Issue 3 2023

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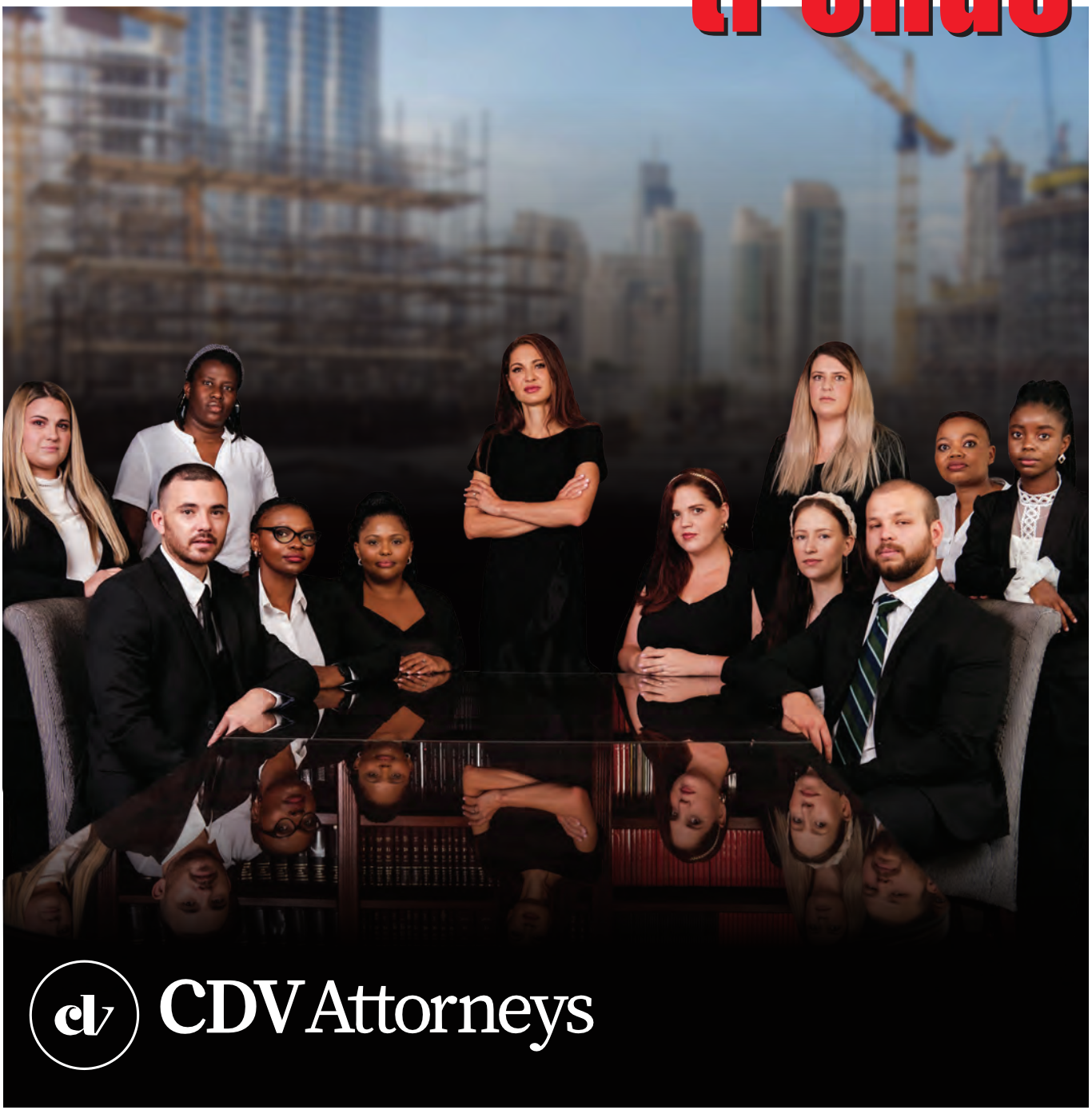

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- Strategic vision of the cement industry in 2040
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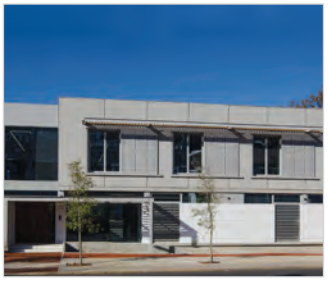

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MANAGING EDITOR:
Eamonn Ryan
email: EamonnRyan@dmgevents.com
T: +27 21 700 5608 M: +27 82 560 8718

PROJECT MANAGER:
Tracy-Lee Behr
email: TracyLeeBehr@dmgevents.com
T: +27 21 700 5512 M: +27 73 367 9647

MARKETING:
Yaseen Dalvie
email: YaseenDalvie@dmgevents.com
T: +27 21 700 5506 M: +27 79 403 0683

EXHIBITION & PUBLISHING SALES MANAGER:
Kenneth Masvikeni
email: KennethMasvikeni@dmgevents.com
T: +27 21 7005509 M: +27 72 686 6998

DESIGN & LAYOUT:
Virgil Jacobs
email: rykim@mweb.co.za
M: +27 83 524 5024

PRINTED BY:
Onyx Press
T: +27 21 593 9173

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The construction industry in Africa is facing a shortage of skilled workers

One of the biggest threats to the future economic growth of South Africa is the shortage of technical skills in engineering and technology.

Eamonn Ryan

The construction industry in Africa is a crucial driver of socio-economic development and a key employment multiplier. However, in the midst of high unemployment the industry is facing a serious challenge of skills shortage, which is driving up labour costs and creating delays in projects. There is a growing need for workforce development programmes to train new workers and upskill existing ones.

According to the *Africa Construction Trends* report by Deloitte, the number of projects under construction in Africa increased by 20% in 2021, with a total value of USD521 billion. However, the report also notes that the availability of skilled labour remains a major constraint for the industry, especially in sectors such as energy, transport and water.

This lack of skills in the African construction industry is replicated in the cement and concrete sector, impacting it in several ways including reducing the demand for cement and concrete products as fewer projects are undertaken or completed due to skills shortage. As we move towards an age of intelligent and green concrete, this skills deficit will only worsen and ultimately affect the quality and durability of cement and concrete structures, as workers may not have the adequate skills or knowledge to mix, place, finish and cure concrete properly.

