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www.transporteolutionwest.com

21 – 22 September 2021

Durban, South Africa



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www.transporteolution.com

About dmg events - South Africa

dmg events is a leading organiser of face-to-face events and a publisher of trade magazines.

We aim to positively impact the African economy and community by providing platforms for public and private sector professionals to connect and forge strong relationships that will drive the future of the African continent.

dmg events has a portfolio of 80 events managed across 11 offices worldwide with two of those offices based in South Africa. The team organises 14 events in Africa, bringing together more than 30,000 professionals from the Construction, Infrastructure, Coatings, Mining, Transport, Food & Beverage, Trade and Hospitality sectors.

Contact us

If you have any questions about our events, please contact one of our South African offices on the numbers below or email info@dmgevents.com

Johannesburg: +27 11 783 7250

Cape Town: +27 21 700 5500



AfriSam has supplied many iconic and award-winning projects such as the Zeitz MOCAA

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Building resilience and adapting to a **VUCA WORLD**

If you have not yet come across this term, VUCA is an acronym standing for volatile, uncertain, complex and ambiguous.

The U.S. Army War College introduced the notion of VUCA to describe the state of the multilateral world at the end of the Cold War. After the terror attacks of 9/11, VUCA took hold, especially in the business world.

COVID-19 2020 will certainly go down in history as one example of just how uncertain our world is.

Over the past few months, we have had to literally tear up the proverbial rule books and redefine how and where work gets done, how we sell, how we market, how we collaborate and how we create value in a world none of us could have ever predicted or see coming. Like many industries the construction sector will have to respond quickly and develop – new solutions for new challenges, in real time.

At dmgevents, our core mission is to build and support businesses by bringing people together. We feel it is our responsibility to help these very same businesses today, addressing the unprecedented challenges the COVID-19 outbreak is posing around the world and of course closer to home.

With our next African Construction and Totally Concrete Expo, Cape Construction and KZN Construction Expo, powered by Big 5, scheduled to take place only next year, supporting the industry has been our number one mission for the past eight years in South Africa and for four decades globally, we commit to continue to serve our community of construction professionals around the globe by connecting people and sharing knowledge beyond our face-to-face events.

Rather than putting an end to your communication we are pleased to present two, first-to-market and unique digital

offerings for you to STAY CONNECTED with your customers in a meaningful way.

In the coming weeks we will also host the first digital construction event: The Big 5 Digital Festival Africa. Leading industry brands are getting ready to showcase their latest products and construction solutions from 21 - 22 July, delivering insightful content and lead generating opportunities.

As the first of its kind in Africa, the digital event will bring together 1000+ influential decision-makers, government officials, construction innovators, and key stakeholders from across the continent and beyond for two days of thought-leadership, collaboration, and networking opportunities.

Our team have also developed a series of digital opportunities that will offer content that is engaging, relevant and informative and will run across the year. Visit www.africanconstructionexpo.com/digital-content to learn about our webinar, podcast and product spotlight opportunities.

Now is the time to find ways and means to share your message and to stay connected with the industry to continue the conversation and make critical connections to build understanding, relationships, unity and feasible ways to support one another.

Please feel free to contact us at any time for any support, or with any questions, you may have regarding our activities continentally and in South Africa in the coming year, and more importantly, to see if there is anything we can do to help your business during these terribly difficult times. ■

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BUILDING AFRICA TOGETHER



ENHANCE YOUR PRESENCE AS WE BUILD UP TO OUR LIVE EVENTS CONTACT:

STEVE LEE T: +27 21 700 5507 E: SteveLee@dmgevents.com



29 JUNE – 1 JULY 2021
JOHANNESBURG



8 – 9 SEPTEMBER 2021
CAPE TOWN



21 – 22 SEPTEMBER 2021
DURBAN



Effective sewerage systems for infrastructure development and maintenance

Effective sewerage systems are an essential element of infrastructure planning, development and maintenance. They ensure that communities live in hygienic conditions through the collection, conveyance, treatment and disposal of wastewater in a non-hazardous manner to people and the environment. A critical function of sewerage systems is to prevent water-borne diseases from becoming active.

The success of such systems is dependent on the design, good quality materials and products, sound installation and construction practice and continuous monitoring and maintenance to ensure effectiveness throughout service life.

Rocla manufactures sewerage system products carrying the CMACS Mark of Approval and offers a range of products for application in sewer reticulation:

- Reinforced concrete pipes with HDPE lining – The HDPE lined concrete pipe offers the advantages of a conventional concrete pipe as well as a plastic pipe in that it maintains its shape under load and is inert to acid attack. They are an ideal product for large diameter gravity pipelines in almost any condition. The standard HDPE lining is light green and 3mm thick. A HDPE capping strip is welded over the joints after installation to protect the exposed concrete at the joints from corrosive products. These pipes are available from 750mm diameter pipes.



Rocla Pipes

- Reinforced concrete pipes with a sacrificial layer – The company manufactures the following types of reinforced concrete pipes with a sacrificial layer: The host pipe is manufactured from ordinary Portland cement (OPC) concrete with either dolomitic or siliceous aggregate and the sacrificial layer is manufactured with dolomitic aggregate in an OPC concrete or calcium aluminate cement (CAC) concrete.
- Reinforced concrete pipes with Xypex BIO-SAN C500 – Concrete pipes with

Xypex BIO-SAN C500 are offered for 300mm to 600mm diameter pipes. Xypex BIO-SAN C500 is a uniquely designed

- A mixture for integral, long-term protection of concrete in harsh sewerage conditions with high levels of H₂S that causes microbial induced corrosion in pipelines.

Infrastructure accessories supporting precast concrete sewerage accessories include:

- Pipes with access hole
- Bends – custom made bends of up to 30 degree can be supplied
- Manholes – HDPE lined manhole chambers, reducer slabs and cover slabs



HDPE Lined Pipes

Rocla products have been utilised in the Waterkloof Quarry and the Nellmapius Ext 22 housing project both in Pretoria, as well as for the Polokwane Eastern Ring Road and rehabilitation of the D528 in George's Valley and the Great North Plaza in Limpopo. Projects in Cape Town and Mozambique have also sourced the expertise that Rocla can offer when it comes to infrastructure specialist requirements. ■

Building skills for a **complex and volative world**



Donique de Figueiredo, employee engagement and talent manager at Concor Construction

It's a VULA world that today's youth will need to be prepared for. VULA is an acronym gaining traction to describe a volatile, uncertain, complex and ambiguous environment. For Donique de Figueiredo, employee engagement and talent manager at Concor Construction, agility is one of the company's core values – a quality that has been tested by the COVID-19 pandemic.

Confronting and challenging

"Now more than ever, we are living in times of volatility, uncertainty, complexity and ambiguity," says De Figueiredo. "Globalisation, technological advancement, the fourth industrial revolution

and pandemics like COVID-19 are our reality." In line with the company's focus on education and skills development as critical drivers of transformation, she says empowered youth can adopt an agile attitude that will prepare them to confront and conquer challenges.

External initiatives target youth across the education spectrum, from senior primary school through to tertiary education and beyond – to out-of-school youth and even young entrepreneurs. At schools, this includes extra tuition and resources for learners, focused on science, technology, engineering and mathematics.

Vula turning potential into excellence

There is also a targeted bursary programme aimed at students interested in the built environment, and a graduate mentorship programme to absorb graduates as interns. Out-of-school youth can participate in learnerships, which the company also uses to identify talent. Start-up enterprises within the built envi-



Concor's external initiatives extend across the education spectrum, and include Grade 7 mathematics support

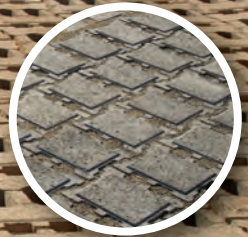
ronment value chain are supported by Concor's enterprise and supplier development programme. Internally, Concor develops future leaders within the business through leadership development of young people who show exceptional performance and high potential.

"We focus on youth to build a talent pipeline, not only for our business and our industry but for the general economy," says De Figueiredo. "In a country where youth unemployment exceeds 50%, our investment in youth development is aimed at serving the greater good." ■

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TECHNICRETE



Nicholas McDiarmid,
Editor

In my 15-plus years as an editor in South Africa's infrastructure and built-environment, I know you don't need me to tell you that we have weathered many storms. The Concrete Industry is the glue that holds our construction sector together. Concrete is concrete. And it needs to be heard right now. At the service and the mercy of so many stakeholders and their fortunes, the Concrete Industry fundamentally needs projects. Projects may be the only catchword until they start to flow again.

As a crucial economic buttress, it is time for President Ramaphosa to clear the way for serious public sector investments in construction. There are no losers in this call.

In talking to a range of business leaders, associations, small and large companies, the last months in this editor's seat have been tough. Not because of the effects of COVID-19 on the industry I work in, but because of the unrelenting yearning for movement in our country's development – and I am not going to shy away from the fact that we are not seeing anything close to what any form of recovery needs.

What do we need? When do we need it?

Let's start with housing. I can share the happy news that our pre-cast industry is ready to go – with innovations, with materials, with stock ready to build quality, cost-effective homes. The logistics are ready, the emerging and established contractors – are ready too. The Consulting Engineers, and the Civils – they have always been ready. We need announcements, we need plans, and we need tenders rolling in. Learning about and specifying pre-cast concrete efficiencies into the next wave of public housing construction projects is overdue, and through the next weeks, **Concrete trends** will be exploring the communications, consultations and the numerous provincial and national bodies working to make this a reality.

'Ready-to-go' – The National Federation for the Building Industry

Aubrey Tshalata, President, National African Federation for the Building Industry (NAFBI), is one of the key voices linking the industry with government, and engages from the level of the presidency onwards. We have been engaging through the Public Private Growth Initiative (PPGI) which is chaired by President Ramaphosa. This initiative was started by Roelf Meyer and Professor Nick Benedel of the Gordon Institute. The structure brings together all of the directors' general from government departments and the president asked us all to submit lists of 'ready-to-action' projects, which originated from the President's investment conference.

Prominent amongst these projects is the cluster of projects from the South African Roads Agency (SANRAL). The tenders are ready to be released. NAFBI has given mentorship to over 540 smmes that are going to be subcontracting on these SANRAL projects. With over 22 000 kms of road under its perview, we are really looking forward to guiding the action on this tranche of projects. The consultants have been appointed, and the projects will start as soon we go back to work. On the 21 April I was joined by Mike Wylie (former CEO of WBHO), and Louwtjie Nel (current CEO of WBHO) in talks with CEOs of construction companies about other 'ready-to-go' projects, including the extension of the Durban Harbour. In the provinces, the obvious projects emerging are low-cost housing projects. Solving the challenges here is a particularly interesting space." One of the key considerations for all rapid low-cost housing projects is in pre-cast concrete products.

And back to work

It is a new pleasure to be writing this last paragraph from my desk at the dmg events offices in Cape Town. How many months has it been? It is clear from this vantage point that as a construction community, it is the emerging contractors who need equal support in creating and maintaining COVID-19 level health and safety standards on-site. Many of the specified requirements are reportedly beyond the reach of many emerging contractors, and we add our voice to NAFBI's in spreading the word that support is out there. ■



L13, L18, L22,
M10, M15



Terrafix



Terracrete



4x4 Step Block



L11, L12, L15, L16

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QUALITY

The forefront of AfriSam's operating ethos

Quality, more than ever before, drives decisions of customers, developers and property owners as they demand value for money, durability and the best service possible.

AfriSam, as a trusted manufacturer and supplier of construction materials, has put quality at the forefront of its technical solutions offering for the past 85 years. Quality policy guidelines underpin this leading construction materials company's core values: People, Planet and Performance. These are the core principles on which we base a culture of customer satisfaction.

Quality cement

"AfriSam's approach to quality cement products is well-known with a significant investment of resources in its certification to the SANS (ISO) 9001:2015 standard for quality management systems" says Alta Schoultz, technical consultant to AfriSam.

