ultra-high-performance concrete. (Photo: Brittany Greeson, Special to the Free Press)

"Regular concrete will have a strength of about 4,000 pounds per square inch (psi) ... that's maybe the weight of an SUV on every square inch," said Sherif El-Tawil, a U-M professor of civil and environmental engineering. "However, UHPC can support at least 22,000 psi or six times as much."

In addition, the concrete is built to better handle freeze/thaw cycles, which contribute to the creation of those pesky potholes. Regular concrete is good for about 28 cycles. This concrete is good for 90 cycles or more.

So, how does it work?

The super-strong concrete packs more particles into each bit of concrete. If regular concrete is three tennis balls stacked on each other in a triangle, there will be gaps in the stack. Super-strong concrete fills those gaps, and then fills the gaps in the next layer and so on until there aren't any gaps. That keeps water from getting in, freezing and then causing problems when it thaws. There are also thin steel fibres mixed into the concrete to help hold it together when it does crack.

The super-strong concrete was developed by a private company, but it's expensive – around \$2,700 or \$2,800 per cubic yard.

Regular concrete costs about \$100 per cubic yard. The Michigan Department of Transportation gave U-M a grant to see if it could develop a less costly version. In 2016, MDOT outlined the problem with commercially available brands of UHPC in a research publication.

"While the durability properties of UHPC are very attractive ... mixes are currently prohibitively expensive for widespread use and require specialised equipment and curing practice," MDOT's research report stated. "But if costs were reduced ... (it) could have potential ... including thin overlays for decks that now need to be replaced every few decades."

U-M's version costs about \$880 per cubic yard. That's still much more than regular concrete.

The reason U-M's is still more costly is largely due to those thin steel fibres. MDOT mandates that only American-made



Bronze-coated steel fibres being added to a batch of ultra-high-performance concrete. (Photo: Brittany Greeson, Special to the Free Press)

products be used and the steel fibres are more expensive than similar products made overseas.

"Our (concrete) will bring down the cost of long-term maintenance," El-Tawil said. "It's still more expensive than regular concrete. But if you consider the effect over the lifetime of a bridge, then the cost becomes very competitive."

"If you have a concrete deck on a bridge that lives for 200 years with little to no maintenance ... imagine the cost savings. I think we should use it for all infrastructure."

U-M is currently working on finding the best way to mass manufacture large quantities of the mix. It was used recently in a bridge repair in St. Clair County which MDOT is using as a test site.

Unlike the private companies already doing the super-strong concrete, U-M plans to give away its formula for the concrete as a way to increase its use, which the U-M engineers believe will also help drive down the cost. ■

Source: <https://goo.gl/ickgQ3>

Bridging the gaps at Serepta Bridge

Consulting engineers from Aurecon and from Ingerop recently specified eight Sika products for an extensive refurbishment project on the old, free-standing Serepta Bridge in Bellville South, Cape Town. When Sujean Property Investments acquired 120,000-m² of land surrounding the old disused railway bridge, they were required to completely refurbish the bridge prior to re-developing the area into a modern industrial Mega Park.

Exeo Kholeka Construction was contracted for the project that commenced in February 2017. Prior to filling internal voids and cracks in the bridge walls, Sikadur-AP was used to close all surface cracks. An all-purpose, two-component epoxy paste adhesive, Sikadur-AP provides excellent adhesion on a wide variety of materials, and is ideally suited for vertical and overhead applications. With a convenient 1:1 mixing ratio, it is easy to apply on either dry or damp surfaces and provides high abrasion resistance.

To treat spalling on the bridge, SikaTop Armatec-110 EpoCem was applied. As a cementitious, epoxy resin compensated, three-component coating material with corrosion inhibitor, SikaTop Armatec-110 EpoCem meets the requirement of EN 1504-7 and is certified for application under dynamic load conditions. Numerous advantages provided by this product include extended open times for repair mortars, excellent adhesion to concrete and steel and good resistance to water and chloride penetration.

Thick-layer concrete was repaired using Sika MonoTop-615 HB, which is a high-build, cementitious, polymer-modified, one-component repair and reprofiling mortar, containing silica fume and Ferrogard corrosion inhibitor. With excellent workability characteristics as well as excellent thixotropic behaviour, Sika MonoTop-615 HB is especially suited for vertical or overhead applications and provides good resistance to water and chloride penetration.

Prior to waterproofing of the bridge, injection specialist, Dampmen was sub-contracted to inject Sikadur-52 ZA, a two-part, solvent-free, low-viscosity injection liquid, via ports into the bridge structure. The product not only forms an effective barrier against water infiltration and corrosion-promoting media, but also structurally bonds concrete sections together. It is suitable for use on dry or damp surfaces, even in low temperatures and hardens without shrinkage. Some cracks in the bridge were so large that SikaGrout-212, a one-component, ready to mix, free-flowing, shrinkage-compensated expansive grout, was used prior to injecting Sikadur-52 ZA.

The sub-contractor then coated the entire bridge with Sikalastic-152, a two-component, fibre-reinforced mortar based on cement modified with special alkali-resistant polymers containing fine particle size, selected aggregates and adequate additives. Sikalastic-152 provides flexible waterproofing and concrete protection all in one product.

To cover all their bases and ensure absolute structural integrity of the bridge, engineers specified Sika Carbodur S512 plates to be bonded onto the interior vertical walls using Sikadur-30, a thixotropic, structural two-part adhesive based on a combination of epoxy resins and special filler. Extensive Testing and Approvals of Sika Carbodur plates are available from many countries worldwide. Dampmen attached approximately fifty, 4.2-m lengths of Sika Carbodur S512 plates to the walls.