Poor skills increase the risk of defects, failures and disputes, as workers may not follow the specifications, standards and codes of practice for cement and concrete applications. It hampers the innovation and sustainability of cement and concrete solutions, as workers may not be able to use new technologies, materials or methods that can improve efficiency, performance and environmental impact.

There are centres of learning excellence, especially in South Africa, and the cement and concrete sector in Africa is aware of the skills challenge and is taking steps to address it.

However, the skills shortage in the construction industry is caused by more fundamental weaknesses in national education systems. For instance, the low quality and relevance of education and training systems in many African countries do not match the needs of the industry.

Furthermore, there is a high attrition rate among skilled workers, many of whom leave the industry due to poor working conditions, low wages, lack of career progression and opportunities for further learning. This is especially evident in the migration of skilled workers to other countries or regions, where they can find better prospects and remuneration. Teachers too are lured abroad, worsening prospects for uplifting skills in sub-Saharan Africa.

The skills shortage in the construction industry has negative consequences for the sector and the economy as a whole, such as an increase in labour costs, which reduces the profitability and competitiveness of construction firms and contractors. A decline in the quality and productivity of work and projects in turn affects the satisfaction of clients and end-users. It may also result in delays or cancellation of projects, which hampers the delivery of infrastructure and services that are essential for social and economic development.

To address the skills shortage in the construction industry, there is a need for workforce development programmes that can:

- Provide relevant and quality education and training for new entrants to the industry, as well as existing workers who need to upgrade their skills or learn new ones.
- More aggressive implementation of recognition of prior learning programmes.
- Promote skills transfer from experienced workers to less experienced ones, through mentoring, coaching and on-the-job training.
- Enhance the recognition and certification of skills acquired through formal or informal learning, to increase the employability and mobility of workers.
- Improve the working conditions, wages and benefits of workers, to retain them in the industry and attract new ones.
- Foster collaboration and coordination among stakeholders, such as government, employers, workers, education providers and civil society, to align skills supply and demand and ensure quality standards.

Workforce development is not only a necessity but also an opportunity for the construction industry in Africa. By investing in human capital, the industry can improve its performance, competitiveness and sustainability, while contributing to social and economic development. ■

The Concrete Manufacturers Association celebrates half a century of precast concrete development

Written by David Beer on behalf of the Concrete Manufacturers Association

Now celebrating over 50 years of precast concrete promotion, the Concrete Manufacturers Association (CMA) first took root in 1972 when five concrete block manufacturers, Hume Limited, Concrete Products, Mazista Limited, Roodepoort Brick Works and Watson Concrete founded the Concrete Block Association.

Members of the CMA attending the AGM. Credit: Eamonn Ryan/Concrete Trends

If there is one substance which more than any other sets the scene for the built environment it is concrete. In South Africa the material came into its own at the beginning of the 20th Century thanks to its strength, versatility and durability. Its footprint extends to almost every human settlement and is so interwoven into the fabric of our lives that most people rarely give a second thought to its essential role in the smooth functioning of modern communities.

Precast concrete – any concrete product manufactured off-site rather than cast in-situ – has been around since the mid-nineteenth century when concrete pipes were first introduced in the US for improved sanitation. South Africa's first cement factory was established by Pretoria Portland Cement (PPC) in 1893.

The substantial growth in the use of precast concrete is largely a post Second World War phenomenon, spurred on by rapid industrial and economic expansion across the globe, and it was the humble concrete brick and block, both in South Africa and abroad, which unlocked the massive post-war development of the precast concrete industry.

The name Concrete Block Association was used for four years from 1972 until 1976 when it was changed to the Concrete Masonry Association to reflect the inclusion of concrete bricks as well as blocks in its promotional activities.

Operating on a shoestring, barely sufficient to cover secretarial or administrative costs the Association received funding from Portland Cement Institute (PCI) and later the Cement and Concrete Institute (C&CI) which also provided technical help and administrative assistance. It was only in 1995 that the name Concrete Manufacturers Association was adopted.

The Association promoted technical excellence in the manufacturing and application of concrete masonry units during the 1970s when thousands of low-cost houses were successfully and productively built using this modular design approach.

A major turning point was reached in 1979 under the inspiring leadership of George Taylor, the Association's first national president, when a Concrete Block Paving division was established. Its initial membership comprised some of the major concrete block paver producers: Grinaker Precast; Concor Precast; and Brickor Precast, among others.

There was no official paving standard then and everyone was producing to varying standards and specifications. This situation took a dramatic turn for the better when one of the world's leading concrete block paving experts, Brian Shackel of the University of New South Wales in Australia, accepted a two-year contract offered by the CSIR's National Institute for Transport and Road Research to conduct accelerated testing of local roads and airport paving.

The CMA was heavily involved in Shackel's research on paving and it formed the basis for the SANS (formerly the South African Bureau of Standards [SABS]) standard in the manufacture of paving blocks and its application. Shackel's input had a profoundly positive impact on the local paving industry and it transformed South Africa into a world

leader in concrete block paving technology – a status it still enjoys today.

During the early eighties regional committees were established in the Western Cape, the Ciskei, Eastern Cape, Natal and Transvaal and some of the influential members from the regions included Columbia DCM, Corocrete, Deranco Blocks, Grinaker Precast, Calsica Bricks and Border Concrete.