All AfriSam's cement products meet the conformity requirements of SANS 50197-1.

Adherence to the technical specifications of 'SANS 50197-1 Common Cements' is continually evaluated. The SABS regulatory division inspects the manufacturing sites and their test protocols on a regular basis to sample and test the cement to ensure product conformity.

Process control test results from all AfriSam laboratories are fed into a cement-monitoring programme to observe compliance. On-going compressive strength testing, using standard reference materials, monitors the performance of AfriSam cements in concrete.

The electronic monitoring report correlates all these results and gives managers immediate access to trend analysis reports. Maintaining performance criteria depends on the instant action this kind of monitoring facilitates.

Mechanical and chemical testing

Mike McDonald, manager of the AfriSam Centre for Product Excellence, explains that the laboratories at its Roodepoort operation have ISO 17025 accreditation for several mechanical and chemical tests.

Accreditation confirms that AfriSam's laboratories operate competently and generate valid results for accredited tests, thereby promoting confidence in the results.

The e-mark

In addition to meeting the technical conformity criteria of SANS 50197, AfriSam's bagged cement also carries the



All AfriSam's cement products meet the conformity requirements of SANS 50197-1

"e-mark" which is attained by complying with SANS 1841. This is the standard governing the control of the quantity of contents in prepacked packages within the prescriptions of the metrology legislation. AfriSam voluntarily participates in this e-mark scheme to add confidence that the mass of its bagged cement products meets the minimum quantity.

AfriSam's long-standing relationship with SABS is an example of its policy to support and empower SOE towards creating a positive African future. This strong and trusted collaboration with SABS contributes towards AfriSam being known as a well-respected and admired African brand.

SABS certification is the highest mark of standards across Southern Africa, and conveys the credibility enjoyed by AfriSam's complete range of cement, concrete and slag products.

Customer experience

The most recent findings to emerge from AfriSam's biannual Voice of Customer (VoC) survey clearly demonstrates



AfriSam takes a holistic approach to quality and ensures it provides customers with a quality experience over a number of touch points



“ AfriSam knows that quality extends beyond product quality; we take a holistic approach, ensuring that we provide our customers with a quality experience”

that customers choose AfriSam because of its approach to quality. The survey, based on sound research principles and methodology, is conducted twice annually by Consulta, an independent company.

Statistical analysis is done after each survey to showcase significant changes, reliability and validity of the study and the results are based on 95% confidence interval and 5% margin of error.

Ilonka de Magalhaes, AfriSam’s customer experience manager, explains the importance of accurately measuring customer experience. “AfriSam knows that quality extends beyond product quality; we take a holistic approach, ensuring that we provide our customers with a quality experience over a number of touch points: product quality, technical support, on-time delivery, and availability of product; sales staff, contact centre staff and general administration of all accounts. Our customers rate our quality as higher than any of the other key players in the industry.”

Concrete regulation and the readymix market

Whilst the cement industry is highly regulated, the readymix concrete industry does not enjoy the same level of oversight, and non-conformance is rife and the risks of structure failures are high. The readymix concrete market’s very low bar-

riers to entry have resulted in unscrupulous suppliers being able to set up readymix plants at very low cost, sacrificing quality for profitability.

Amit Dawneerangen, general manager of AfriSam’s readymix division, emphasises that while pressures from the subdued construction industry necessitate stringent cost control, AfriSam will never sacrifice quality or customer service. Nowhere is this more evident than in the strict adherence of AfriSam’s readymix operations to environmental protocols in the managing of dust suppression and the use of recycled water.

Readymix and aggregate manufacturer of the highest standard

Significantly, AfriSam is the only readymix concrete (and aggregate) manufacturer to have both industry and external – SABS – accreditation. Many of the readymix concrete suppliers do not carry any certification nor do they subject themselves to external auditing.

In addition, AfriSam encourages a competitive operating environment, based on upholding the same standards (quality and ethics) and regulatory compliance. The company often has to defend the readymix market when a customer has “burnt his fingers” by using the cheapest option.

Carbon Tax came into effect in June 2019 and has had a direct impact on the price of concrete. To mitigate this, AfriSam instituted focused research & development programmes to refine mixes, resulting in the utilisation of more reactive



AfriSam is the only readymix concrete manufacturer to have both industry (SARMA) and external (SABS) accreditation

cement, the optimal use of supplementary cementitious materials (SCMs) and improved admixture additions without sacrificing strength or quality.

Quality beyond its frontiers – AfriSam’s industry footprint

The testament of AfriSam’s commitment to quality is that it goes beyond its immediate business to the extended support for initiatives that promote quality across the industry, as a whole. AfriSam was the anchor sponsor of the prestigious Concrete Society of Southern Africa’s 2019 Fulton Awards, which celebrates excellence in concrete. It is more than significant that of the 31 finalists, 15 projects were constructed using AfriSam readymix concrete.

“ AfriSam celebrated its 85th birthday this year, and we would not have existed for this long if we did not uphold quality standards.”

Dr Grizelda du Toit, cement project professional, says that AfriSam not only invests in individual development of staff, but also works closely with tertiary institutions to support and promote research in cement and concrete.

Completing the quality chain for the good of the industry, AfriSam is a staunch supporter of the various industry bodies – The Concrete Institute (TCI), Concrete Society of Southern Africa (CSSA), Concrete Manufacturers Association (CMA) and the Association of Cementitious Material Producers (ACMP).

In a quest to strengthen the mandate of these bodies and to monitor crucial quality issues, AfriSam is actively advocating the consolidation initiative. This drive is currently underway to ensure that all these bodies come together as a credible service through a unified voice for the good of all stakeholders in the construction industry.

AfriSam’s legacy

Richard Tomes, AfriSam’s sales and marketing executive, sums it up. “AfriSam celebrated its 85th birthday this year, and we would not have existed for this long if we did not uphold quality standards.”

Tomes adds that AfriSam has the capacity and competency to complete major projects often requiring complex and highly



AfriSam celebrated its 85th birthday in 2019



AfriSam works closely with tertiary institutions to support and promote research in cement and concrete

technical demands. This includes the company’s cement, aggregate and readymix footprint, complemented by concrete technologists with the internationally accredited Advanced Concrete Technology qualifications as well as postgraduate degrees in chemistry and various engineering disciplines. Some of the recent, and in some instances, award-winning projects, include:

- Mall of Africa
- The Leonardo
- Boitekong and Rustenburg Wastewater Treatment plants
- Mafube Colliery
- Zeitz Mocoa
- Saldanha Tippler
- Discovery Head Office
- Alice Lane
- PWC
- Deloitte Head Office

Quality is not an optional extra for AfriSam – it is The AfriSam Way. ■

Lets make it together

The 'local is lekker' slogan has been around for some time, but now more than ever, there needs to be a fundamental shift in consumer purchasing behavior, in line with supporting local products, if we as a country are to preserve jobs and revive the economy.

Although the government has commendably made available a R500 billion fund to boost the economy during the COVID-19 crisis and beyond, everyone is aware that it's going to take more than that to keep South Africa standing and to keep the economy fluid.

Energetic growth for the economy

For some time now, even before the COVID-19 crisis, the government has, in addition to assistance offered to local manufacturers, been encouraging the nation to buy local to assist in job creation and infuse the economy with positive growth and energy. Since the COVID-19 pandemic, this has become not only more important, but also sometimes the only option. Globally, this may become the norm for the foreseeable future – already countries are looking at 're-shoring' their manufacturing efforts to mitigate the risks that globalisation has brought.

Local booms and busts

It's not the first time that South Africa has faced a need to reverse the negative impact of imports, albeit for different reasons. In the late 1980s South Africa's footwear manufacturing industry was booming, with 900 factories servicing the industry. But then the first wave of cheaply made Chinese imports arrived and brought with it a flood that would decimate the industry, reducing this number to a mere 130 factories today



– a number likely to decrease post the COVID 19 pandemic. By 2003 local companies were desperate for a solution. Home-grown safety footwear leaders Bagshaw Footwear, Beier Safety Footwear, United Frams and Wayne found themselves locked not only in a battle for survival with imported products, but also amongst themselves. Collaboration was the only solution to defending the local safety footwear manufacturing industry and this resulted in a merger that brought about the formation of BBF Safety Group, the largest manufacturer of safety footwear in Africa.

“Protecting and creating jobs is imperative – we operate from a base of looking after our own communities. If we do not change our consumer buying habits now in line with locally manufactured products, we will all have some role to play in the unemployment figures.”

For many years, BBF Safety Group's mission has been to ensure economic empowerment, transformation and development in South Africa, and have forged numerous mutually beneficial partnerships with local SMMEs to create a network of highly committed, professional and efficient local suppliers.

"Protecting and creating jobs is imperative – we operate from a base of looking after our own communities. If we do not change our consumer buying habits now in line with locally manufactured products, we will all have some role to play in the unemployment figures. Now, more than ever, we have to put our people first." says Silvio Ceriani – Group CEO, BBF Safety Group.

Keeping it local

Recently, BBF Safety Group experienced an import issue with the production of their PPE masks, which although manufactured using majority local materials, required two specific components to be imported. To counter this and drive localisation, BBF Safety Group turned their attention to local manufacturers with the potential to deliver on these components. Through incentives and support offered by the government, a local supplier adapted their production to meet the specifications required in the essential filtration component, which is now being manufactured locally. Through collaboration with a South Africa based



Nikki FFP2 HR6502 dust mask

company, the nose clips are now being manufactured locally resulting in a FFP2 mask that can be 100% locally sourced and manufactured.

"We are proud of our team who worked with other South African companies to deliver on solutions that benefit us all as a country. It is testimony to the talent within our country and the potential we have to source and innovate locally, defending and, if supported, creating local jobs. It's a great accomplishment," says Silvio Ceriani – Group CEO, BBF Safety Group.

In the coming weeks and months, as South Africa experiences the different levels of lock-down and a slow easing of restrictions on trade and movement, we can expect to see more and more innovation from companies, ensuring that the nation can truly make it together. South Africa, her people and her businesses must stand together to ensure that the changes wrought by the pandemic are positive and effectively give the economy the boost it so desperately needs. ■



What are drugged employees costing your company?

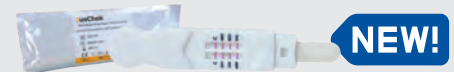


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ALCONTROL

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Personal protective standards

Training, testing and support for those in the business of personal protection.

The outbreak of COVID-19 in South Africa and the consequent rapid requirement for bulk personal protective equipment (PPE) supply, has led to an influx of PPE products from many suppliers and distributors. This has thrown the control of quality and functionality into confusion, and the South African Medical Technology Industry Association (SAMED) is sounding the alarm.

SAMED states that everyone involved – and everyone is involved – in eliminating the COVID-19 virus must be aware of, and scrutinise the standards and guidelines applicable to all products used to prevent, diagnose and treat COVID-19.



Supporting quality to members and non-members alike

To tackle the issue, SAMED is working with its 180 members, to ensure compliance with safety and quality standards, and that licencing required by SAHPRA is adhered to. The organisation is also extending its support and guidance to other medical device suppliers.

SAMED collaborates with the SAHPRA, the South African Bureau of Standards (SABS), the National Regulator for Compulsory Standards (NRCS) and other credible entities to assist local manufacturers and importers in following the regulations and is engaging with a range of stakeholders to find ways to ramp up local production of PPE and other related items.

Govender Bester says that, in addition to being a SAHPRA licensed establishment, companies that supply PPE need to have in place processes for managing adverse events and recall of inefficient or unsafe products.

Quality, testing and training

“In relation to screening and testing kits, respiratory aids and other more complex devices, the supplier also needs to be able to train healthcare providers on the correct use of equipment,” she notes.

SAHPRA has established a dedicated hotline for medical devices, and has issued guidance documents,

including those for rapid COVID-19 serological testing kits.