These plates are pultruded carbon-fibre-reinforced polymer (CFRP) laminates designed for strengthening concrete, timber,



masonry, steel and reinforced polymer structures. They are used to improve, increase the performance and resistance of structures for improved load carrying capacity, repair damage to structural elements, enhance serviceability and durability, change of the structural system, offer resistance to possible events such as earthquakes, and to repair design or construction defects. The high-strength laminates are non-corroding, provide excellent durability and fatigue resistance and are supplied in lightweight rolls that are easily transported and installed.

The combination of all these renowned Sika products together with the Sika Carbodur system has significantly increased the longevity of the old Serepta Bridge. ■

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

Zambian Road Development Agency embarks on a sophisticated bridge-maintenance strategy

The Zambian Road Development Agency (RDA) recently embarked on a programme that will help significantly strengthen its bridge maintenance programmes.

A joint venture between Kiran & Musonda Associates (KMA) and JG Afrika is working closely with the RDA to validate its inventory of bridges and related structures, as well as to inspect and appraise their condition.

JG Afrika has previously worked closely with KMA, Zambian-based consulting engineers, on a number of RDA-related projects in the country. The leading South African-based consulting engineering practice brings extensive structural design capabilities to the partnership. These include the skills and expertise of Kobus Burger, a technical director at JG Afrika, who is overseeing the JG Afrika teams working in Zambia. Burger is a South African National Roads Agency Limited (SANRAL)-registered senior bridge inspector who specialises in complex technical structural undertakings, including forensic structural investigations.

This project also benefits from JG Afrika's extensive experience working with the Struman Bridge and Structures Management System, which the RDA has now adopted for inventory and classification. The Council for Scientific and Industrial Research software is used by leading South African road authorities for their bridge maintenance programmes. It was also a tool deployed by SANRAL before the road agency designed its own in-house system for bridge management purposes.

Burger says that the project, which encompasses Zambia's entire core road network, counting all trunk, main, district, feeder and urban roads, commenced in June 2017 and is on

track for completion by December 2018, well ahead of the actual project deadline of June 2019.

"This assignment involves about 4,000 structures, including the rubble masonry crossings that were constructed as early as the 1920s. The average life of the bridges serving the core road network is about 40 years, and these complement those that continue to be built by the RDA since 2012 when the roads authority first embarked on a substantial programme to expand the road network," Burger says.

The first component of the project entails locating all of the structures on the new database to verify and update this information where necessary. This includes corroborating the type of structures and their exact global-positioning co-ordinates on the country's core road network.

The professional engineers then inspect the condition of the bridges, recording and photographing all structural defects, as well as rating the urgency of the remedial action.

RDA engineers are immediately notified of structures that may not be safe for road users. Importantly, Burger says the new bridge-management system will provide the roads authority with an accurate indication of the real costs associated with maintaining and repairing the structures.

"The depth of information contained in the new database will enable the RDA to better motivate the funding it requires from the Zambian authorities to implement a pro-active bridge maintenance programme. It has helped many custodians of road assets worldwide to influence decisions affecting their maintenance budgets. Unfortunately, in many instances, these budgets compete for funding against new infrastructure-delivery



The average life of the bridges serving the core road network is about 40 years, and these complement those that continue to be built by the RDA since 2012.

programmes with their perceived higher value," he says. "By the time that KMA and JG Afrika have completed the project, their teams will have travelled throughout Zambia, including extremely remote rural areas of the country."

Ensuring the safety and security of their teams while working and camping at the various sites is a priority, and one of the most challenging facets of the entire project.

Wildlife, including carnivores and large animals, pose a real threat in many areas. Members of the professional team have had to practice extreme caution working above and close to the river bank of a crocodile-infested river, or while camping in an area without boundaries to separate them from nature, including very curious hyenas.

As a precautionary measure, the RDA's provincial managers are given advance notice of the inspection teams within their province. It was also decided that it would be safer for both teams to work together in the same province.

Both teams comprise representatives from KMA and JG Afrika. They are self-sufficient and have been equipped with rugged off-road utility vehicles that are able to traverse extremely arduous terrain.

Certainly, KMA team members' familiarity with the terrain and their fluency in local languages, such as Bemba and Nyanja, have contributed to the excellent progress made thus far.

The teams started working in Lusaka Province and within very close proximity to KMA's headquarters and, by mid-August, were making their way to the Southern Province as part of an early trial phase.

Once they have successfully completed their operations there, they will determine which of the remaining seven provinces they will visit next, while working to a strict deadline that also takes into consideration the wet season in Zambia.

Burger remains impressed with the performance of both teams, describing the engineers as 'adventurous' and 'wild-spirited', and says that they are also enjoying every opportunity to undertake important work in a country renowned for its scenery and its beautiful rivers and bridges.

He concludes that it is also a pleasure to be working on another project with the RDA, which is operated by professional engineers who are highly regarded on the continent for the very high quality of their engineering and technical skills. ■

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www.jgafrika.com**

China is building solar roadways that charge driving cars

By John Fitzgerald Weaver

China is currently building roadways with solar panels underneath that may soon have the ability to charge cars wirelessly and digitally assist automated vehicles. This second solar roadway project – part of the Jinan City Expressway – is a 1.2-mile stretch. The building technique involves transparent concrete over a layer of solar panels.

Construction is complete and grid connection is pending, but is expected to be complete before the end of the year.

The Jinan City solar highway is formed with three layers. The top layer is a transparent concrete that has similar structural properties with standard asphalt. The central layer is the solar panels – which are pointed out as being 'weight bearing.' The bottom layer is to separate the solar panels from the damp earth underneath. The road will be durable enough to handle vehicles as large as a medium-sized truck.

It was noted by engineers that wireless vehicle charging could soon be integrated and automated car functions could take advantage of the inherent data in this already wired roadway.

No details were given on which solar panels are being used. Two separate sizes could be seen and it appears as if the solar panels are covered with a film to protect them from workers moving over them.