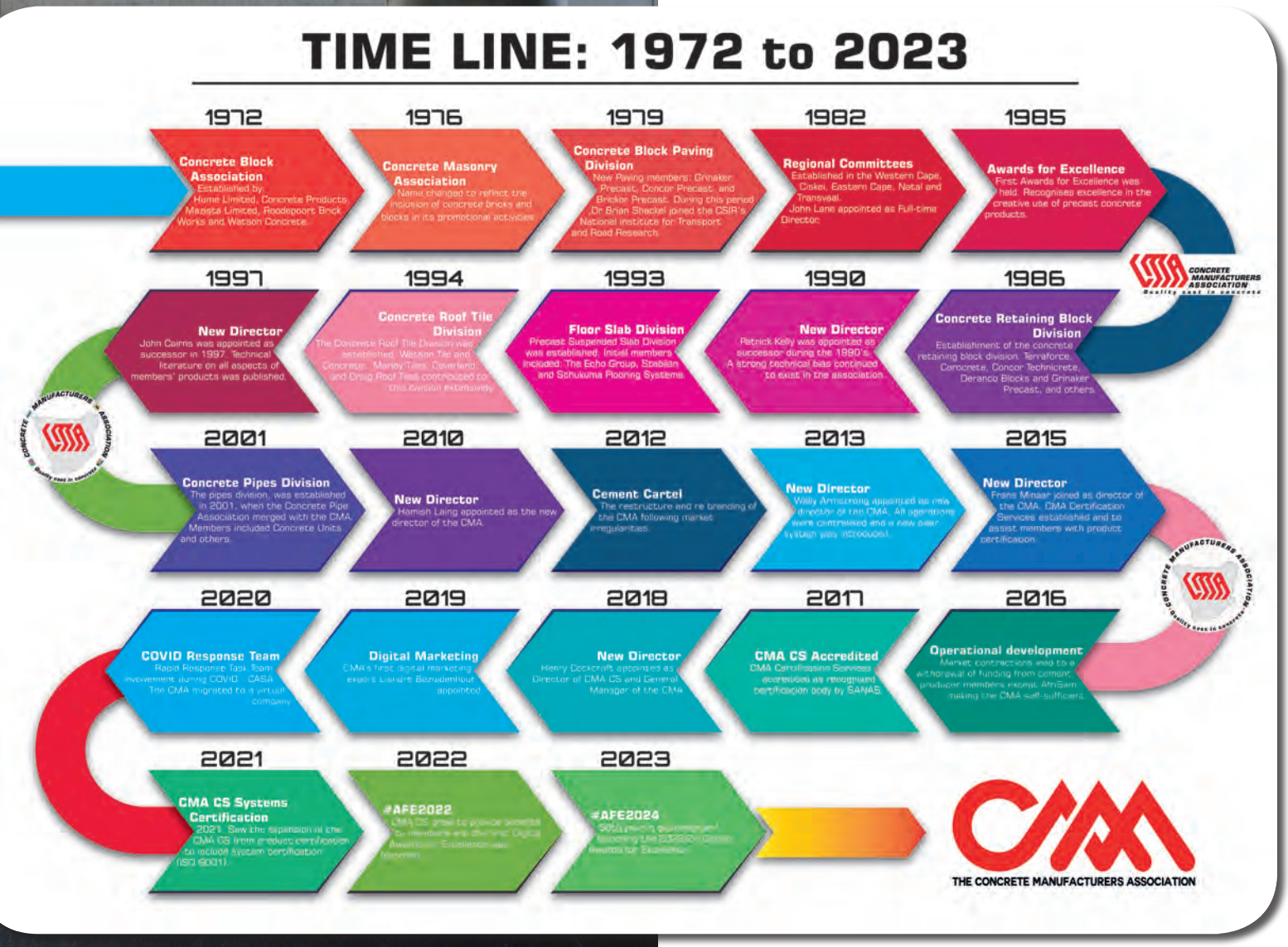
It was in 1982 that members began to appreciate that using a neutral and technically proficient body such as the CMA offered enormous potential for promoting the excellence of precast concrete products through the production and wide distribution of technical literature. An important element of the new initiative entailed the appointment of a fulltime director, and John Lane, a civil engineer and one of the country's foremost masonry and paving experts, was the first to fill this position in October 1982.

Under Lane's stewardship, the Association adopted a strong technical bias, a process which was continued under two subsequent directors, both of whom were civil engineers, Patrick Kelly in the 1990s and John Cairns from 1997 to 2010. Technical literature on all aspects of members' products was published across all divisions with many producer members offering their expertise and time on a pro bono basis. This practical educational material was available to construction professionals and the public at no charge, and enabled the CMA to promote the correct and professional application of precast concrete countrywide.

Contact with peer associations in Australia, New Zealand, the UK and the United States, was initiated during the 1980s and this ensured that the South African precast concrete industry kept abreast with, and in some instances led, developments in the rest of the world.

The year 1985 was a momentous one for the Association for it was then that the first CMA Awards for Excellence competition was held. Staged biennially, its chief purpose has always been to recognise excellence in the creative use of precast concrete products, and to honour those involved in the application of these products, either through design or construction, or both.

Then in 1986 a Concrete Retaining Block (CRB) Division was established, and Terraforce, Corocrete, Concor Technicrete, Deranco Blocks and Grinaker Precast, among other companies, played a major role in its diverse activities, largely under the direction of Silvio Ferraris and Taco Voogt. The division did much to ensure the correct and safe installation of CRB walls by staging seminars on a regular basis and working closely with the SABS on standards for the manufacture of CRB blocks and the design of CRB walls.



Two further divisions were added during the 1990s, Precast Suspended Slab Division in 1993 and the Concrete Roof Tile Division in 1994. The sixth and final division, PIPES, was established in 2001, when the Concrete Pipe Association merged with the CMA

It was during the late 1990s that the CMA became acutely aware of the need to improve the quality of life for previously disadvantaged communities. From then onwards concrete block paving and job creation projects were promoted in townships and precast concrete toilets were introduced in rural communities, greatly improving sanitation.

Down the years various independent surveys were sponsored by the CMA, for example on masonry, piping, roofing and paving materials, all of which demonstrated how precast concrete was the best performing material in these applications.

Besides the active promotion of precast concrete, the CMA's underlying success story lies in providing its members with a service which they are unable to do nearly as well individually. And thanks to its close working relationship with SABS most of today's standards which regulate the production and application of precast concrete products were established. There is no doubt that without the active participation of the CMA, the technical integrity and synergies which have punctuated the sustained growth of the precast concrete industry would simply not have been possible. This activity was not only to the advantage of CMA members, but has benefitted all South Africans.

After 13 years at the helm John Cairns retired in 2010. He was succeeded by Hamish Laing (2010-2013), Wally Armstrong (2013-2015), and Frans Minnaar (2015-2018). The current incumbent, Henry Cockcroft, succeeded Minnaar in 2018 when he was registered as a director and assumed the title of general manager.