Detailed information on the regulatory status of different products used in the prevention of the coronavirus infection was issued jointly by the SAHPRA, the NRCS and the SABS. It encompasses facemasks ranging from nonclinical cloth type to surgical (medical) and those that provide respiratory protection; general and medical gloves; and surface, hand and other body sanitisers and disinfectants.

In terms of face masks, the document indicates that general face masks, when not intended for a medical purpose and no claim is made for protection from viruses, do not fall into the SAHPRA's or the NRCS's mandates.

Surgical masks and medical masks are classified as Class A medical devices and are regulated by SAHPRA. Respirator and particle-filtering half-masks (dust masks) are classified as Class B medical devices and must comply with specific requirements as guided by several different Acts depending on their purpose and where they are being used, such as within medical or mining industry environments.

Meanwhile, SAMED, with participation by SAHPRA representatives, will host a regulatory forum – a training webinar for members and all companies operating in, or intending to enter, the medical device sector. ■

Urgency and Vigilance

Since COVID-19 reached South Africa, the procurement and manufacture of crucial protective and testing products has been a matter of great urgency.

A lack of knowledge and experience in navigating the South African regulatory environment could pose a risk to the safety of healthcare workers and patients, and workers in general. With the new opportunities opened up by the crisis for new local and international manufacturers and suppliers, a healthy caution must be applied in assessing what is on offer.

SAMED chairperson Avanthi Govender Bester explains that new hand sanitiser gels, facemasks and diagnostic tools are appearing on the market, and their composition, reliability and appropriate use differ. “This can result in the use of subquality and inefficient products and inappropriate use of such items, which can also cause harm.”

South African Health Products Regulatory Agency (SAHPRA) CEO Dr Boitumelo Semete-Makotlela points out that the critical need for products related to the COVID-19 response has attracted companies that have little or no presence in the South African market.

“It can be difficult to distinguish bona fide suppliers from more opportunistic and unscrupulous suppliers. Through industry collaboration we can safeguard patients and medical personnel and achieve optimal healthcare outcomes.”

Prepare your workplace for COVID-19



**Martin Smith (CEng, BEng Mechanical),
Technical Director –
Buildings, Aurecon
(rebranding as Zutari)**

The COVID-19 global pandemic has triggered unprecedented disruption, impacting organisations across the world. We are acutely aware of the gravity of the situation we find ourselves in as a result of the pandemic. Our workplaces enabled us to be productive and economically active, but now pose profound risks to the health and safety of our employees and our continuous business operation.

We realised some time ago that occupants' health and wellness would become a critical component in commercial buildings. Therefore we made an investment to upskill our teams to achieve the first WELL-rated building on the African continent, namely the flagship Exxaro head office in Centurion for building owner Growthpoint Properties. With the latest COVID-19 crisis on hand, there will be an increased emphasis on the design and operation of buildings for occupant health and well-being.

So how can property owners respond to this challenge and best prepare their workplaces under such circumstances? We take an in-depth look at what property owners can do to prepare themselves and protect their employees:

Understand your business occupancy needs

Full occupancy is unlikely to be possible in the short term and possibly even beyond that. Given the tough economic time we look to be facing, some businesses will scale down on space and increase working from home. For some, their business continuity will depend on saving costs, whilst having a productive workforce, even if that means from home. Your employees would have been 'shocked' into new ways of working, and that changes what is possible going forward. For landlords, this scenario may change the space needs of occupants and require a change in building management technology and practices.

Diagnose your building's infection routes

The virus is understood to spread through multiple infection routes, including surface contact, macro droplets, micro droplets and other contamination spreaders in your building such as your sewer systems. To get to grips with the risks within your building, a comprehensive diagnostic is needed of staff behaviours, organisational processes and the building itself. The physical operations are as important as the technology, including ventilation, air-conditioning, control systems, water and sewerage systems. All these components contribute to the functioning of the building and serve as infection routes.

Prepare immediate, medium- and long-term response plans that align

The aim is to try and find practical solutions that close the gap between your business needs and the risk of infection. These include operational processes and controls and building physical and technological improvements, along with emergency procedures and awareness. The challenge here is not to have a knee-jerk response with short-term actions, but to systematically reduce risk in a manner that is affordable and makes sense in the short and long term.

Aurecon's *Building Health Assessment Tool* is a comprehensive diagnostic of the key operational and physical factors that helps property owners put in place plans to mitigate workplace risks and assists them with resuming business and increasing health and productivity. We use a gap analysis to prepare a short-, medium- and long-term plan that meets your business needs.

To help you respond to COVID-19 risks and prepare your buildings for resumed operations, we have drawn from our extensive multi-disciplinary experience to develop a customised building health assessment tool. The tool assists property owners to demonstrate to their shareholders, management, employees and clients that a systematic, balanced approach has been taken to find an optimal solution to minimise the health risk.

With over 75 Green Star certified Green Star projects, and delivering the first WELL-rated building in Africa, where our team assessed and/or designed the buildings and indoor spaces, we understand the dynamics of your building and the impact on the health of your people. ■



The Association of African Exhibition Organisers announces new board

The Association of African Exhibition Organisers (AAXO) hosted their AGM on 25 June, and have announced their new board roster for 2020/21.

The association will once again be led by the founder and MD of Exposure Marketing, Projeni Pather. In her second term as chairperson she will continue to focus the association's efforts on partnerships within the sector in South Africa and throughout Africa, as well as support the industry as it navigates very unprecedented times.

"As the voice of credibility and professionalism in a developing and growing industry in Africa, we will continue to build partnerships with relevant industry stakeholders and will be working tirelessly to support our members and the industry at large through this challenging and unique period," comments Pather.

Concrete Trends takes great pride in the announcement that dmj events' Vice President Devi Paulsen-Abbott



will serve as Vice-Chairperson, and congratulates new board members Carol Weaving (Reed Exhibitions), Chanelle Hingston (Clarion), Phetogo Kubheka (Synergy Business Events) and Suzette Scheepers (Messe München) who have been elected as directors; while Mark Anderson from Specialised Exhibitions as Treasurer. ■

Mentorship crucial in the drive to empower women in construction

The built environment industry, like many other technical and engineering industries, has traditionally been male dominated. This is unsurprising given the nature of the work at its core, historically aligned with physically demanding manual labour. However, as the construction industry has evolved, so too has its workforce. From civil and structural engineers, through to consultants, contractors and construction workers, women on the jobsite is no longer an unfamiliar scene.

"The Construction Industry Development Board (cidb) aims to see this trend on the rise for the foreseeable future, until the industry is better representative of South Africa's population," says Cyril Vuyani Gamede, CEO of the cidb. According to the cidb's January 2020 report, Construction Monitor – Transformation, women-owned contractors access just 20% of total public contract awards, and make up 30% of all contracting enterprises who participated in the research.

The Monitor presents an assessment of the state of transformation of the construction industry and concluded that, amongst other recommendations, "addressing transformation is not the responsibility of one entity or organisation, and requires a commitment from the established construction industry to transform from within."

The cidb encourages established construction professionals to contribute to transformation through a personal commitment to mentorship and coaching of women in the industry. The Monitor found that while women-owned entities were on the rise, most of these fall within the lower cidb grades 1-3. "Mentoring in the industry may see these businesses successfully scale to larger operations, contributing to job creation and the empowerment of women in construction," comments Gamede.

Further, this should not be an exclusively female-driven initiative; willing professionals of any gender should consider leveraging their institutional knowledge and wealth of experience to guide up-and-coming women. This aligns to the cidb ethos of development through partnership. "Inclusive leadership and a willingness to teach are at the core of achieving transformation in the industry. We encourage capable professionals in the industry to position themselves as role-models and mentors, to set the example and play their part in developing the construction industry to one of inclusivity and equality," concludes Gamede. ■

Recognising and promoting industry transformation

In line with these objectives, the cidb has developed an awards programme to showcase projects and achievements from women in the construction industry. The Empowerment and Recognition of Women in Construction (ERWIC) Awards consist of ten awards categories, which are open for entry to any entity which is registered with the cidb and is at least 51% female-owned. The awards also recognise clients, entities and individuals who support gender transformation and mentorship of women within the industry. Entries are open until 17 July 2020 with winners named during Women's Month in August. Specific entry criteria differ for each award and can be viewed in the awards overview online here. For more information, visit <http://www.erwicawards-cidb.co.za>. ■

From sacrificial plasticisers to viscosity modifiers

Digging deep into admixtures

Servaas Le Roux – Product Manager for admixtures at Mapei South Africa – discusses the application of bespoke admixture solutions for unique applications

In layman's terms it could be said that concrete consists of fine and coarse aggregates mixed with water and cement and that the strength of the concrete depends on the ratio of water to cement (W:C ratio), the compaction applied after placing and the curing applied after compaction. Whilst this description is true in the broader sense it falls short of describing the many chemical and mechanical issues affecting the fit for purpose of a specific concrete mix. These factors affecting the suitability of a concrete are often taken for granted because most concrete users think only of eventual strength when defining the nature of their concrete mixture even though the workability of concrete and the initial strength are often stronger determining factors.

To further complicate matters the workability retention and initial strength of concrete oppose one another when workability retention is achieved in the conventional manner which is to add water or retarding admixtures to the concrete. It is because of this tension between workability and strength that concrete admixtures have become a pivotal point when optimising the various issues around concrete manufacturing.

Workability retention in a nutshell

It is helpful to first consider the mechanisms allowing initial workability to also understand the ways in which this workability is lost later in a concrete mixture's life. This also highlights the necessity of concrete admixtures to optimise workability retention.

In this regard "workability" is achieved by allowing for enough paste (binder and water) between aggregate particles to prevent mechanical interlock whilst also allowing enough space between binder particles in the paste to prevent the hydration process from occurring too rapidly.

Hydration commences as soon as the cement particles are brought into contact with the water. Very close to the onset of the hydration process the gypsum that is present in OPC (Ordinary Portland Cement) creates a substance called ettringite, which covers the cement particles to stunt the growth of the hydration crystals. The ettringite layers are broken down with time as hydration crystals starts breaking through, this sets in motion a process where the concrete mixture becomes increasingly alkaline.

At first, the hydration crystals do not touch, but eventually they intertwine to form a dense matrix. It is in between these two states that workability is lost.

Workability is lost in a number of ways – the most common being:

- Evaporation of the water in between cement particles due to excessive ambient heat. This brings the cement particles closer together which allows hydration crystals to touch much sooner.
- Absorption of water and plasticizing agents into aggregates. This has the same effect as evaporation.
- Hydration of cement particles which eventually develops into a dense crystal matrix.
- Breakdown of plasticizing agents due to alkalinity – this is discussed in more detail below.

Plasticizers – the underpinning of concrete admixtures

Plasticizers are chemical substances that attach to the ettringite layers covering the cement particles which then polarises these particles. The effect is that the cement particles are distributed more evenly in the paste and so the state in which hydration crystals do not yet touch is prolonged.

Most plasticising agents tend to break down when the concrete mixture eventually becomes highly alkaline. This has a rapid slump loss effect. There are, however, plasticizing agents on the market that remain dormant until the concrete mixture becomes alkaline. It therefore reacts in a relay fashion with the normal plasticizers.

Figure 1 below depicts typical slump loss relative to time when various plasticizing products are applied in the same concrete mixture. The terms "Normal Plasticizer" and "Super Plasticizer" are both references to families of products as the distinction is based on the product's ability to reduce water.