Also, last September the Quilu Transportation Development Group completed the first solar roadway in the same city of Jinan. This is the same state-owned company that built the first one. The first project took 10 months to complete and is fitted with 790 square yards of solar panels.

Even though Solar Roadways have their critics, they are being tested in multiple locations around the world:

The Netherlands was first to dip their toe in the solar roadway waters by building a solar powered bike path in 2014.

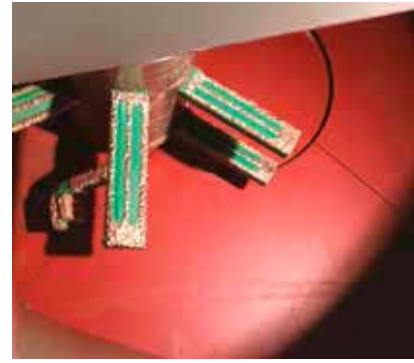


Jinan City's solar roadway will be durable enough to carry medium-sized trucks.

France soon followed suit by building a solar roadway of their own. The project is in the Normandy village of Tourouvre-au-Perche. The 1-km-long solar road installation consists of 2,800 m² of energy-producing panels. The system cost about €5 m, and is expected to serve about 2000 motorists a day. France has since set a very ambitious goal of installing over 1000 kilometres of solar roadways.

Idaho-based Solar Roadways has received three rounds of U.S. government funding (plus \$2 million in venture capital) to test its technology. ■

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



MONEY FOR NOTHING

Comparing Eirich mixing technology with other mixers – pan mixers, paddle mixers, stationary pan mixers, twin shaft drum mixers and spiral drum mixers (ready mix) – produces cost savings and profit margins for users of this machinery.

We believe Eirich mixers should be standard equipment in any concrete application where quality, time, cost and reduced rejects are the order of the day.

Eirich has an extensive range of mixers (from 5 lt - 14 000lt) to suit any concrete need – from lab tests to big production demands.

What makes Eirich mixing technology superior to the rest?

The example below illustrates the kind of savings that can be achieved for companies using Eirich mixers:

- 2 400 kg of fresh concrete = 1 m³
- Assuming we use 12% cement per 1 m³ of fresh concrete = 288 kg

By using an Eirich mixer you save as much as 10% cement per mix.

- 2 400 kg of fresh concrete = 1 m³
- 12% cement per 1 m³ of fresh concrete = 288 kg
- 10% of 288 kg = 28 kg

The cost saving amounts to:

- 28 kg of cement at R 1.15 for 42,5R cement = R 32.20 per mix

An Eirich RV19 intensive 1 500 litre

mixer is capable of a minimum batch cycle time of 2 minutes.

- This equates to 30 batches per hour
 - R 32. 20 X 30 = R 966 per hour
- Most concrete factories work a 9-hour day.
- 9 X 30 X R 32.20 = R 8 694 per day on cement

This amounts to saving as much as the following monthly:

- R8 694 X 21 working days = R 182 574

The saving continues:

Eirich intensive mixers save energy due to efficiency time which is reduced drastically. The fact that a person can save on cement means that one utilises less water.

Theory states: more water, more cement and vice versa. Less cement thus equals less water. Hence the savings using Eirich mixers compared to the traditional pan mixer, planetary mixer or twin shaft mixer (to name but a few) are as follows:

1. Cement saving of approximately R 182 574 per month
2. Electricity in the region of R 100 per kw/h
3. Water

It is often said that Eirich mixing technology is expensive – this can't be

further removed from the truth if one takes all aspects into consideration in the production line and not only the capital expenditure.

Eirich mixers are not only for block making machines but are also suitable for any concrete application such as wet cast mixing, dry cast, semi-dry cast, blending applications, etc.

Eirich have been the pioneers in material processing ever since opening their doors in Germany in 1863.

An Eirich plant will manufacture high value, high quality concrete, heavily pigmented products. Featuring the Eirich Intensive Mixer, the installed plant cost can be recouped in cement savings alone in less than 5 years.

Savings in power, water, pigments and maintenance will more than compensate for any original capital expenditure.

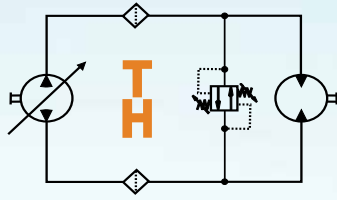
Then how cheap is cheap, actually? Operating cost advantages do not end when the purchase price is recovered.

After that, it's money for nothing.

It would be the same as purchasing a Bentley... and being paid for driving it after the initial purchase. ■



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



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Experience quality, innovation and progress with Liebherr



Liebherr Africa, known for being an active supplier in the Mining, Earthmoving and Construction industries, is a brand associated with high-quality premium products. Liebherr has several divisions in South Africa operating from all major cities in the country.

One such division, operating from Springs, Johannesburg is the Concrete Division. The Liebherr Concrete division is well known for concrete batch plants and truck mixers with Liebherr having a reputation for consistent batching, advanced software programs and equipment that is capable of having one of the longest lifespans on the market.

Liebherr Africa is also very proud of their truck mixers and Riaan Lotter, General Manager of the Liebherr Concrete Division is quite confident that the Liebherr Truck Mixers, compared to other suppliers, can legally carry the largest amount of concrete without spilling and the mixer can easily mix 3000 m³ of concrete more than its nearest competitor.

Lotter has said that, depending on the sales price and cost, one can actually make more profit before you have to replace the drum. If you have a big fleet of mixing trucks this can translate into your potentially making millions more.

Recently Liebherr also added the new Mobile Dry Batch Plant to their product offering and this plant is really one-of-a-kind. It is easy to transport, easy to set up and is available as a fully automated or manually operated plant. Customers have a choice of configurations and accessories.