It was around 2008 when the Competitions Tribunal launched an investigation into two cartels, one run by the country's cement producers and the other by nine precast concrete manufacturers, all of them CMA members. Heavy fines were imposed on all involved. The CMA was involved by administering the sharing of statistical information on precast concrete production output among all its members. The Competitions Tribunal released an advisory document regarding the information exchange system of the CMA, limiting activities, an injunction which affected the Association and its membership base negatively. Moreover, cement producers which had hitherto supported the CMA financially through what was then the Cement and Concrete Institute (C&CI) were experiencing a drop-off in demand and this prompted them to withdraw their support.

On succeeding Hamish Laing as director in 2013, Wally Armstrong embarked on a new membership recruitment drive. He was also instrumental in streamlining the Association's six operating divisions into two operational pillars, Precast Building and Precast Infrastructure, and this assisted in broadening the membership base and attracting new members.

When Frans Minnaar succeeded Armstrong in 2016, many CMA producer members had grown dissatisfied with the certification of their products and this prompted Minnaar to initiate the establishment of a specialist precast concrete certification body, CMACS (Concrete Manufacturers Association Certification Services). CMACS was accredited by SANAS (South African National Accreditation System) a year later and its subsequent success has contributed substantially to the sustainability of the CMA.

When Minnaar resigned in 2018, his shoes were filled by Henry Cockcroft. The latter initiated a well-defined strategy which strengthened communication between the CMA and the built environment, and re-established the Association as the custodian of the South African precast concrete industry.

This strategy involved the appointment of the CMA's first digital marketing expert, Liandre Bezuidenhout, in 2019. He has played a major role in establishing the Association's social media channels, an initiative which paved the way for a new era of operation and communication.

Henry Cockroft, present executive director of CMA.

Bezuidenhout was also instrumental in converting the acclaimed CMA Awards for Excellence competition into a digital extravaganza. Unprecedented levels of reach into the digital built environment and associated industries were achieved during the 2022 competition, making it by far the Association's most successful marketing exercise to date.

The Covid pandemic in 2020 saw a huge shift in the CMA's business model. Its central office premises were permanently closed and the Association transferred its communications and marketing arms onto digital platforms.

During that year the Association also played a pivotal role in collaborating with other stakeholders to form the Rapid Response Task Team, a body which successfully lobbied government to switch the cement and construction industry from Level 1 lockdown status to Level 4. This initiative enabled the precast concrete manufacturing industry to return to production as early as June of that year much to the relief of CMA producer members. Subsequently, the Rapid Response Task Team has evolved into the highly acclaimed Construction Alliance of South Africa (CASA).

The Association achieved another milestone in 2021 when CMACS expanded its product certification service to include ISO 9001 certification. In 2022 CMACS attained record turnover and profit levels. As a shareholder in CMACS this achievement has provided the CMA with added financial security, enabling it to excel in advancing its members' interests.

Cockcroft has every confidence that the CMA will continue to grow from strength to strength, entrenching its position as the proud custodian of South Africa's precast concrete industry. The Association is currently involved with its 18th Awards for Excellence competition and it has embarked on a new wave of precast concrete content delivery. This will not only benefit CMA members, but the country at large as well. As Cockcroft says: "We are yet to attain the crest of the wave but will always endeavour to operate to the best-practice standards." ■

Tiger Cement: A 100% Black- and woman-owned cement manufacture eyeing Africa

Written by Eamonn Ryan

In the highly competitive sector of cement manufacturing in South Africa, one company stands out for its unique ownership and commitment to quality. Tiger Cement is a 100% black- and woman-owned company, headed by CEO Grace Thovhakale.

Grace Thovhakale, CEO Tiger Cement

This gives it an edge in securing government contracts and tenders from construction businesses and retailers wherever Broad-Based Black Economic Empowerment (BBBEE) is a key factor. Thovhakale notes that it provides a significant portion of construction supplies in township development.

Being a significant player in the market, Tiger Cement distinguishes itself by prioritising the production of high-quality cement and providing excellent customer service. The company's team of 38 employees and directors are dedicated to ensuring client satisfaction, she says.

The company has invested in chemical and civil engineers to ensure that only the best and environmentally-friendly raw materials are used in its cement production. All the raw materials used by Tiger Cement pass the rigorous tests conducted by the South African Bureau of Standards (SABS) and adhere to South African National Standards (SANS).

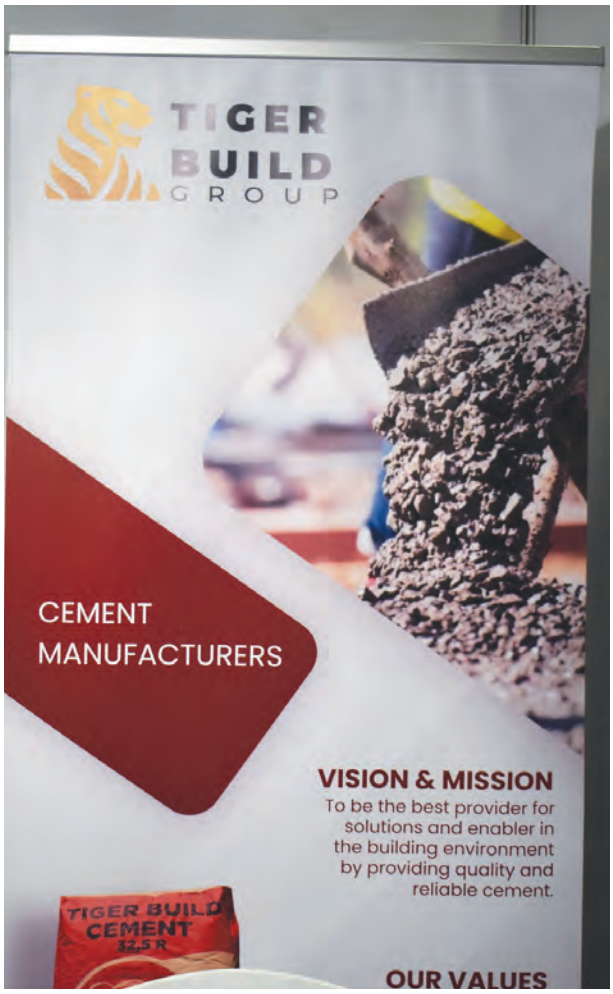
The company has a growing presence in Africa. "We have already established offices in Ghana since 2019 and are currently in the process of establishing offices in several other countries to benefit from partnerships in the African Continental Free Trade Area (AfCFTA), with management currently visiting Cote d'Ivoire and Zambia. The company evaluates each country based on its stability and merits before venturing into new markets," explains Thovhakale.