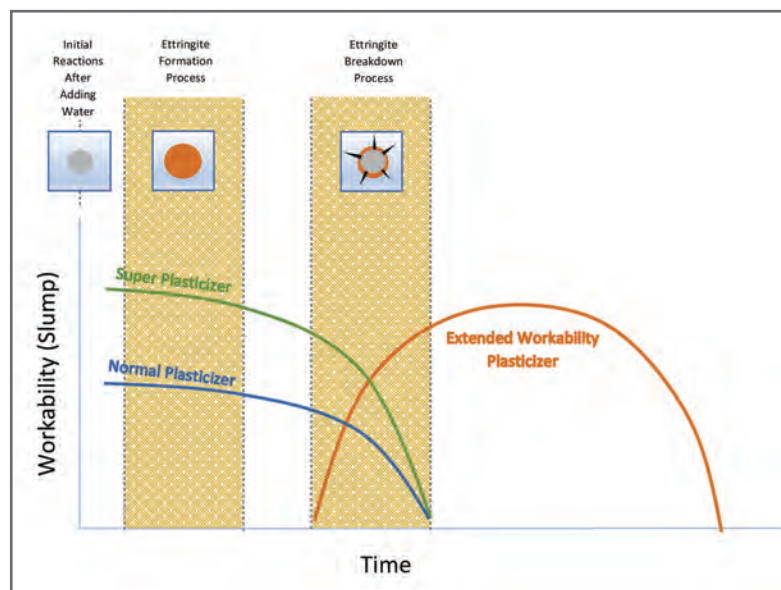


Figure 1: Using various ranges of plasticizers with normal hydration process

Necessity of unique admixture solutions to concrete

Concrete admixtures do, however, extend beyond the scope of only “plasticizers”. The term refers to a collection of chemical substances used to modify the characteristics of concrete in order to meet the demands of a specific project. Whilst the “demand of a project” typically relates to the strength, workability and workability retention of the concrete the limiting factors are often set by the cost or character of one or more of the raw materials used in the project.

If, for instance, extenders are exceptionally costly at a specific project’s location it could force the project team to use pure cement which would imply much faster hydration and thus quicker slump loss. The project team could then be forced to specify workability extension admixtures (such as Mapei’s Dynamon EW) over and above the standard plasticizing agents.

If the aggregates available on site show a significant gap in the consolidated grading then the concrete would tend to show mechanical interlock at low paste contents whilst segregating at high paste contents. The solution to this problem would be to specify the use of a viscosity modifying agent (such as Mapei’s Viscostar 3K) to make the concrete mixture more cohesive at the point of segregation.

In some cases, the aggregates available on site show significant levels of absorption.

A solution to this dilemma would be to utilise a “sacrificial plasticizer” (such as Mapei’s Dynamon MS100) that is formulated to be drawn into the pores of aggregates and in so doing stunt the absorption process to allow for an extension in workability retention.

Mapei’s concrete admixture product offering provides solutions for every possible problem set that could arise on site due to the limitations set by site conditions. We are confident that our expertise and service offering will match the quality of our products. ■

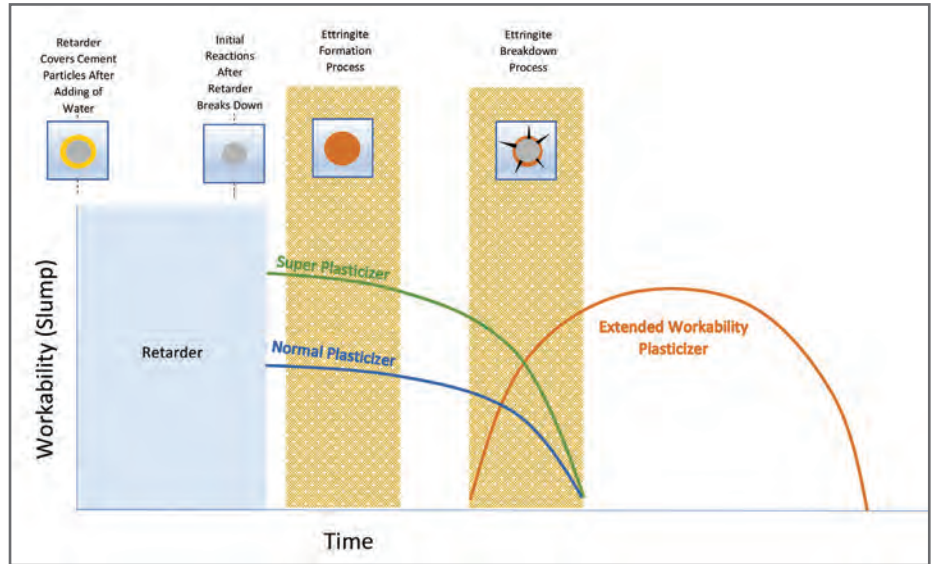


Figure 2: Using retarder with normal hydration process

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Future technologies the drivers for a more sustainable South Africa?

Somers Govender, Principal Architect at Artek 4 Architects and AfriSam-SAIA Sustainable Design Awards adjudicator, discusses the future of architecture and technology



Somers Govender, Principal Architect at Artek

The global pandemic has forced society to adopt a new culture of remote working. To be successful in this, technologies affiliated with the fourth industrial revolution have been used and proven their worth, equipping countless industries with the necessary technological infrastructure to continue operating effectively and efficiently.

Architects, designers and engineering professionals are particularly attuned with the possibilities that

fourth industrial revolution technologies such as artificial intelligence (AI), machine learning (ML) and virtual reality (VR) present for their professions, not only in the easing processes, but presenting sustainable alternatives to conventional designs and methods.

A marriage of creativity and efficiency

Somers Govender, Principal Architect at Artek 4 Architects, explains that while technologies such as AI are being used more in the architecture space, it is unlikely they will replace architects anytime soon. "The creative cognitive ability that architects possess still trumps machine abilities for now," he

says. "That said, there are amazing programmes that enable architects to be more efficient through intricate calculations such as Building Information Modelling (BIM)."

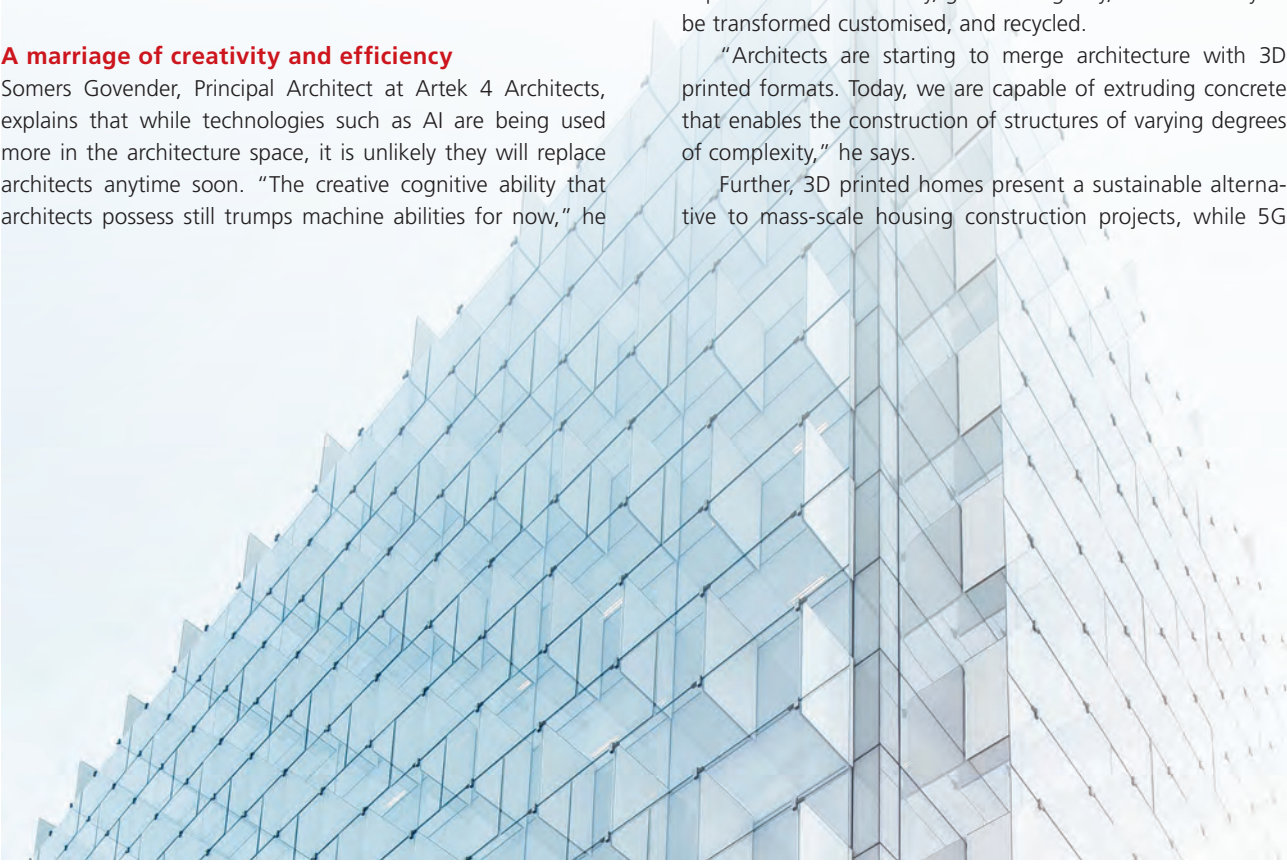
The advent of 5G connectivity will allow countless machines, devices and infrastructure to connect to each other – a reality that Govender imagines will have a major impact on the manner in which architects and engineers plan road and parking structures, for example.

"Modern architecture and city designs need to be receptive to such change," he explains. "What we need is an adaptable architectural design that veers away from traditional static architecture, and gives way to a more purposeful attitude to recycling and sustainability. 5G connectivity will also enable instant sharing of information and a more dynamic level of accuracy, greatly reducing human error. If used wisely, architects can ensure their visions are more achievable and follow a more predictable path."

Govender says machine learning and technologies such as 3D printing are particularly useful and present opportunities for the manufacture of new components and materials that will enable previously inconceivable innovations. This presents architects with an opportunity to create materials that allow for improved structural safety, greater longevity, and the ability to be transformed customised, and recycled.

"Architects are starting to merge architecture with 3D printed formats. Today, we are capable of extruding concrete that enables the construction of structures of varying degrees of complexity," he says.

Further, 3D printed homes present a sustainable alternative to mass-scale housing construction projects, while 5G



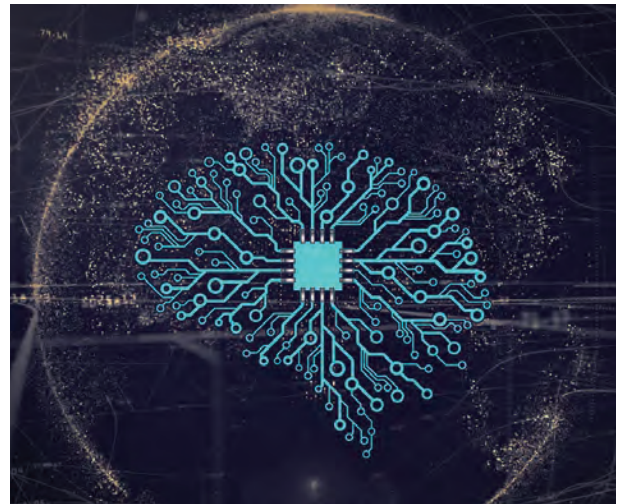
and other new technologies can enable power consumption and efficiencies that foster sustainability. Govender does however cite some concerns.

“South Africa is not quite there yet in achieving complete sustainability solutions, but with economies of scale, we can catch up quickly. The country is facing many challenges in trying to achieve sustainability goals, but with careful pre-planning and embracing 4IR technologies, we could alleviate many of its problems, such as a shortage of housing. We need to start engaging with the technologies we are aware of, such as green energy generation, and perhaps with legislation the gradual phasing out of fossil-based fuel can be achieved as well.”

The current pandemic has placed a spotlight on the need to change the way things have been done, and Govender says this is particularly needed in the way architects plan projects.

He suggests that architects should provision for the implementation of green power generation, as well as rain water harvesting initiatives for human consumption. “Municipal water could be pumped directly from reservoirs or other water sources with green energy on demand and only as the individual need arises. Aquaponics can deal with the filtering process and the by-product can be used to cultivate vegetables.”