Being highly mobile and cost-effective to erect, this plant is perfect for remote locations. Our customers like the fact that this plant can be used for short- and long-term concrete production as well as the fact that they reduce both costs and risks associated with long-distance concrete delivery.

The Liebherr Africa Concrete Division is totally committed to the support and servicing of all their customers' plants. We have Liebherr-trained technicians available 24/7.

Non-accredited service providers often approach Liebherr customers by offering seemingly inexpensive parts and services. Unfortunately, these non-accredited service providers also fit non-original or refurbished parts that can seriously reduce the batch plant's capabilities and life cycle as well as causing great financial loss due to reduced performance.

Liebherr continually invests in training our in-house and approved field service technicians to ensure that they are proficient in all the latest Liebherr technology and processes to guarantee that Liebherr control systems and equipment function at peak performance.

Liebherr is in the process of introducing the new My Liebherr online package to all their customers. This is a free services where all Liebherr customers and users can register technicians, procurement personnel and managers to identify, check stock and order parts directly from the My Liebherr software.

Riaan Lotter has made it his personal challenge to improve services on all levels and he is backed by a team with many years of experience in servicing and supporting the Liebherr Batch Plants and Mixing Trucks. ■

**More information from Liebherr-Africa (Pty) Ltd,
Tel: +27(0)11 365 2000 / email: info.laf@liebherr.com
www.liebherr.com**

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- Aluminium pallet design and casting
- Seminars and workshops

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Concrete roof tile designs combine our technical roofing knowledge with our manufacturing expertise. The same roof tile machinery may be used to produce more than one product.

Standard profiles are available, such as Double Roman, but special tile profiles can also be designed to suit clients' specific needs. The extremely sought after Tuscan profile is also available and we are pleased to announce the addition of the Shingle profile, a beautiful upmarket tile with gentle undulations.

Eleven different types of ridge tiles and special fittings are available in our range.

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Dow Corning sealants for pillow windows of converted waterfront silo

Dow Corning structural glazing sealants, supplied by a.b.e. Construction Chemicals, were used for the glazing requirements of the converted old silo that now houses the new, acclaimed Zeitz Museum of Contemporary Art Africa (MOCAA), and the ultra-luxurious The Silo Hotel in Cape Town's waterfront.

a.b.e. Construction Chemicals is part of the Chryso Southern Africa Group.

The 1921 grain silo that was converted into the impressive museum and hotel is situated at the V&A Waterfront. The building, constructed by WBHO and owned by V&A Waterfront Developments, was commended for its excellence in the use of concrete in this year's Fulton Awards. The museum is the largest to open in Africa in over a century.



Visitors to the MOCAA have spectacular views of Cape Town and Table Mountain from the museum's rooftop garden.



Glazed circles on the floor of the rooftop garden offer bird's eye views of MOCAA above.

The state-of-the-art overhaul and redesign of the massive old silo was masterminded by the British industrial designer, Thomas Heatherwick. Part of the silo was raised in height to accommodate The Royal Portfolio's The Silo Hotel with its striking façade of "pillowed" glass windows, carefully inserted into the geometry of the hotel

Each hotel window protrudes over a metre, is roughly 5.5 metres tall, and contains 56 triangular glass panels to give the crumpled pillow appearance.

A concrete wall containing similar pillow windows – and green vegetation growing on top – was installed as protection against the elements on the Zeitz MOCAA rooftop sculpture garden. From innovative glazed circles that form the transparent rooftop area's floor, guests can look down into the massive museum and also enjoy spectacular views

Grant Batty, national manager: silicones, sealants and adhesives for a.b.e., says the company supplied three Dow Corning sealants for the glazing of The Silo Hotel and Zeitz MOCAA:

- Dow Corning 895 – for the glazed circles on the Zeitz MOCAA roof; and
- Dow Corning 993 as well as Dow Corning 813C – for the glass pillow façade of the hotel as well as the wall of pillowed windows on the Zeitz MOCAA rooftop garden.

Batty says Dow Corning 895, used to seal the glazed circles on the museum's rooftop sculpture garden, is a single-component silicone sealant for structural glazing.

Dow Corning 993, used for the pillow window sealing, is a two-component silicone sealant able to resist exceptionally high stress levels caused by wind, thermal dilatation and the constant weight of the glass units.

Also used for the pillow window glazing, Dow Corning 813C is a one-part, neutral curing, low-modulus silicone sealant particularly suitable for weather seals, expansion and building joints. It offers durable adhesion to porous and non-porous surfaces, resists ozone and UV radiation as well as extreme temperatures, and can cope with joint movements of up to 50% of neutral joint width.

Batty personally made regular visits to the The Silo Hotel/MOCAA building site to attend planning meetings with project engineers, ARUP, and applicators, Mazor. He was also present at the final inspection and handover of what is destined to be a landmark building on the V&A Waterfront.

Mazor Aluminium installed the glazed façade following their appointment by project engineers, ARUP Cape Town. Mazor manufactured all the glazing components locally in Killarney Gardens, Cape Town, using special imported glass. Each window was then transported to site as a single unit, fully glazed, and craned into position where they were sealed with the Dow Corning products.

To manufacture each unit precisely, Mazor constructed a jig to accurately position each piece of steel and aluminium within a 1-mm tolerance.

Mazor, which has frequently used Dow Corning sealants from a.b.e. for other intricate structural glazing projects, is a Dow Corning specialist approved structural silicone applicator and member of the exclusive Dow Corning International Quality Bond programme. Quality Bond members are trained and audited by Dow Corning to ensure that they comply with the company's stringent application procedure and a.b.e. Construction Chemicals ensures that all these quality procedures are met.