She notes that Africa's infrastructure and government projects present significant opportunities for Tiger Cement, which is why the company has decided to focus its efforts in these areas. The demand for cement in African markets, combined with Tiger Cement's dedication to quality, gives the company a competitive advantage in securing new business.

While cement production remains Tiger Cement's primary focus, the company is currently exploring the manufacture of related products such as paint and tile adhesives. "We're constantly seeking to improve quality and expand our range of offerings," explains Thovhakale.

Reducing carbon emissions is a major concern for the cement industry, one which Tiger Cement recognises this and has dedicated its research and development (R&D) efforts. The R&D team is seeking innovative solutions to ensure it uses eco-friendly manufacturing techniques, ethical business practices, as well as contributing to the economic empowerment of the local community – within its means.

Succeeding against the big cement manufacturers is not without challenges, she says. "Our main focus is on cement production, and we remain committed to sustainability and actively seek alternative methods in various African countries where we operate. We aim to minimise our environmental impact and contribute to the fight against climate change." ■



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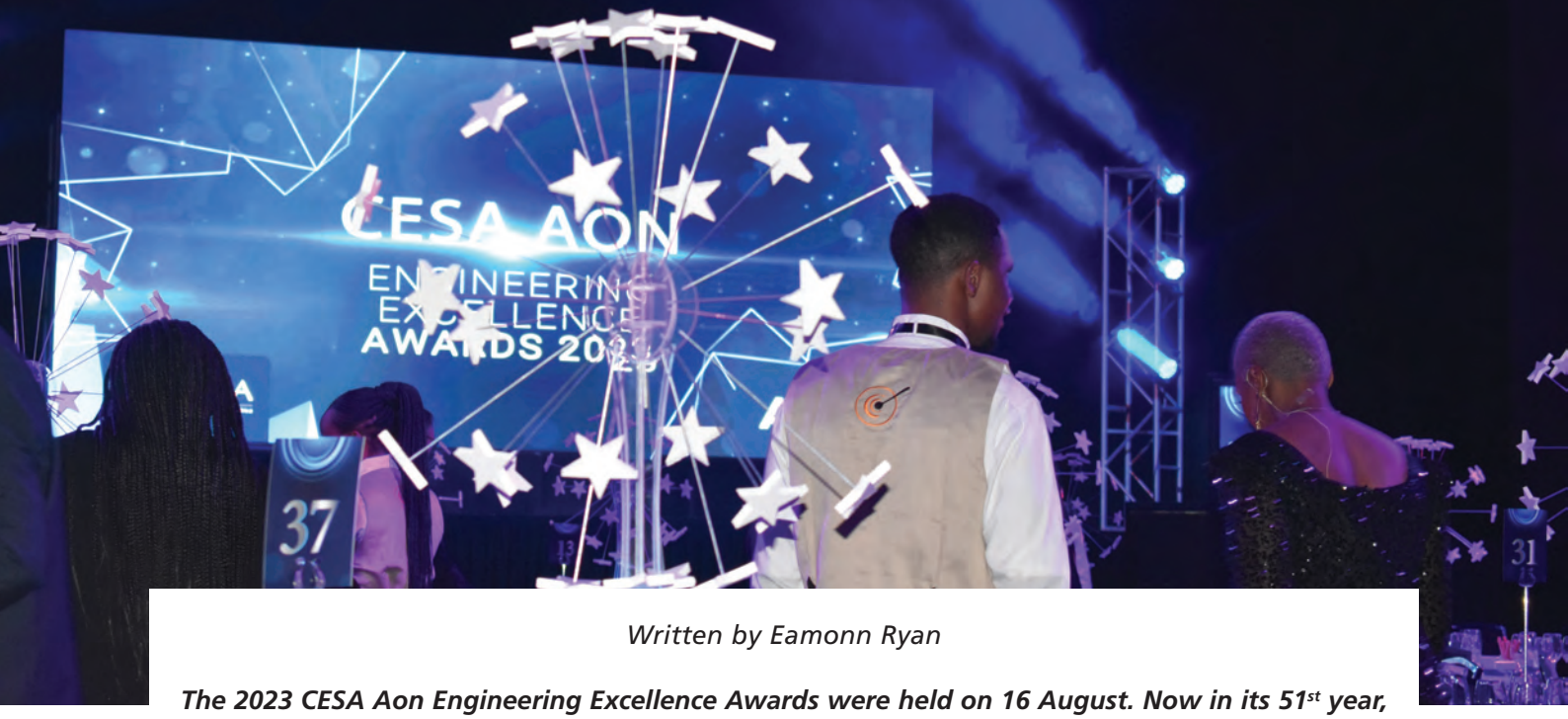
CESA Aon Engineering Excellence Awards 2023 winners announced



Written by Eamonn Ryan

The 2023 CESA Aon Engineering Excellence Awards were held on 16 August. Now in its 51st year, the Awards celebrate innovation, quality, outstanding workmanship and professionalism which was evident in the entries for each category.

Olu Soluade, president of Consulting Engineers South Africa (CESA), opened the evening. "Tonight, we are here to celebrate not just the outstanding achievements of our member firms, but also the profound impact they have had on the engineering industry and society as a whole.

"Throughout the years, the dedication and commitment of our member firms have undoubtedly made a difference in protection of lives and livelihoods. Your work as engineers goes beyond technical expertise - it embodies a noble calling: to serve and make a positive impact on the world around us. Tonight, we are about to witness the legacy of excellence in engineering, and these awards serve as a testament to the incredible achievements of your various firms and the immense impact you've had on society.

Olu Soluade, president of ASHRAE South Africa chapter.

"Excellence is not a static destination, but an ongoing journey of relentless progress towards achieving the extraordinary. What once constituted top-tier performance decades ago may now appear as commonplace. And this emphasises the need for potential innovation and forward thinking," says Soluade.

"Our inherent DNA bestows upon us the capacity and the resilience to push the boundaries and exceed our human limitations. To all our members, we call for commitment to invest in nurturing our future leaders, empowering them with the tools and support they need to enable us to drive groundbreaking infrastructure development and perpetuate this spirit of innovation that we now so passionately celebrate. At CESA we stand firm on our unwavering values of honesty and integrity."