An advocate for green initiatives and sustainability, Govender forms part of the adjudicating panel of the AfriSam-SAIA Sustainable Design Awards, which has Sustainable Architecture as one of the four categories that are recognised as drivers of sustainability.



Launched in 2009, the competition has grown into South Africa’s most prestigious sustainable design awards programme, drawing an exciting range of entries in sustainable architecture, and creating public awareness and debate on sustainability in the built environment.

“COVID-19 has resulted in several disruptions and forced everyone to adopt new behaviors to address sustainability. The pandemic has truly highlighted the need for humanity to address sustainability in all aspects of our lives, and AfriSam’s role in showcasing this is evidence of its commitment to a better tomorrow,” concludes Govender. ■



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Gamification and the Digitised Engineer

Cutting-edge digital tools will play a key role in ensuring the future sustainability of the construction industry as the national lockdown in South Africa moves to a risk-adjusted, phased-down approach to mitigate the impact of the COVID-19 pandemic on the country. Concrete Trends zoomed into the offices of Aurecon – soon rebranding as Zutari – to discuss this future with Creative Technologies Developers, Murray Walker and Shane Eglinton, Wind and Solar Leader for Africa.

Engineering companies have been using digitised models and gamification to enhance the engineering process by gaining feedback from construction contractors, operators, community and stakeholders during project development and execution. It gives engineers and owners remote access to their virtual project, contractors insight when tendering for contracts, and allows specific training of operations and maintenance staff before assets are even built.



▲ City panorama smartphone control view
◀ Digital Assets drone

Closing the distances

“As we realise new, decentralised ways of working in the future, our ability to create value in situations where distance separates users and assets continues to grow,” observes Walker. The COVID-19 pandemic is an excellent example where digitised construction assets are affording stakeholders the opportunity to gain value without site presence.

“In times like these where we are forced to decouple from our teams, clients and project sites, cutting-edge digital tools can ease the burden. Digitising design, construction and operational assets enables unparalleled remote insight into engineering, status and quality,” comments Walker.

For the last three-and-a-half years, Aurecon has explored how advanced visualisation of projects can aid its design teams and clients. “From the get-go, we have combined reality-capture and design-model data with a gaming engine to build custom interactions into applications that aid the design teams in both decision-making and client understanding,” explains Walker.

Reality capture

Beyond working purely with design models, Aurecon is able to monitor and communicate construction process by combining drone imagery, smart field applications and insight from the site team to robustly track progress and quality in a gamified digital twin. Creating geospatial digital databases, linked with design models, has enabled the creation of workflows that can assign construction and quality information to the digital asset automatically.

“Using our proprietary SiteLab tool to view this information, users anywhere on the globe can observe real construction progress and quality by asset layer and through time. This is critical given the many remote project sites in rural Africa, with the owners, engineers and contractors often headquartered out-of-country, let alone being off-site,” stresses Walker.

Reality capture – by terrestrial laser scans, drone photogrammetry or manual terrestrial photogrammetry – allows for remote assessment of sites and assets. If the capture is conducted to the correct standard, an incredible level of detail

can be realised. Hence reality capture technology, best practice capture methods and smart data processing tools all combine to slash project budgets.

“Extending the value of the models extracted from reality capture data is a major focus now to improve the assignment and transfer of metadata and attributes from design through to construction and into operations, creating more value from the digital asset,” adds Walker.

“We are creating digital tools today so the asset managers of tomorrow are empowered to maximise value from their portfolios by having maintenance manuals, BIM data and sensor data which is all available in an intuitive, real-time and interactive environment.”

This asset digitisation also opens up the possibility of developing robust, practical virtual reality training modules for asset operators and maintenance teams. Aurecon has developed a full substation technical training module for one of South Africa’s municipalities, which can now train new electrical technicians in a safe environment on their specific assets.

3D design transfer in an instant

In solar energy, Aurecon has automated workflows to transfer designs to full 3D digital in minutes rather than weeks. “Our engineering engine allows for the accurate calculation of shadow paths with accurate tracking movement, confirm component placement and function, in-simulation measurement, and completely free user navigation through the model,” points out Shane Eglinton, Wind and Solar Leader, Africa.

On wind-energy project sites, Aurecon is now testing its civil works designs with gamified delivery vehicles (including telescopic trailers with rear steering for delivery of abnormal components), visualising wake impacts from wind turbines to assist layout development and explain impacts to non-technical stakeholders, and animating construction sequencing. This allows owners, engineers and construction contractors to test solutions throughout the development process before executing final designs.

“We are constantly looking ahead to what emergent technologies can offer the engineering world, and adopting tools from other industries such as gaming to bring multiple new layers of understanding, versatility and value to projects,” Walker concludes. ■

Ultra thin reinforced concrete pavements

A practical application

By Hans Brink, Managing Director, HBA Civils

The decade of practical refinements in the use of Ultra Thin Reinforced Concrete (UTRC) has resolved most of the challenges initially encountered when Adrian Bergh of the Council for Scientific and Industrial Research (CSIR) introduced the technology to the market. Developed by the CSIR as a cost-competitive, durable and more labour-intensive alternative to conventional surfacing methods, Hans Brink, Managing Director of HBA Civil Engineering Consultants, has been at the forefront of implementing the technology and refining construction methods. The projects and refinements developed by HBA in consultation with the CSIR put Brink in the ideal position to illustrate UTRC's significance to future of roads.

The layers of development

Thin concrete pavement technology is increasingly proving a solution for the problems South Africa is facing in terms of provincial and urban road construction and maintenance. UTRC is a relatively new construction method for urban and rural roads, replacing both the base layer and the conventional bituminous surfacing.

The UTRC consists of a 50 mm layer of 30 MPa concrete, with reference 200 welded mesh reinforcing, placed in the centre. The concrete pavement is constructed continuously, in strips between two to six metres wide with anchors at both ends of a straight section. The sections on straight alignments may be up to several hundred meters between anchors. This

UTRC and the emerging contractor

Emerging Contractors are a critical factor of South Africa's economic development. Technologies and Construction Methods with fewer barriers to entry and delivering quality and sustainable results are their lifeblood. UTRC exemplifies these enabling qualities:

- Substantially labour intensive
- Low capital costs
- Minimal transport challenges, with aggregate locally sourced
- Portable concreting skills (such as the local housing market)

Because so much of the work is done by hand, there is no investment required in heavy plants. Apart from the plant required for the sub layers, typical equipment requirements are a vibrating beam and a vibrator. The accessibility of this method can't underestimated for emerging contractors.

Economical material and construction costs

- Concrete supplied by ready-mix plant is more freely available
- Minimal tendency to rut, shove or form potholes
- Existing road sub-structures frequently useable 'as-is'
- Ideal for upgrading deteriorated roads by over-laying
- Concrete road surfacing has a service life of 50 years or more, with no major maintenance required
- The previous failures of concrete surfacing at the joints are eliminated in Ultra Thin Concrete, due to the continuous design.

effectively eliminates transverse expansion joints, and associated failures. The continuous concrete layer functions as stretched sheet of material, tied-down at each end; this significantly reduces the induced traffic loads transferred to the underlying layers. Compared to conventional road construction methods, UTRC achieves the same resistance to heavy truck traffic with significantly fewer supporting layers.

Continuous reinforcing spreads the load over a much larger area of the lower layers and this significantly reduces the development of potholes from any weak spots in the lower layers – such as those arising from water ingress. Concrete roads generally outlast bituminous roads, and require little to no maintenance.

The advantage of the thinner layer works for the construction of new slip lanes and lane widenings in urban areas is that the existing utility services, which frequently block road widenings, may be left intact and the widening is built with minimum disruption to these services. For remote areas where asphalt or even block paving are not available, the 50 mm UTRC option will yield a considerable cost saving. In addition, the reduction of the cost of the base layer makes this option cost competitive in comparison to conventional surfacing.

Environmental factors

- Concrete production has a smaller carbon footprint than hot-mix bitumen-based plants
- Concrete roads can utilize fly ash, a polluting by-product of thermal power plants
- Concrete is light in colour – resulting in the reflection of about 80% of the sun's heat, compared to only about 5% reflection for asphalt.

The road from challenge to solution

Some early challenges in the first test projects using UTRC included shrinkage and other types of cracks, varying in severity. Originally the UTRC consisted of a 50mm layer of 30MPa concrete with Ref 193 welded wire mesh reinforcing (5,6mm @ 200 x 200 c/c) placed in the center the slab. The concrete had a slump of 75mm and was mixed on site. When placed, the concrete was leveled and compacted using a vibratory beam.

Some of the practical refinements developed by HBA Civils in consultation with Adrian Bergh of the CSIR included:

- The Ref 193 welded wire mesh was changed to Ref 200 with spacing of 100X100mm and 4mm thick wire to eliminate the block cracking
- A Spin Screed roller was used in place of the vibrating beam
- Polypropylene fibres were added to the mix to inhibit shrinkage cracking
- Concrete was mostly obtained from 'ready mix' suppliers to address the problem of consistency

The following 'road-scape' represents the strength of industry performing additional development beyond the initial research, practically demonstrating long-term efficacy and cost competitiveness. ■

Transnet Capital Park, Pretoria

The main road carrying truck traffic was upgraded from a badly deteriorated asphalt road to a UTRC road.



Preparation of base



Preparation of reinforcing



Casting of concrete



The finished product

UTRC road at Matsulu – Jericho Umgwaco road (East of Nelspruit)

This road was upgraded from a gravel road close to ground level, to a UTRC road on a high fill, crossing a set of box culverts, over a river. To compensate for the possible settlement of the fill, several additional anchor beams were installed.



Test pit showing clay soil



Spin roller level out wet concrete



Spreading of wet concrete, note bridge to prevent walking on concrete or the steel mesh



A section ready for concrete, three sections of 100 m² per day can easily be achieved by each team



Anchor beams with soft board separation



Curing the UTRC under plastic sheeting



Completed road

UTRC road at Ga-Rankuwa Unit 10

Ga-Rankuwa Unit 10 is an economic housing development near Tshwane. The in situ material consists of a fair amount of red clay. Large savings came from using the in situ material, stabilized with lime for sub base to reach the moderate CBR strengths required.



Mesh installed on spacer blocks, ready for concrete



Segmenting at bell mouth with continuous outside edge beam



Spreading of concrete with spin roller



Completed Road

Common misconceptions surrounding the demolition industry



Jet Demolition Contracts Manager Kate Bester.

Specialising in the heavy industrial and large commercial space, Jet Demolition undertakes a range of challenging demolition projects. It also excels at technically-demanding projects that require the highest levels of safety and quality. Jet Demolition Contracts Manager Kate Bester (N. Dip. Civil Engineering) takes a look at some of the common misconceptions surrounding this highly specialised and niche sector of the construction industry.

Demolition is all about ‘blowing up buildings’

Demolition takes many forms, from removing an internal wall to the complete demolition and rehabilitation of a redundant mining site. A critical skill in the demolition industry is applying the appropriate method for the task at hand.

When considering the demolition of a tall building, for example, top-down mechanical demolition and implosion are comparable, but are restricted by the environment in which the demolition is to take place. If there is sufficient space and time available, implosion might be the better option, whereas a very restricted or operational environment might result in high-reach demolition being more effective and better suited to the structure itself.

Any contractor can tear down a building

It is not uncommon for a building contractor to also undertake demolition work. However, it is up to clients to determine whether the demolition service provider is bona fide and has the appropriate tools, equipment and skill to be able to undertake large-scale demolition projects.

Fortunately, we do see a change in the industry whereby due diligence audits and assessments are being undertaken prior to contracts being awarded. This is encouraging as it will result in a stronger and more accountable industry.

Anyone can become a demolition expert

Our personnel undertake regular training and certification in their areas of experience, but the true strength of our company



Decontamination of lead ingots

lies in the skills of our personnel. In South Africa, it is not unusual to be tasked with the demolition of a structure for which as-built drawings and records do not even exist.

Upfront planning and preparation for such structures involves intensive analysis and in-depth examination. This often means reverse-engineering structural assessments derived from the initial investigation to best assess the primary characteristics and stability of such structures.