Quality Bond members furthermore qualify for a Dow Corning warranty of 250 Euros per square metre, which would cover all costs related to the replacement of faulty sealant. This provides architects and engineers with the assurance that their quality and expertise specifications will be met. ■

**More information from Elrene Smuts,
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SAPS introduces Alcoblow Rapid Test to combat drinking and driving

A LCO-Safe, the leading provider of alcohol and drug testing and educational material, has been selected by the South African Police Service (SAPS) as their preferred supplier of Alcoblow Rapid Test breathalyser instruments, countrywide, in their latest bid to combat alcohol abuse and overcome driving under the influence.

The Alcoblow Rapid Test is an effective, fast means of testing whether an individual is over the legal drinking limit. The compact, handheld instrument was selected for its speed and ease of use, simply requiring the individual to blow onto the inverted cone area of the device with results delivered in under a second. With no need for mouthpieces, disposable or otherwise, the device is not only efficient, but cost effective too.

Rhys Evans, director at ALCO-Safe, said that SAPS required a fast, user-friendly device, which offers a simple way to



identify whether individuals are over the legal drinking limit, but needing confirmation as to whether they were over professional vehicle driver alcohol limits or private vehicle driver alcohol limits; professional vehicle driver alcohol limits being lower than those of private drivers.

"SAPS wanted a device that could differentiate between the two and we modified the device to indicate a pass or fail through coloured light indicators," said Evans.

The speed and simplicity of the Alcoblow Rapid Test will enable officers to move quickly through the testing process, spending less time on testing and more on attending to anyone who is over the legal limit. ■

**More information from Rhys Evans,
Tel: +27(0)12 343 8114 / www.alcosafe.co.za**



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FCB Horomill®, the right choice

By Loïc Pottier, Area Sales Manager at Fives FCB

The cement market faces a number of challenges, of which competitiveness and adaptability are not the least, and the proper selection of a grinding technology is crucial to meet these challenges.

What factors influence the selection of an effective and sustainable grinding solution?

Nowadays, with grinding process representing up to 60% of the electrical energy demand in a cement plant, energy consumption is certainly under the spotlight.

Without doubt reliability and ease of use are other key factors, in that any production plant will expect its grinding installation to be widely available, with minimised interruptions, reduced maintenance costs, and reduced manual interventions in daily operations.

However, in the present tough and competitive market situation encountered in most areas, another key consideration is the potential to produce cements with higher cement / clinker ratio, thereby combining reduced carbon footprint and production costs.

Last but not least, it is vital that the grinding installation can meet the fast evolution of market demand and can easily switch production, from one type to another.

To meet all these requirements and challenges, Fives provides a proven industrial solution based on the FCB Horomill® technology. In addition to the bed compression grinding technology that makes de facto FCB Horomill® highly energy efficient, let us highlight the other advantages related to its specific process and innovative design.

Extensive use of additives such as pozzolana, limestone or fly ash and GBFS implies a combined drying / grinding arrangement. Actually, the FCB Horomill® grinding system relies on a specific arrangement with separated grinding, classifying, and drying

functions fully integrated in a single, compact circuit, offering the highest performance for each function, best flexibility, ease of use, and ultimately a cement quality at lower cost.

No water injection

Before elaborating on the FCB Horomill's® response to the key factors above, it's worth mentioning that FCB Horomill® offers the opportunity to grind cement or any other mineral without any water injection. Indeed, the special concept of the mill features a fully controlled material / recirculation loop that ensures optimal mill stability. With zero-water injection, it avoids waste of process water and the related increased heat consumption to evaporate it. On the other hand it prevents the pre-hydration of cement in the mill, a phenomenon leading to loss of cement performance.

Low energy consumption and stable high quality product

FCB Horomill®, being part of the roller mill family, benefits from the material bed compression which is the source of significant energy saving compared to traditional technologies, by saving 50% energy compared to ball mill plants. Moreover, as it is not an air swept mill, the gas circuit is only dedicated to classification and drying as the case may be. Therefore, no extra gas flow nor pressure drop is incurred by material handling to the classifier, which is actually done by means of a bucket elevator, thus achieving up to 25% energy savings compared to those of vertical mill plants.

For example, at Teresa plant in the Philippines, (Republic Cement), the overall energy consumption for the whole grinding plant is limited to 25.2 kWh/t (cement type 1P), while at Barroso plant in Brazil, (LafargeHolcim), the overall grinding circuit consumption comes down to 10.8 kWh/t (Raw mix).

Thanks to this arrangement, the mill settings can be fully optimised for best grinding efficiency, while the gas circuit is adapted to classification and drying optimisation, without compromise. As a result, the concrete or mortar strength development achieved is similar or even better than those obtained with other technologies.

Easy management of moist materials

As FCB Horomill® is not air-swept, the drying function is ensured in the gas circuit, the moist materials being fed below FCB TSV™ Classifier. Upon material amount, type, and fineness, FCB Aerodecanter or Venturi type flash dryer is used. The separate drying also ensures low moisture content in-



FCB Horomill® at Tula plant (Mexico).



FCB Horomill® at Barroso plant (Brasil)

side the mill proper. This enables achievement of the lowest operating wear rate (typically from 0.1 to 0.7 grams/ton).

Operation stability in association with a very high efficiency classifier

The stability of FCB Horomill® combined with the highly efficient FCB TSV™ Classifier is also a major advantage for production of even finer cement, a target currently shared by all cement producers. While vertical mills need significant water addition to stabilise the mill, FCB Horomill® keeps the finished product dry. In trials carried out in Fives FCB's Research & Testing Center and adequate classifying conditions, very high fineness level at more than 7000 cm²/g was reached with CEM I.