"May this event inspire even more innovation and transformative projects in the years ahead," says Soluade.

CESA Chief Executive Officer, Chris Campbell congratulated the winners and finalists whilst stating that amidst economic challenges and sluggish growth, it is essential to recognise the pivotal role of consulting engineering. "While external factors may pose obstacles, our focus on delivering excellence must remain unwavering."

WINNERS AND COMMENDATIONS

In the category Young Engineer of the Year, Mareli Botha from Zutari was named winner. One of the youngest technical directors and shareholders of the firm, she acts as lead process engineer, project manager or engineering manager on a wide variety of impactful projects for the process mechanical group of the company. She has gained significant international experience through her involvement in several global projects in locations across Africa, Australia, New Zealand, Europe, America and the Middle East. She's an enthusiastic problem solver, mentor, sustainability specialist and leader with a deep passion for green process engineering. She embeds sustainability principles at the core of every design.

In her acceptance speech, Botha says: "It's really excellent to see all these faces in this room who all believe in CESA vision of engineering excellence. A seed doesn't grow except in soil. I have had access to brilliant leadership that is transparent (at Zutari) that brings us along. It's all about the impact in this case. I really hope that I can actually make an impact in my role.

Darren Pillay from Knight Piesold was commended for "striving to create infrastructure solutions that not only injure the test of time, but also promote efficiency and environmental consciousness. His eminent and mindset and technical proficiency contribute to shaping a connected world where infrastructure serves as the backbone of progress and development".

Stephen Rose was commended for successfully growing the data center division at Royal Haskoning DHV, exceeding targets and expanding the portfolio to become the largest in Africa received commendations.

In the category, Projects with a Value Between R250-million and R1-billion, KBK Engineers were announced winners for the N1 Musina Ring Road for Sanral.

Zutari was named winner in the Projects with a Value Between R50 million and R250 million category for the Square Kilometre Array Meerkat Extension for the South African Radio Astronomy Observatory (SARAO). Two commendations were awarded in the category with Bigen Africa receiving a commendation for the East London Industrial Development Zone Electrical Upgrade and Zutari receiving a commendation for the Groote Schuur Estate Refurbishment for the Coega Development Corporation.

In the category, Projects with a Value Less Than R50 million, the Naidu Consulting- MSW Consulting JV was the winner for the Tongaat Water Treatment Works Emergency Remediation Works for the eThekwini Municipality. Zutari received a commendation for the compilation of the 15-year Western Cape Integrated Drought and Water Response Plan.

The winner of the Best International Project was ARQ Consulting Engineers for Yusufeli Dam for Limak Construction SA for DSi, the Turkish State Hydraulics Works. Two commendations were awarded in the category with AECOM receiving a commendation for the ABSA Head Office in Zambia; and MPAMOT Africa receiving a commendation for the Beitbridge Border Post Upgrade and Modernisation for Zimborders.

In the category Engineering Technology and Innovation – HVAC Building Systems Design Excellence, Maninga Engineering received a commendation for the Test and Examination Centre: Part 1 – Flower Hall for the University of Witwatersrand.

Wits' Flower Hall is located in the southwestern corner of the West Campus and is currently being used as a test and examination venue. The university's requirement was to free up academic desk and office space for various schools in anticipation for increased enrollment of postgraduate students as per the university's 2022 strategic mission. A further phase of building will see the conversion of the building for use as engineering research laboratories. Maninga Engineering reduced the energy consumption of the building with the implementation of active chilled beams controlled by a building management system. The Flower Hall installation is the biggest installation in Africa with 138 active chilled beams.

In the category Engineering Technology and Innovation – Water, Sanitation, and Hygiene (WASH), Zutari received a commendation for the Groote Schuur Estate Refurbishment for the Coega Development Corporation.

BVi Consulting Engineers won the Business Excellence Award, while Koleko Solutions walked away as winners in the Small/Medium Company of the Year category. For the Mentoring Company of the Year award, Naidu Consulting, received a commendation. ■

SAARDA Golf Day hosted in Johannesburg

SAARDA's golf day was held on Wednesday, 31 May at the East course of the Royal Johannesburg and Kensington Golf Club in Linksfield North, Johannesburg.

The creation of the South African Affordable Residential Developers Association (SAARDA) was driven by the need for a body to represent the interests of developers involved in the affordable housing development sector within the national policy and implementation discourse. SAARDA's role is unique as its members face very specific issues: the affordable housing sector has particular characteristics, requires specialised knowledge, and imposes certain practical parameters on the players involved in the delivery of affordable housing.

The purpose of SAARDA is to act as a mouthpiece for the relevant role players In the affordable housing market such as developers, construction companies, marketers, bond originators, professional consultants, and conveyancers. SAARDA's mandate is to put pressure on banks (including end-user and development financiers), on national, provincial, and local government, and other relevant parties, informing them of the difficulties the industry is experiencing in providing affordable housing to the people of South Africa.

SAARDA is an all-inclusive national body driven as a business.

SAARDA allows for different types of annual memberships depending on the nature of your involvement in the affordable housing space:

1. Contractors and developers (voting members) – small establishments which construct 40 houses and less each year and large establishments which construct more than 40 houses a year.
2. Associate voting members:
   - Suppliers
   - Bond originators
   - Professionals like conveyancers, engineers, town planners, quantity surveyors
3. Honourary non-voting members – financial institutions (banks, NURCHA, etc.), municipalities, provincial government, and national government. ■

Teams from all over the region enjoyed the scenic Royal Johannesburg and Kensington Golf Club in Linksfield North, Johannesburg.

Picture credits: Eamonn Ryan/Concrete Trends

Unpacking the latest developments in the built environment

Big 5 Construct Southern Africa, now in its tenth year, was held at the Gallagher Convention Centre on 27-29 June 2023.

The exhibition clearly reinforced how the construction market in Southern Africa has demonstrated a strong resilience, paving the way for industry growth amidst a range of opportunities and challenges. Notably, infrastructure investment in South Africa is witnessing favourable developments with a substantial allocation, for instance, of R2.6 billion being made for human settlement development over the upcoming three years in the Western Cape, along with an additional R100 million dedicated to enhancing the City's strategic economic assets and informal trading infrastructure. These noteworthy initiatives represent a glimpse into the multitude of ongoing projects and innovative ideas across the region.