The information is then used to verify whether the anticipated methods are appropriate, and to anticipate the structure’s response. While modelling software is available internationally that is capable of determining to some degree how a structure will react, it is very much dependent on fully detailed as-built information, which isn’t readily available. Instead, we rely on our own extensive experience with similar works and the application of very conservative safety factors.

Demolition is dangerous

In demolition, the majority of projects work from the most dangerous or difficult point of a structure towards a point of safety on the ground. Therefore we have adopted a non-negotiable approach to safety. Our business, our reputation, and our industry is based on engineering methods focused on the safety of persons.

Over the past 28 years, we have developed a comprehensive Integrated Safety Management Programme, which has resulted in the highest level of safety performance in the



Demolition of redundant mining infrastructure



NIOSH Safety Awards won by Jet Demolition



Flame-free high-reach demolition within a flammable environment



Overnight bridge demolition over a highway

industry. In its annual 2019 NOSA audit, we scored 98.14%, one of the highest achievements internationally in the commercial construction industry.

Demolition is environmentally-unfriendly

We are well-equipped and experienced to deliver environmentally-responsible, but also practical, projects for large industrial and mining sites. We have previously demolished an extensive range of industrial, chemical, and mining plants, where a wide spectrum of toxic or hazardous materials were decontaminated, treated, neutralised, or disposed of.

We also offer asbestos abatement, which is often associated with the demolition of older structures. We are registered



Jet Demolition personnel undertake regular training and certification

with the Department of Labour as an asbestos contractor and are certified to safely remove all types of asbestos in strict accordance with the relevant regulations and standards, such as the Asbestos Regulations 155 of 2002, Environmental Laws Amendment Act 14 of 2009 and the Waste Act 59 of 2008.

An extensive range of environmental and regulatory requirements apply to demolition projects, in addition to specific client requirements. We are accredited in terms of the following safety, health, environmental and quality standards: CMB253 NOSA Integrated HSE System, NOSA NOSCAR Safety Performance Level, ISO 45001:2018 Occupational Health & Safety Management System and ISO 9001:2015 Quality Management System. ■



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The construction of a future

Concrete Trends interviews Bhekani Mdlalose, Group Managing Director, Grinaker-LTA



Bhekani Mdlalose, managing director of Grinaker-LTA

Bhekani “Bheki” Mdlalose has over 20 years’ experience in the construction industry and was appointed managing director of Grinaker-LTA in February 2015. He is a shareholder in Laula Consortium which acquired Grinaker-LTA from JSE-listed Aveng in the last quarter of 2019.

Concrete Trends caught up with Mdlalose recently, to see if that strategy had changed at all, since the CORONA-19 virus lockdown took an already ailing sector by surprise, and what navigating this landscape means for this South African construction giant.

CT What should the market know about the remaining obligations relevant to the acquisition itself, as well as Grinaker-LTA’s vendor and debtor obligations?

BM In terms of our remaining obligations related to the purchase of the company, our vendor obligations and debtor obligations, these have not been affected. Unless we return to COVID-19 Level 5 restrictions for an extended period, there is no prospect of us needing to renegotiate payment terms for the company.

Nor have our future obligations been affected, and we are increasingly confident in the government’s risk-adjusted approach to reopening the economy, especially now as the level 3 conditions have positively affected the whole construction sector.

CT The timing of this acquisition suggests the members of the Laula Consortium are confident in the medium-to-long-term future of this sector. What is your immediate strat-

egy in managing both the change of ownership and leadership, and the impacts of the lockdown?

BM Since we are not a listed business, we have the liberty of playing to our strengths: High quality, safety driven contract delivery. We are looking for steady growth by working with people who appreciate the quality of our work and respect and honour the contracts they enter. People who are going to pay us when payment becomes due. We are looking for true projects based on honest contracts. Competing for jobs based on margin alone has done great damage to our industry.

Our primary focus will be on improving our margins and diversifying our revenue base. The advantage of being an engineering and construction group with a strong mechanical and electrical side to the business, is that we can offset the general lumpiness of construction revenue streams by increasing our annuity income on maintenance and shutdown contracts. On the mechanical and electrical side of the business, we maintain a strong position in the oil and gas sector, being lead contractor in five of South Africa’s six refineries. This already represents a significant portion of our revenue base, and we have our sights on increasing our Independent Power Production (IPP) contracts, especially as the need for sustainable off-take agreements has never been more compelling.

CT Tell us more about your expectations from IPPs?

BM Government decided to pursue more IPPs in the last quarter of last year. We’ve taken the decision to continue the IPP business which Grinaker-LTA started under Aveng and we will continue pursuing more IPPs as this makes sense on a number of levels.

The high foreign investor appetite for these IPPs is a strong sign of their viability and sustainability. Grinaker-LTA is in talks with a number of international parties to partner in the next round of IPPs. Certainly as a country, we urgently need to diversify our energy mix beyond ESKOM. Two things government needs to fix is the certainty on the price of offtake price. If they send mixed pricing messages, they could kill the concept. The next thing to fix is the empowerment element of our industry.

CT What do you see as the most broken elements of transformation in the sector?

BM The lack of uniformity and standardisation has been a disaster for the sector and we continue to see bad application of Black Economic Empowerment resulting in the tired narrative of BEE. The experience of many black business leaders, including that of our chairperson who has been a member of the president’s BEE Advisory Council under both President Zuma and President Ramaphosa, is that BEE has to be more than about chasing the scorecard but instead be about the deliberate and well-structured programmes to

grow black-owned and managed businesses whilst growing the economy. There needs to be single-mindedness about meaningful transformation where government commits to a single policy over a long period of time, until the intended objectives are achieved as against tinkering with both the intended objectives and policy.

CT You have been vocal about the closing window of opportunity to regain South Africa's global status as a construction heavyweight; what are the key priority areas to address to ensure this doesn't happen?

BM The biggest threat is the loss of skills in both the public and private sectors. The poor trading performance of the sector has decimated the industry, and on top of that much of the construction site disruptions we saw prior to the COVID-19 challenge have their roots in the failed government and sector transformation intervention, or the lack thereof.

Consider the matter of an effective emerging contractor development programme, which the sector needs desperately; government has in certain instances sought to use such a programme to support our country's struggle veterans suggesting that the form of support and care due to them ought to be given them by turning them into emerging contractors. The two are different and require two different deliberate initiatives. On the other hand many of the first-tier companies have not developed their own targeted emerging contractor development programme beyond the scorecard and public tender requirements.

Whilst Government has announced repeatedly that all public sector contracts require 30 per cent emerging contractor participation, they have yet to provide a single uniform policy, regulation or guideline around this. This view of the Construction Sector, coupled with a lack of certainty, is in no small part to blame for the emergence of the so-called Construction Mafia.

CT What impact has this had on the ground?

BM One of the most destabilising by-products of all these factors is the lamentable increase in contract disputes. The existing socio-economic realities on the ground coupled with profound missteps regarding empowerment sees the continued disruption of construction sites around the country, with sites held hostage by the so-called Construction Mafia. While the sector commends and appreciates the work done by SAFSEC in this area, we believe that there is more work to be done. On the public sector side, the sector needs to work with government in improving their construction contract management capacity to handle the complexities of the demands of local communities on the one hand and the legal implications of such disruptions on the other. Not giving attention to this has led to many contract disputes where government administrators and the sector defer to the courts as arbiters. Acceding to a force majeure is impossible as the escalation in costs exceed Treasury's contract cost adjustment restrictions.

The intense impact on engineers on both sides of the contract is very damaging and this only leads to an adversarial relationship. Ideally you want a sector that works well with government in ensuring that in the public sector you have technical expertise that is able to plan a contract, run a robust

procurement process and run an effective contract administration process, and Grinaker-LTA is seeking ways of working with government to assist in developing these skills.

CT What about the technical skills?

BM One of the key deliverables of my portfolio is to build on the technical skills that exist in the business to create the future cadre of skilled professionals that will take this business to the next 100 years. Any gathering of the industry should have skills as its permanent priority. Similarly, business will have to come to terms with building an emerging contractor approach that works. It is essentially Enterprise Development, but it cannot be for the sake of ticking off boxes. It must be for the good of the sector, the good of the communities and the good of our businesses. Whilst we can do all this, we must look at the fact they already have the Skills Development Fund, and government writes the policy, directs the resources and has some control over what we in the private sector do. Government must meet with the communities and direct this matter – and have certainty of policy to ensure it happens properly. This is outside BBEE. This is simply development. ■



The Private Life of Bheki Mdlalose – life in lockdown

CT What do you do to cope in the time of lockdown?

BM The lockdown presented a mix bag of good and bad activities, enough time to think and revisit some of the decisions that were taken earlier in the year. The truth is business won't be the same after lockdown as quick rightsizing and adopting innovative ways on doing the business will need to be implemented fairly quickly. Travelling in between operations can be minimised by using video conferencing and thus improve decision making.

Lockdown presented a lot of time to read, revisit business strategy and look at ways to improve efficiencies within the way we do business. I participated in most of the community support in areas where we operate and also play a role in industry lobbying to have construction be allowed back into the economy earlier.

A passion for skills

Engineers should be involved in large-scale projects that significantly impact the well-being of communities. "The reason why we are engineers is that good, safe infrastructure is a priority for the livelihood and longevity of our communities."



Dr. Tony Igboamalu

This is the message from Dr. Tony Igboamalu, recently named Young Engineering Professional of the Year at the 2019/2020 South African Professional Services Awards (SAPSA). He is currently employed by engineering, design and advisory company Aurecon. Dr. Igboamalu's achievements to date are also a proud testament to Youth Month 2020.

"The future of our business relies on the education and skills of tomorrow's leaders," comments Aurecon Africa Chief Executive Officer Gustav Rohde. "We are a firm believer in education as a driver for skills development."

“Aurecon, rebranding as Zutari, is proud to celebrate the achievements of Dr. Tony Igboamalu during Youth Month, named SAPSA Young Engineering Professional of the Year for 2019/2020”

"The successful development of young professionals will provide the next generation of leaders and technical experts who embody the values, culture and behaviours of our organisation," adds Senzekile Mdluli, B-BBEE and CSI Manager at Aurecon.

Matching technical knowledge with professional development

Dr. Igboamalu received his Bachelor of Engineering in Chemical Engineering from Anambra State University in Uli, Nigeria at 23. He completed his Bachelor of Science (Honours) in Applied Science in Chemical Engineering: Water Utilisation at the University of Pretoria in 2011, followed by a Master's (with

distinction) in 2014 and a PhD in Chemical Engineering in 2019 at only 32.

He joined Aurecon in 2016 as a water and wastewater engineer in the Tshwane office. "It has been my dream company since 2012 due to its technical knowledge, which suited my professional development. During my PhD work I received a lot of support from the company, which I appreciated a lot."

The company's employees work in multidisciplinary, multisector and multicultural teams that pool their skills and



Gustav Rohde, Aurecon Africa Chief Executive Officer

expertise across Africa and its design centre locations. "To grow your career as a young professional requires deep disciplinary knowledge, along with an ability to communicate across social, cultural and economic boundaries. You also work alongside industry-leading professionals, mentors and peers so as to experience numerous areas of our business," stresses Mdluli.

"You learn a lot from your peers in terms of ethical conduct, integrity and good governance. We have annual continuous development programmes that keep us up to date with best practices locally and internationally. We work with professionals and great mentors who bring ideas to life. The company provides the resources for one to succeed and break away from any doubts one might have," points out Dr. Igboamalu.

Mentorship and inspiration

"I believe in continuous learning and development. There is both formalised and informal mentoring with the professionals we interact with in the different projects. Mentorship is key to a successful career, and I have had the privilege to be part of this," highlights Dr. Igboamalu, who has mentored Masters and undergraduate students at the University of Pretoria.