Conclusion

With over 60 machines in operation for cement among 34 different cement companies, FCB Horomill® is a well proven innovation in comminution technology, with a unique design providing waterless, low energy consumption, reliable and flexible production and best process conditions to achieve competitiveness targets. ■

More information from Chrystelle Lucidarme,
Tel: +33(0)3 20 43 77 54 / www.fivesgroup.com

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a.b.e. products used for silo rehab at Caledon breweries

a.b.e. Construction Chemicals supplied a wide range of waterproofing and concrete repair products for the refurbishment of dozens of grain silos at SAB Miller breweries in Caledon, in the Western Cape.

a.b.e. is part of the Chryso Southern Africa Group.

Steff Dalton, a.b.e. technical sales consultant, says that to waterproof the 56 silos, a.b.e.'s Index Fidia P thick non-woven polyester-reinforced membrane was applied to the silo walls 4 mm thick by torch-on fusion by the applicators, Vertical Logic, who accessed the 34-m-high silos via rope access.

"Index Fidia P membrane is a compound of distilled bitumen and polymers. After mixing, the polymers are evenly dispersed

throughout the matrix and provide the product with excellent stability and durability at both high and low temperatures," Dalton states.

He says the upper face of Index Fidia P's membrane is treated with serigraph talc, which prevents problems when unrolling the product. The lower face is covered with a sacrificial polyethylene film and the roll is then embossed to assist in the rapid burn-off of the polyethylene film during the torching operation and allows good vapour diffusion."

a.b.e. silvakote bituminous aluminium protective coating, a.b.e. super laykold and a.b.e. superlaycryl were applied as additional waterproofing to a total area of almost 3000 m².



Inspection of the Caledon breweries' silo roofs and work in progress on the refurbishment project for which a.b.e. Construction Chemicals supplied a variety of products.



For the concrete repair part of the project, a.b.e. supplied epidermix 344, durarep FR, epidermix 389, Dow Corning 888, and durabond GP:

- a.b.e. epidermix 344 is a two-component, solvent-free, polysulphide-modified epoxy adhesive. It can bond fresh (plastic) concrete to existing concrete, plaster or brickwork and provide a damp-proof barrier in the concrete matrix.
- a.b.e. durarep FR is a polymer modified, fibre-reinforced structural repair mortar which is chloride free, ready-to-use, and non-shrinking.
- a.b.e. epidermix 389, used for sealing the concrete cracks, is a two-component, low-viscosity modified epoxy crack injection compound.
- Dow Corning 888 silicone sealant was used for sealing joints totalling about 140 m in length. Dow Corning 888 – widely used to seal joints on highways – can seal transverse contraction and expansion joints, longitudinal, centre line as well as shoulder joints in concrete.
- a.b.e.'s durabond GP was used as a primer/bonding medium for the concrete repairs.

Dalton specified the product packages for the waterproofing and concrete repair and trained Vertical Logic, who are now approved a.b.e. applicators. The Cape Town-based company provides rope access services to industries for work in areas where it is not practical to use traditional methods of access such as scaffolding or hoists.

a.b.e. Construction Chemicals will this year provide a.b.e. silocoat elastomeric cementitious coating for the second phase of the silo complex refurbishment. The coating has been designed to be easily mixed on site using a slow-speed drill and paddle, and when applied to the silos' substrate forms an elastomeric impermeable membrane.

Some of the features of a.b.e. silocoat include:

- Able to withstand high positive and negative hydrostatic pressures;
- Effective barrier to sulphates and chlorides and low pH;
- Excellent crack accommodation after immersion;
- Long working life;
- Bonds to green or damp concrete;
- Easy application by brush, roller or spray. ■

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

Bardene development benefits from Concrete Canvas

As a result of Kaytech's supply of Concrete Canvas, a revolutionary new class of construction material, a property developer not only benefitted from substantial short-term savings but will also gain from significantly reduced maintenance costs in the long term.

The site was in Bardene, a suburb of Boksburg, Gauteng, where Similan Properties was developing a residential estate during October 2017. The estate included parks and grassed areas as well as an attenuation pond that was originally designed for storing water and slowly releasing it into the stormwater system.



Applying the transparent hybrid adhesive on Concrete Canvas overlaps.

With Down to Earth Civils in charge of construction, the project was well under way when the Endecon Ubuntu consultant discovered an inadequate water supply for irrigation of the estate's green areas. Seeking a suitable solution to convert the attenuation pond into an irrigation pond, the construction company proposed the use of Concrete Canvas, a flexible, concrete-impregnated fabric that hardens with hydration to form a thin, durable, waterproof concrete layer. Essentially, this innovative product is 'concrete on a roll' that completely negates the need for plant or mixing equipment.

Forming part of a new category of construction materials called Geosynthetic Cementitious Composite Mats (GCCMs), Concrete Canvas consists of a three-dimensional fibre matrix containing a specially formulated dry concrete mix. A

PVC backing on one surface of the mat ensures excellent impermeability. After hydration, either by spraying or by full immersion in water, the material sets. The fibres then reinforce the concrete preventing crack propagation and providing a safe plastic failure mode.

Realising the enormous benefits provided by this product, Endecon Ubuntu had no hesitation in specifying Concrete Canvas CC5 (5 mm thick) for the project. Prior to installation of Concrete Canvas, culvert walls were constructed around the sides of the pond.

Because underground water was saturating the base of the pond, a drainage system that will feed water into the pond via a non-return stop valve was specified.

The user benefits of Concrete Canvas are numerous: supplied in man-portable rolls with pre-mixed concrete, the need for mixing, measuring or compacting is eliminated; hydration of the product is the only requirement; the speed and ease of installation (up to 200 m²/hr is achievable) equates to a far more cost-effective solution than conventional concreting, with far less logistical complexity; and its low mass and low carbon technology uses up to 95% less material than conventional concrete.

On completing the project, 650 m² of Concrete Canvas CC5 was installed as lining for the pond.