The exhibition promotes progress towards growing a strong, transparent, and transformed construction sector. "The event unites industry professionals, experts, and stakeholders in the built environment to exchange knowledge, showcase innovative solutions, and foster collaboration," says Tracy-Lee Behr, Portfolio Director: Built Environment at dmg events.

Each year, Big 5 Construct Southern Africa offers contractors, engineers, architects, quantity surveyors, designers, and property developers free and easy access to over 6 000 products and technologies and 30 CPD accredited workshops, through partnership with the South African Institute of Building Design (SAIBD) and South African Institution of Civil Engineering (SAICE).

A broad selection of topics were discussed in the various conferences and workshops covering key themes from architecture to real estate, concrete to green and smart construction and trends relevant to contractors. From reducing carbon in geotechnical construction, to learning about the benefits of quality assurance through product testing, there was no lack of insight on display. In particular, it sought to offer insight to the industry on how best to encourage the youth to join the industry, boosting job creation and innovation as bright minds bring about bright ideas.

Andiswa Xozwa, Managing Director of Okuhle Project Management said women deserve better representation in the industry and shared practical solutions such as investing in women-owned businesses and creating a positive and diverse working environment across construction.

New to the programme this year was the Real Estate Talks. Broll Property Group CEO, Malcolm Horne opened discussions, setting the scene on real estate alongside Sean Berowsky, Broll's Head of Capital Markets. Included in panel discussion topics, was the intersection of opportunities in real estate, construction and technology, where PropTech solutions were debated. Surviving a property crisis also gives rise to opportunities, which was explored and moderated by Broll Integrated Facilities Management Chief Operations Officer, Batabile Sibaca. "Difficult economic realities require creating thinking and looking ahead with a sustainable lens, and real estate allows for plenty of green innovation," Sibaca says.

Also on the agenda were African Smart Homes. In the age of smart cities, the internet of things, big data and interconnectivity, a smart home should be much more accessible,

and has great potential on a continent like Africa. Exploring this in greater detail, Dave Britany of Switch Smart outlined the options available from quick improvements to entirely controlling a property remotely through a secure app.

Sustainability and growth were high on the agenda across this and co-located events this year. The Big 5 Construct Southern Africa Stakeholders Engagement Forum, hosted in partnership with NAFBI returned alongside Totally Concrete, the African Smart Cities Summit and the Big 5 Southern Africa Construction Impact Awards.

According to Frost & Sullivan Africa Partner and CEO, Hendrik Malan, who was on the judging panel of the awards, the South African construction industry is on an upwards trajectory. As of January, projects worth R232 billion were under construction, amid activity by SANRAL awarding 323 tenders to the value of R59 billion by the close of its 2022/23 financial year. SMEs and communities stand to benefit through large-scale job creation, skills development, and poverty relief, and to counter a lack of technical- and project management resources, Infrastructure South Africa has allocated R600 million towards project preparation, specifically for rural and under-resourced areas.

"These are all excellent developments that filter through to the industry at large, inspiring further growth and innovation," Malan says.

"These events provided a platform to explore issues, solutions and new opportunities across Southern Africa's construction market, while recognising the resilience, adaptability and possibilities ahead," Behr concludes. ■

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Against all odds: the journey of a black woman in the cement industry

In the male-dominated cement and construction industry, one remarkable woman has defied all expectations, overcome hurdles and barriers, and carved her path to success.

Meet Tiger Cement and Tiger Build Group CEO Grace Tshiwela Thovhakale, a tenacious black woman who has navigated the construction sector with no capital but an indomitable spirit.

The maxim that 'entrepreneurs are born and not made' is encapsulated by the business history of Thovhakale. She is a true pioneer who has broken new ground, ventured into the unknown from her youth and continues to do so today. From her humble beginnings in Venda where she attended primary and high school, she has always been industrious. Thovhakale helped pay for her own tertiary education by starting a cool-drink business while studying for both her degrees in music and education at the University of Venda.

Grace Tshiwela Thovhakale

On graduating with a diploma in education, she was employed as a teacher at Soutpanberg Primary School. She taught children for five years until she struck out on her own and ventured into the cement business in 2009. Between 2009 and 2012 Thovhakale managed to make significant inroads into the male-dominated industry and her name became synonymous with cement in Limpopo. A natural entrepreneur and leader, her work experience is characterised by directorships in at several companies between 2012 and 2017. In 2018 she decided to once again venture into the cement business equipped now with a broader understanding of this industry and its supporting value chain of logistics, mining, wholesale and retail businesses. As a pioneer, she established her own cement brand, Tiger Build Cement. She is now the only female cement company owner in South Africa and is well-known in the industry for her tenacity, enterprise and resilience.

"I have a special passion for the cement industry, am passionate about developing women and youth in the SMME environment in order to encourage them to tap into the country's economic mainstream. I'm also very focused on creating a platform for other women to enter the economic space by establishing business ventures – particularly the cement industry. My vision is to create a flagship black woman-owned cement manufacturing company that will traverse South Africa's borders and provide services to the SADC region and beyond," says Thovhakale.

"From the moment I set foot in the construction sector, I was driven by a fervent desire to break barriers and pave the way for other aspiring women. Despite facing numerous obstacles and enduring skepticism, my determination pushed me forward. My motivation was fueled by the belief that success would benefit not only myself but serve as an inspiration to other women facing similar challenges," she explains.

As Thovhakale progressed in her construction career, she actively embraced the role of a mentor to other women. Understanding the importance of representation, she strove to create an environment where women could thrive, providing guidance and support to those seeking to overcome gender biases. Thovhakale dedication to mentoring became a foundation for fostering a stronger, more diverse workforce in the construction industry.

She encountered numerous obstacles that women often face in business, particularly within the construction sector. These challenges include limited access to funding, gender bias in professional relationships, and prevalent stereotypes that undermine a woman's capabilities. Thovhakale's resilience in the face of these challenges exemplifies her unwavering spirit.

"With each obstacle I encountered, my resolve only strengthened. I refused to let setbacks deter me from my dreams. I rather transformed them into stepping stones towards ultimate success," she says. Her unwavering belief in her abilities propelled her forward, enabling her to overcome the limitations imposed by society and conventional norms. In the process, her incredible journey as a black woman in construction is a testament to the power of determination, resilience, and breaking down barriers in pursuit of one's aspirations.