He was also introduced to a Youth Engagement Forum Initiative, as well as a secondary school science, technology,



Senzekile Mdluli, B-BBEE and CSI Manager at Aurecon

engineering and mathematics (STEM) skills transfer programme in Diepsloot. "I am able to share my love of engineering, research and the positive impact the profession can have on society in terms of future-ready engineers and leaders."

Dr. Igboamalu states that his driving passion is sustainability and understanding the link between water and poverty alleviation. "My aim is to improve the lives of impoverished communities throughout Africa by being involved in projects that directly affect their access to critical resources such as water. "My work in the water sector and as an environmental researcher is focusing my research portfolio on improving and developing water and sanitation infrastructure and environmental sustainability to benefit communities." Dr. Igboamalu stresses that access to water is critical during the current COVID-19 crisis, in addition to the effective management, operation and maintenance of our potable water supply.

"I would like to see a continent where all African children have access to clean water and sanitation. I believe that effective solutions in this regard can be supplied by an effective engineering advisory role in addressing water and sanitation problems through the combination of engineering solution with finance, investment and economics," adds Dr. Igboamalu.

Exploring the vocation of being an engineer

His message for Youth Month 2020 is that young engineers should understand why they studied engineering at university. "Tertiary education only equips us, but our career development depends on our personal efforts. Secondly, good mentorship is the key to success. Find someone that will mentor or make a meaningful impact in your life."

Behind every successful young engineer is an extensive support structure, and Dr. Igboamalu pays tribute to his family. "My dad, Chief Francis Igboamalu, who passed away recently, has been my backbone and spiritual guide. In addition, my brothers Dr. Christian Igboamalu, Dr. Frank Igboamalu and Henry Igboamalu have been very supportive. Lastly, my wife and two beautiful boys gives me courage to go beyond my limits."

Aurecon has partnered with the Programme for Technological Careers (PROTEC) since 2011 in a bid to increase opportunities for young learners and youth to pursue STEM careers. This allows the company to contribute towards the National Development Programme goals by advancing STEM education in South Africa.

Other initiatives include partnering with the Scientific and Industrial Leadership Initiative (SAILI) since 2014, which promotes tertiary studies in scarce skill industry by providing maths and science scholarships to low-income families. This year one of the sponsored learners pursuing a Bachelor of Engineering in Civil Engineering at the University of Cape Town was awarded an Aurecon bursary. Employees also provide learners with tutoring opportunities, mentorship and guidance programmes, interactive job shadowing sessions and various skills development workshops.

An external undergraduate bursary scheme is available for undergraduate studies at various tertiary institutions, in fields specifically related to the company's activities. Aurecon currently has 44 external bursars in civil, mechanical, electrical/electronic, mechatronics, chemical and industrial engineering at several tertiary institutions, including the University of Cape Town, Stellenbosch University, the University of Pretoria and the University of the Witwatersrand. Of these bursars, 75% are black candidates and 43% are female. ■



Concrete technology – innovation and digital design

The overall concrete market is expected to see steady growth between 2018 and 2023, driven largely by the development of smart cities, infrastructure repair, and new concrete technology. In the first in Concrete Trends' series of global insights, Doug Darling, author at Cor-Tuf, argues that concrete producers who want to maximize their share of this growing market need to stay on top of the most recent improvements in concrete technology. Advanced concrete technology is the best way to ensure you stand out from other producers and contractors, helping you win more repeat business.

Here is a look at the latest trends in concrete across three categories – the product itself, the process, and the technology.

The product: New innovations in concrete construction technology

Electronically conductive concrete

Electronically conductive (or heated) concrete can deliver great benefits on roads and other surfaces during times of snow and ice.

The Des Moines International Airport is testing two slabs of this heated concrete to see how it improves runway conditions during the winter. The concrete is managed through a smartphone app, with performance and quality being carefully monitored and captured.

If successful, this type of concrete can be used in cold-weather conditions on roads, bridges, and airports to increase safety.

Ultra-High Performance Concrete (UHPC)

UHPC is a new class of concrete that is extremely strong and durable. UHPC is very similar to traditional concrete, but roughly 25 percent of its composition is composed of a variety fibers and mineral/ chemical additives that create a significantly

stronger end product. The integrated fibers vary from polyester to fiberglass, basalt and steel, with each bringing its own unique advantages.

UHPC has an estimated lifespan of more than 75 years compared to 25-35 years for traditional concrete. It also has a compressive strength of 30,000 pounds per square inch (psi), with some mixtures achieving 100,000 psi. Traditional concrete has a compressive strength of just 4,000 psi.

Other benefits of UHPC include flexibility, ductility, and extraordinary resistance to salt, moisture and chemicals. All of these remarkable improvements result in a projected dramatic increase in the life cycle of infrastructure constructed with Cor-Tuf UHPC as a major component. The properties of this concrete make it ideal for traditional applications, as well as newer and more advanced uses in areas such as architectural design, which require thinner components and complex shapes.

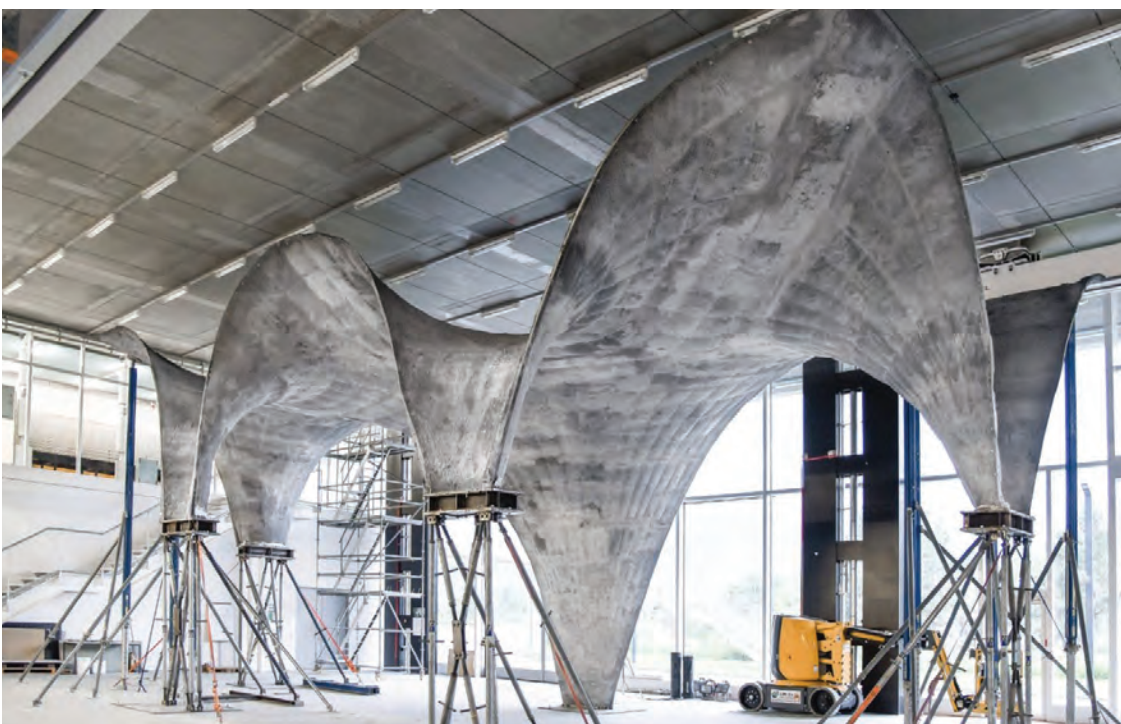
Green concrete

Cement production is responsible for approximately 5 percent of global man-made CO₂ emissions. Steps are being taken by many concrete producers during the mix process to make a product that lasts longer and requires less maintenance in order to conserve energy and reduce these emissions.

UHPC is a great example of such a product, given its longer lifespan and minimal maintenance needs. New types of concrete (such as UHPC) that are stronger and thinner also require significantly less material and steel reinforcement per project, further reducing CO₂ emissions.

Off-site production

The global market for precast concrete is expected to see a compound annual growth rate (CAGR) of 6.1 percent between



This ultra-thin concrete roof is a testament to concrete innovations and digital design

2018 and 2025. Off-site production of precast elements shortens production time and reduces costs.

Prefabricated elements can be delivered quickly to construction sites, reducing the disruption to traffic and increasing worker safety at the site. Quality control for temperature and mixing can be more closely monitored off-site, increasing the quality of the end product.

Automation

Robotic concrete 3D printers are now being used to automate some concrete production. Two such devices were introduced last year, one from Apis Cor and one from MIT. Both machines are mobile, allowing them to be moved to various sites, and they can build structures such as a small house in less than a day.

The world's first 3D-printed bridge was unveiled in Spain in 2017. A structure of this size took roughly 18 months to build and install.

This type of advanced concrete technology requires fewer labourers and produces less waste for the environment. While this technology is still very new, it has promising implications for disaster relief and other emergency situations.

Workforce/Labour

There is a labour shortage in the construction industry, with the top concern for builders being the cost and availability of labour. Construction workers—and specifically concrete workers—will also need to be more skilled, as new concrete technologies demand a wider skill set. This need for more highly skilled workers combined with a shortage will likely drive up wages. Concrete producers and contractors should plan accordingly.

The good news is some of the recent advances in concrete technology, such as off-site production and automation, can reduce the total number of workers needed on a given job.

Real-time updates

GPS sensors on trucks and equipment deliver updates to foremen about concrete deliveries and pours. Mobile devices keep the communication lines open at all times, regardless of where workers are in relation to supervisors.

Customers can be updated in real-time on delivery and pour status. Concrete workers spend less time idling with real-time updates, and schedules can be adjusted quickly.

Intelligent equipment

Embedded sensors on concrete mixers and equipment can monitor machines for maintenance issues.

When a certain threshold is reached (whether that be a temperature, mixing rate, or other setting), an alert is sent out immediately. Issues are addressed and fixed before an actual break-down occurs. Strength gauges can be used to better monitor concrete for curing times. These advances reduce downtime during the production process and save money on maintenance costs. They also help produce a higher quality product.

The recent surge of innovations in concrete construction, with improvements ranging from better concrete products to the incorporation of advanced technology to create and deliver a better product more efficiently. Knowledge of these latest advancements and trends enables concrete producers and distributors to stay competitive, especially when it comes time to bid on contracts. We will do our best to keep you updated. ■



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SA construction contractors under siege

The construction sector was in steep decline before the COVID-19 lockdown and few businesses have the cash reserves to be sustainable. According to MDA Attorneys, construction and technology law specialist, the most pressing concerns for contractors are surviving the lockdown and navigating the impact of 'construction mafia', where work is halted by local business groups demanding work or financial reward. This emerged in online gatherings hosted by MDA, with over 1000 South African construction sector participants.

Civil construction sites re-opened under level 4 restrictions after a full five-week lockdown, but as activity levels drop, the impact of COVID-19 on the construction sector is devastating.

"There are four contract forms recommended by the Construction Industry Development Board (CIDB) for all construction work in South Africa, so the focus was for contractors to be clear on what relief options are available, if any. The online MDA Lockdown Series was oversubscribed," says Ian Massey, MDA Attorneys consultant.

“The most pressing concerns for contractors are surviving the lockdown and navigating the impact of ‘construction mafia’...”

Taking cost recovery action is crucial for contractors during the COVID-19 where contracts make provision for it. Contractors were advised to submit required notices timeously, keep detailed records and ensure that they are signed off by the relevant responsible person. The speedy submission of certificates for payment was advised.



Ian Massey, consultant at MDA Attorneys



Work stoppages related to 'construction mafia' problems have been widely reported, yet Massey says that the issue is adequately dealt with in only one of the four standard contract forms. "Construction companies have also not fared well under the eyes of the law. Some of the outcomes of matters referred to our courts where civil unrest has affected the work, have not gone well for the contractors. These court precedents are used as arguments against contractors making claims for cost and time," he says.