The flexibility of Concrete Canvas provides excellent drape characteristics that follow any ground profiles or surfaces on existing infrastructure. To ensure impermeability, a transparent hybrid adhesive, together with screws, was used on the joints.

When comparing its durability, Concrete Canvas is twice as abrasion-resistant as standard OPC concrete, provides excellent chemical resistance and good weathering performance; and does not degrade in UV light.

With its solid, 40 MPa strength and significant water retention ability, maintenance is reduced to an absolute minimum, making it the perfect solution for this type of application.

Besides channel lining, Concrete Canvas can be used for slope protection, bund and culvert lining and remediation of existing concrete structures. ■

More information at
www.kaytech.co.za



L13, L18, L22



Terrafix



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4x4 Multi



L11, L12, L15, L16

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Lightweight vibrators for precast concrete deliver high performance and extended life

Martin Engineering, a global leader in industrial vibration technology has introduced a lineup of powerful, long-lasting vibrators for precast concrete applications. Lighter and easier to transfer from one form to another than comparable vibrators, the Martin® U1-1600 High Frequency Electric Vibrator delivers the force required to minimise voids and provide a smoother surface finish. With greater equipment reliability and service life, these competitively priced units offer improved quality and durability, reducing the overall cost of ownership.

“Surface voids – also called bug holes – are usually found on vertical casts as a result of entrapped air or water,” explained Larry Horrie, Vibration Product specialist at Martin Engineering. “Using a powerful high-speed vibrator to expose these bubbles improves material consolidation for exceptional strength and a flawless finish.”

Constructed with durable lightweight materials, the unit weighs only 10.4 kg, compared with other precast concrete vibrators that average 15.8 kg. Using standard mounting brackets, operators with several vibrators affixed to a form have found the U1-1600 easily replaces heavier units and offers a longer equipment life with less cumulative weight.

The design also makes the unit more portable. Using the easy-grip handle attachment, it can be quickly swapped between multiple forms. With male/female wedge brackets, the vibrator slides snugly into a V-shaped slot that’s specially designed to withstand heavy forces.

The U1-1600 provides 816 kg of force from a 115 volt (12 amp) electric rotary motor running at 9000 RPM. Triple-



The Martin® U1-1600 High Frequency Electric Vibrator extracts bubbles from the form to reduce finishing labour.

dipped and shock-resistant class F windings are designed to operate under high internal temperatures for the sustained periods required for these applications. The long 3-prong power cord features a switch box for overload current protection.

The oversized ball bearings that carry the high frequency vibration are lubricated for life and protected from abrasion and wear due to the unit’s tight seal construction. Designed with an aluminium housing and durable O-rings between the end caps, the internal workings of the motor are protected from dust and water, even during pressure washing.

“Vibration speed is a big factor in precast concrete,” Horrie pointed out. “Without the higher frequency, water and air bubbles aren’t adequately driven to the surface, which can require extra labour to treat and may affect the structural integrity of the cast over the long term.”

In most cases, after the cast leaves the form there is a need for manual touchup because bug holes are generally revealed only once the concrete has set. The more prevalent the small holes on the surface, (generally less than 2.5 cm in size), the more labour is required to fix them. By using a high RPM portable vibrator, operators can extract bubbles from anywhere in the form, resulting in considerably less finishing labour.

“The U1-1600 is made in America and comparably priced with its foreign competitors, but manufactured with higher-quality materials and more rugged construction,” Horrie concluded. “Longer lasting and more reliable products are a cornerstone of Martin Engineering’s manufacturing philosophy, and the U1-1600 is a good example.”

Martin Engineering is a global innovator in bulk materials handling, developing new solutions to common problems and participating in industry organisations to improve safety and productivity. The company’s series of Foundations books is an internationally-recognised resource for safety, maintenance and operations training and can be downloaded as a PDF from the Martin website. Martin Engineering products, sales, service and training are available from factory-owned business units in 17 countries. ■



The powerful high-speed vibrator improves material consolidation for exceptional strength and finish.

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Back to the drawing board? Hell no!

By Vaughan Harris, executive director – BIM Institute

Dear Traditional Architect,



I regret to inform you that we no longer draw lines on the computer screen. The process of designing includes building a digital model with parametric components loaded with specification data and information.

Allow me to introduce you to the new term BIM (Building Information Modelling.) It is, in fact, the most overused word in all architectural journals, in seminars and in daily architectural discourse.

I suggest that you begin learning to use Revit or Archicad. If you are already using these tools, I hope you are exploring their full BIM capabilities,

permitting the computer to do some of the work for you.

While you may love your old design software or drawing boards, pencils and paper, paper, paper, the digital world is moving faster than you can fathom and it is time to embrace this before it's too late. Who wouldn't love to produce construction drawings faster while avoiding conflicts between components? Wouldn't it also be cool to see your designs in 3D and not have to refer back to Sketchup or AutoCAD to make great client presentations and all your other glossy brochures?

Now, an architect's job is fundamentally to design, manage and sometimes coordinate projects, but BIM is not all about you. It's not merely a 3D graphic representation, but a virtual model designed to evaluate the construction and performance of the built reality. Properly implemented, BIM delivers projects more efficiently, of higher quality and more safely. It also provides an information asset that can optimise the management (and performance) of the completed facility and, upon wider adoption, has the potential to revolutionise the way public infrastructure is planned and public services delivered.

BIM isn't just a design software program, nor is it simply a 3D model converted from a 2D drawing. It includes a database or series of processes that include the model elements as well as vast amounts of information that contribute to a healthier project life cycle. BIM is too often viewed in multiple file formats, becoming a disconnected process that quickly becomes complicated. Thus many architects become sceptical and write BIM off as a sales ploy for software vendors or as creating additional work that the client must be billed for.

Many architects criticise BIM as it forces them to produce designs counterintuitively to how they have been trained, and how they think. BIM design demands precision and information "too early in the design process," while drawing and sketching with pencils is familiar and comfortable.