Skills development and training is one of the casualties of the construction sector's steady decline over the past few years. Says Massey, "Construction companies are not the large employers they once were and a large portion of construction work is now carried out by labour-only subcontractors. As a result, there is less emphasis on employee development and available training services have become unaffordable for many."

“Construction companies are not the large employers they once were and a large portion of construction work is now carried out by labour-only subcontractors”

Massey says that MDA Attorneys has met with various industry representative bodies over the past year to explore viable training alternatives. "Perhaps one unintended positive consequence of the COVID-19 lockdown could be online training that meets the needs of the industry and those of service providers," he says.

The MDA Lockdown webinars were supported by South African Forum of Civil Engineering Contractors (SAFCEC), the Master Builders Association and South African Institution of Civil Engineering (SAICE). ■

CEMENT AND CONCRETE PLAY A CENTRAL ROLE IN TRANSPORT INFRASTRUCTURE, ESPECIALLY FOR SOUTH AFRICA'S MAJOR PORT, RAIL AND ROAD PROJECTS.

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TO MEET WITH KEY AUTHORITIES RESPONSIBLE FOR DRIVING THE REGION'S TRANSPORT INFRASTRUCTURE PROJECTS AND HEAR FIRST-HAND WHAT THEIR CONSTRUCTION REQUIREMENTS ARE, PLEASE CONTACT:

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Setting your sites on **health and safety**

Edited by Nicholas McDiarmid, Publishing Editor, Concrete Trends

Working in one of the more regulated sectors from a health and safety point of view, construction companies have much in place already, and ensuring your health and safety plan is updated and covers all the bases is the most important step towards site-readiness

Bringing it all together

John Mathews, President of the Master Builders Association, emphasises that despite the Construction COVID-19 Rapid Response Team (CC19RRTT) making headlines for its case to recognise construction as an essential service, its primary purpose is to support all efforts to manage the sector through the pandemic and safely back to work. “We started off with six national bodies formulating a voluntary task team that would try and unlock the construction industry post-COVID. We all support the president’s lockdown but what happens afterward? We know have 13 organisations joining the task team, and we need to have a plan in place,” notes Matthews.

This level of coordination between so many industry bodies has resulted in strong sectoral support, and the recent launch of The Master Builders Association North (MBA North) comprehensive COVID-19 health and safety consulting and training services is an important guide to managing health and safety on the construction site. All regions will be preparing for a safe return to work as quickly as possible once the restrictions are lifted.

Getting prepared on time

Reopening construction sites after the lockdown is set to be a challenging process, says Gerhard Roets, Construction Health and Safety Manager at MBA North, convener of CC19RRTT. “Over and above your COVID-19 Workplace Readiness Plan,

the Construction Industry will be required to update their current Health and Safety files and re-induct employees on site. Preparing to return to work in a safe and compliant manner could take some time, therefore any company hoping to resume work next month should be preparing to do so now,” he says.

Workplace Readiness Plan Requirement

The challenge of compliance with the new COVID-19 directive is exacerbated by ‘information overload’ and confusion about which projects may resume when. Roets says, “Many members are asking how they should prepare. All construction may resume in Level 3 – this includes both commercial and residential construction. But before resuming work, they must prepare a Workplace Readiness Plan and apply for a certificate or permit with the Companies & Intellectual Property Commission (CIPC).”

The workplace readiness plan should include:

- Thorough risk assessments and site-specific protocols in place
- Detailed plans for the phased-in return of workers to the workplace, and staff rotational arrangements
- Health protocols to protect employees from COVID-19, including screening and testing facilities and systems
- The appointment of a compliance officer to oversee implementation of the plan
- Policies on site visitors
- Reporting and escalation measures.

Compliance with COVID-19 Health and Safety directives is expected to prove costly for the sector, and will likely slow





down work, says Roets. “There are many different areas of work involved, in many cases people need to be working side by side, which complicates compliance with physical distancing guidelines. Preparing the Workplace Readiness Plan may take some time before they are able to begin physical work, and daily screening and health and safety checks will add hours to each working day.”

SMME support

The Association says compliance may be particularly difficult for SMMEs. Having generated no revenue in the past two months, they will now have to fund additional COVID-19 Personal Protective Equipment (PPE) and incur other expenses.

However, the cost of non-compliance could be devastating. A single worker infected with COVID-19 may spread the virus resulting in site closure; and infractions could result in penalties and fines.

To help the sector prepare to reopen sites safely and in line with new regulations and guidelines, the MBA North now offers consulting and training priced within reach of even SMMEs. The Association can assist both members and non-members in preparing a COVID-19 Health and Safety plan, conduct risk assessments, and can even send its mobile training unit (ToM) to sites to raise workers’ awareness of the new safety protocols in place, which is offered in five languages.

The Association has tailored its offering to help all contractors to get back to work safely as soon as restrictions are lifted.

A proven model for recovery

Prior to the COVID-19 outbreak, the construction industry faced significant challenges including the lack of work, late

and non-payment and uncontrolled illegal construction site invasions that resulted in reported company closures and loss of jobs. The industry is now calling for activation of planned public infrastructure spending as announced in the medium-term expenditure framework (MTEF), for positive knock-on effects on economic recovery and growth through the multiplier effect.

This is a proven model for economic recovery that has been used by many countries emerging out of periods of crisis. Despite bearing some of the highest burden of the pandemic, the governments of the United Kingdom, USA, Australia, New Zealand, Germany, China and Italy have re-opened their construction industries and committed to increased public infrastructure spending as part of their post-pandemic economic recovery plans. ■

CC19RRTT comprises: Master Builders South Africa (MBSA), Association of South African Quantity Surveyors (ASAQS), Western Cape Property Development Forum (WCPDF), South African Institute of Architects (SAIA), Black Business Council in the Built Environment (BBCBE), Consulting Engineers of South Africa (CESA), Association of Construction Project Managers (ACPM), South African Institution of Civil Engineering (SAICE), South African Black Technical and Allied Careers Organisation (SABTACO), South African Women in Construction (SAWIC), The Concrete Institute of South Africa (TCI), Cox Yeats Attorneys and Master Builders KwaZulu-Natal (MBA KZN) as the convener.

3D printing of concrete at the SA Innovation Summit

If you want to capture someone's attention – display concrete flamingos! This strategy seems to have worked for two postgraduate students who exhibited their research in 3D printing of concrete at the SA Innovation Summit. “We received a very positive response from delegates at the Summit,” say Frederick Bester and Marchant van den Heever, postgraduate students in the Department of Civil Engineering. Frederick and Marchant were invited to exhibit their work at the SA Innovation Summit in Cape Town in September.

The Summit is in its 12th year and is an annual flagship event on the South African Innovation calendar. It was created to support and promote innovation, and nurtures, develops and showcases African innovation. It brings together corporates, thought leaders, inventors, entrepreneurs, academia and policymakers to try and increase South Africa's competitive edge and to inspire sustained economic growth across the continent of Africa.

“Our exhibition attracted a lot of interest, especially from architects. It seems there is a great need for an aesthetic product that is easily available,” says Marchant. The good response could not only be attributed to the presence of the beautiful flamingos. Although it was logistically not possible or viable to demonstrate the actual 3D printing process in the small exhibition space at their disposal, they ably conveyed the impact of their research project by means of a poster, a video, a graphical presentation as well as interaction with visitors.

“3D printing of concrete promises to become a disruptive technology in the construction industry. It has the potential to reduce construction times and waste drastically, while also enhancing architectural freedom through its ability to produce geometrically-complex elements when compared to traditional methods of construction,” says Frederick.

The conventional approach to construction involves casting concrete into a mould (known as formwork) using materials

such as timber. This formwork accounts for about 60% of the total cost of concrete construction and is a significant source of waste, as it is discarded. Worldwide the construction industry is responsible for 80% of waste and the formwork therefore not only adds to the cost of construction, but also contributes greatly to the waste. Another disadvantage of this conventional method is that pouring concrete into formwork limits the creativity of architects to build unique shapes, unless very high costs are paid for bespoke formwork. 3D printing utilises additive manufacturing techniques, which means objects are constructed by subsequent deposition of material layers. Free-form (using computer models) additive construction allows design freedom at no additional cost. The cost of producing a structural component would not be tied to the shape, so construction could be freed from the ‘ordinary and dull’ rectangular designs that are so familiar in current building architecture.

“If you want to enter the market, printing smaller items (such as these concrete flamingos) would be a good starting point,” says Marchant. Frederick adds jokingly: “If you want to make a ‘quick buck’ this is the way to go.” However, Marchant and Frederick have a much bigger picture in mind and are very serious about first completing their research and obtaining their PhD degrees. After that, there will be ample time to try and make a few ‘quick bucks’!

Frederick and Marchant are part of the diverse seven-member Stellenbosch 3D concrete printing team under the leadership of Prof Gideon van Zijl. The team's research includes printable concrete material development, comprising foam concrete, high-performance standard and fibre reinforced concretes. In addition to research conducted on rheo-mechanical print process optimisation and durability assessment; the design and analysis of reinforcement strategies, prefabricated structural elements and the feasibility of 3D concrete printing in the South African context are investigated. ■



Main photograph: Marchant van den Heever (left) and Frederick Bester with the bench and table X-Furniture prototypes they manufactured by means of 3D printing of concrete. Far right shows the 3D printing process of a concrete flamingo. Far left are the elegant flamingos that attracted many visitors to the students' exhibit at the SA Innovation Summit.

AfriSam and the environment – an ongoing partnership

As one of the top ten CO₂ emitters globally when measured per capita, the cement manufacturing industry is often singled out as the culprit in the greenhouse gas debate and comes under fire regularly to reduce its carbon footprint. As a leading supplier of construction materials, AfriSam has over many years pioneered and sustained numerous initiatives towards a greener planet across all its business units, for the benefit of all stakeholders and at all touchpoints.

“AfriSam was at the forefront to introduce proactive measures in the southern African cement manufacturing sector,” according to Nivashni Govender, environmental specialist at AfriSam. “To put actions to our concerns, we established our own environmental department as early as 1992 and developed an environmental policy just two years later.”

“Continuous investment in research and development has enabled AfriSam to improve processes, technology and products with the ultimate goal of energy optimisation and emission reduction encompassing the complete range of our products: aggregate, cement and concrete,” says Govender.

“It is in our cement manufacturing business where the most notable impact on the lowering of carbon emissions is achieved. Our ongoing focus on alternative fuels and resources (AFRs) has allowed us to steadily reduce the amount of coal burnt in our cement kilns, which in turn contributes to lower CO₂ emissions,” Govender says. “One example is at our Dudfield plant where we developed and implemented process modifications to allow us to co-process scrap tyres – a strategy that also contributes significantly to addressing the environmental hazards posed by tyres when they are disposed of in a landfill.”

Govender continues: “Cement kiln emission improvement has been the AfriSam way for a long time, setting the benchmark for others.”

“The introduction of our green cement product range in 2000 added to our goal of becoming one of the lowest CO₂ generators per ton of cement in Africa,” she expands. “The



To mine limestone in the ecologically sensitive Saldanha Vredenburg area, AfriSam is placing more than 150 ha of this property into environmental status

use of extenders in our cement has resulted in a substantial reduction in our clinker factor without compromising the quality of our products.”

Energy and water conservation are ongoing programmes, featuring high on AfriSam’s environmental agenda, according to Govender. Energy efficient lighting has been installed across the company’s cement, readymix and aggregate quarry facilities, and water conservation has become a priority in all its operations.

Dust suppression remains another critical environmental priority for all AfriSam readymix plants. Where deemed necessary as an additional measure, automatic dust suppression systems using fine recycled water mist have been installed around the perimeter of identified plants with additional systems where the readymix trucks are loaded.

“AfriSam’s reputation of caring for the planet, people and the environment is evident in the way we manufacture our vast product offering and how we conduct our business,” Govender concludes. “This philosophy is underpinned by the Centre of Product Excellence and applies to all business units to actively measure and manage their impact on the environment, whilst continuing to produce high performance products with low carbon footprints”. ■

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