BIM design amplifies the need for data, not just physical size and location, but other data that may not even be available until you have a schematic design concept. Data that is traditionally generated during the construction document phase is suggested (or even demanded) much earlier in the process. This requires a shift in the fee structure when convincing clients to invest more capital earlier to generate the model can prove challenging on projects. This is especially true for projects that may never make it past the Schematic Design phase.

Does BIM really matter to owners?

In order to adopt a BIM strategy across all projects, we need to understand the owner's interest towards healthier buildings. We also need to consider the impact that the adoption of BIM will have on both private and public sector bodies, on construction related service providers, main contractors and their supply chain and facilities management.

If BIM is applied correctly by designers and contractors, many of our building can and will feature enhanced ventilation to improve air quality, layouts that encourage physical activity and take into account our lifestyle preferences. Then we will possibly see project team connectivity and the need for transparency on product information.

More than half of owners are not aware of the financial and lifestyle benefits BIM can bring to their buildings, which include:

- Improved tenant/employee satisfaction with the building
- Happier and healthier building occupants
- Improved construction quality
- Healthier buildings



Summary

BIM is prolific and is implemented across 54 countries across Europe, Australia, Singapore, Canada and the USA. The UK government mandated the use of BIM to Level 2 on all central government projects in 2016. Its use in the US is widespread. Singapore is seen as an innovator in this area requiring that planning applications be submitted in BIM format – an idea that has recently been applied by the cities of New York and also Dubai.

BIM is fast becoming an essential requirement for informed consumers of construction services across the globe. Is it not time that South African architects, engineers, contractors and project management professionals start moving towards improved ways of working? ■


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Concrete's important role hides in the bush

There's more to the age-old material's contribution to wildlife than meets the eye, writes Jan de Beer.

Of all the unlikely places, a bush cottage in Kruger Park recently underlined the versatility and functionality of concrete – and how this age-old material blends so well with nature and helps preserve wildlife. Much of concrete's sustainable role in the wild goes unnoticed and is taken for granted.

We were staying at Kruger's Berg-en-Dal in one of the camp's revamped cottages. In these modernised units, the innovative potential of concrete inspired the designers to create rough circular mini-bird baths in the edging around the concrete brick paving on the patios. Not massive baths: just about 15 cm in diameter and no more than 5 cm deep – and most inconspicuous.

But after rain, the proliferation of cavities fills with water and the birds welcome their new bathing and drinking facilities. I kept filling the mini-baths at our cottage as soon as they had dried up after prolonged sipping and hectic bathing, attracting plenty of users every day: colourful robins, noisy francolins and even squirrels revelled in their new water supply.

Kudos to SANParks for a clever, inexpensive way of adding to small animals' quality of life.



A robin revelling in one of Berg-en-Dal camp's mini-birdbaths created on the cottage patio's paving edging.



Yellowstone National Park is using porous concrete in all walkways.

Conventional concrete bird baths have always been placed at strategic places in Kruger. Concrete is, in fact, widely used in this and most other South African nature reserves: for dams, bridges, culverts, signposts, paving, benches, hides, braai stands, and camp cottages, decks for campers and caravans.

In the North West Province, Pilanesberg National Park has some noteworthy concrete features.

At Kwa Maritane Bush Lodge in Pilanesberg, large segments of precast concrete form the walls and roof of a 180-m-long underground tunnel leading to a waterhole linked to the cottage TV sets by webcam. Walking in the prescribed absolute silence through the well-lit subterranean passage feels like being in a mining tunnel, but any similarity vanishes when you hear an elephant's stomach rumble from ground level just a few metres away from the hide's benches.

The Hide Safari Camp in Zimbabwe's Hwange National Park has a similar, but much smaller, underground concrete tunnel to a floodlit watering hole.

In Pilanesberg, in 1995, the multiple-arch Lengau Rubble Masonry Concrete (RMC) dam was built near the Bakubung Gate. RMC – a composite material, derived from placing uncut stone randomly in a bed of mortar – is often used in mass gravity and arch buttress dam construction and has been used throughout the world for thousands of years. Nearly 25 years later, the Lengau Dam is standing the test of time. Hardly surprising because in AD122, the Romans used RMC to build Hadrian's Wall and in 1679 Van Riebeeck and Co built Cape Town's Castle of Good Hope with similar material.

Further afield, America's Yellowstone National Park is using porous ('thirsty') concrete in walkways throughout the park. The new Flexi-Pave concrete is made with stones and recycled tyres, and Michelin has provided assistance in installing the paving. The pathway project began in 2015 when 10 Michelin employees spent a week replacing aging, cracking concrete pathways at the Old Faithful geyser basin with sustainable, environmentally friendly pathways. The decades-old concrete walkways did not allow rainwater and snowmelt to seep through evenly, a process that is critical to this environmentally sensitive area. The new Yellowstone pathways enable ground water absorption, do not crack over time, and create a more comfortable experience for visitors.

America's magnificent Grand Canyon, also employs concrete in a special manner. The national park authorities have specified custom-made culverts with exceptionally strong 'lids' on the top to withstand the weight of the constant tour buses that carry a total of over five million tourists to this national treasure every year.

In the 'green age' we live in, increasing demands are now made on building contractors when carrying out new concrete projects in nature reserves throughout the world. It has become customary to stipulate that concrete shall only be mixed in waterproof trays and that the building site be maintained so that no water run-off from the mixing area can occur to contaminate rivers and spruits.

So, with South African cement producers having established several wildlife sanctuaries and being heavily involved in conservation projects, concrete's positive interaction with all things wild and wonderful is firmly established locally.

Now, if Pilanesberg National Park would just consider concrete to improve its shocking road networks, there'd be even more reason to celebrate. ■



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