"It's important to communicate to women that even if you're not funded, you can still overcome challenges. There's a tendency for people to believe that black-owned businesses rely only on government support, but that's not always the case. We just need opportunities, like access to markets. If someone can provide us with a market, it's like giving us a business. Unfortunately, we don't always get such opportunities, making it difficult in this industry. Nevertheless, I remain resilient and determined, never considering giving up. I prefer to run my own race.

"I started this business a long time ago, and it will still take time to reach my desired level of success. A successful person once said that 'to achieve a goal, it takes a thousand steps. What you see today is a result of someone's previous efforts. They may have faced failures along the way, but they kept going'. Similarly, we in the construction sector are not seeking funding from the government. Instead, we hope they recognise the value of having the first woman in Africa in this position – it can inspire other women to join this field."

She describes her goal in the following terms: "Our business goal as a cement blending and distribution company is to become the number one choice for construction companies in South Africa. As a business, we are willing to go the extra mile to invest in building a standard cement distribution company that provide our clients throughout Africa with standardized and top quality, value-priced cement products coupled by timeous and excellent customer services." ■

Women slowly making their mark in construction industry

Women make up only 10% of the South Africa labour force; many other countries in Africa and the Middle East have similar levels of female participation in construction.

Clearly, in terms of gender representivity, the industry has a way to go. This disparity is founded in long-established social norms and cultural expectations. It's well accepted that in such instances, role models have a key role to play in changing perceptions and encouraging more women to pursue careers.

Two such successful women who are showing just how much women can achieve in the construction and adjacent industries are Tshidi Mndzebele and Dr Julia Petla. Both women are CEOs of their respective companies, AvenirHoldings and Amedzo. AvenirHoldings is an engineering consulting and project management firm, and also offers construction and facilities management, and training and development. Amedzo offers turnkey projects in various aspects of construction.

Tshidi Mndzebele

Both companies testify to the success of the women leading them. AvenirHoldings has worked on numerous high-value projects for clients like Transnet, Eskom, ArcellorMittal South Africa, LaFargeHolcim and many others. Amedzo's two highest value projects were for DeBeers' Venetia Mine and in the construction of the Musina Ring Road.

Mndzebele, a professional industrial engineering technologist and certified director, as well as a Master Builders Association North exco member, says that she was initially attracted to engineering because it was a male-dominated industry and wanted to increase her probability of employment. "I saw it as an opportunity both to challenge myself and overturn the gender stereotypes in engineering and allied industries," she laughs. "I wanted to make my mark."

Dr Julia Petla

Petla says, "Women definitely have to overcome the widely held view that construction work is better suited to men. Women in the industry have to work twice as hard to earn a seat at the table," she reflects, adding that the men don't make the industry one particularly welcoming to women.

Mndzebele says that after 20 years, things are still difficult for her in that she constantly has to find ways of subtly asserting herself. Like many women in business, she recognises the reality of imposter syndrome – the feeling that she's got keep on proving herself. Despite all her qualifications, which include an MBA from GIBS, she is currently working towards a PhD at Wits. "As women, I think we feel the need to have documentary proof that we are entitled to be where we are," she says. "We have to learn to believe in ourselves."

Mndzebele is supported by her engineer husband who works happily in the business alongside her.

NETWORKS ARE IMPORTANT PLATFORMS FOR SUCCESS

Mentorship and building strong networks are both seen as key drivers of success in any industry, but particularly for women battling the establishment. "Building strong networks and finding mentors in the construction industry can help women access opportunities and navigate potential challenges," says Petla. "Why reinvent the wheel when you can take advantage of those who've completed the journey."

> "I always say that when all is said and done, passion is what will sustain you – even when things are looking at their bleakest."

One of the hidden barriers women face in construction is the boys' club mentality that plays out on the golf course or at Friday end-of-the-week braais. Aside from anything else, women tend to be excluded from such events because of the difficult work/life balance they have to strike as the primary caregivers in most families.

Mndzebele says that women shouldn't restrict themselves to certain roles within construction – they are more than capable of taking on any of them. "Women have a unique contribution to make because they see things differently. Where men see things in black and white, we see a more complex, holistic picture, so our decisions are perhaps more measured," she argues. "From a transformational point of view – so important in a world that is changing so fast – female leaders are often better at bringing everybody along."

Petla agrees, saying that if you are passionate about something, you will be able to achieve it: "I always say that when all is said and done, passion is what will sustain you – even when things are looking at their bleakest."

Mndzebele says she wouldn't change a thing in her career – even the challenges and failures. She is clear that hardships are good learning experiences. "I'm grateful for the journey I've had; it's made me what I am," she says. "I feel a great obligation to play my part in providing a new generation of women in engineering and construction with the guidance and mentorship I benefited from." ■

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Infrastructure and growing demand for cement and construction services in the MENA region

Written by Eamonn Ryan

Concrete Trends *caught up with United Arab Emirates (UAE) and Dubai-based Eng. Amr Nader to discuss the construction, cement and concrete sectors in the Middle East and North Africa (MENA).*

Eng. Amr Nader

Prior to becoming the CEO of A³&Co.®. In 2021, Eng. Amr Nader has a record of +20 years working with cement executive teams and business leaders in more than 50 different countries, including Lafarge (Middle East, Africa, South and East Europe), ORASCOM (UAE and Pakistan), ASEC (Egypt), SMART Specialised Services (Jordan, Oman, Saudi Arabia, Egypt, Iraq), Yanbu Cement Co. (Saudi Arabia).

Eng. Amr Nader has been involved in the cement industry on every inhabited continent giving him first-hand experience in almost every major aspect of the cement industry. He has been instrumental in numerous international projects by providing sustainable business solutions. Based in the UAE and Dubai, his company focuses on providing comprehensive services tailored to the cement and concrete business. With a keen eye on sustainability, digital transformation, and climate initiatives, their expertise spans cement plant optimisation, digital maturity, and climate technologies.

Through his business Nader has been involved in managing the entire lifecycle of cement plants, from inception and investment to installation, commissioning, operation, and retrofitting. These projects have been in Canada, Tanzania, Egypt, Libya, Morocco, the GCC, the UAE, and Asia. "By implementing work process flow optimisation and retrofitting strategies, A³&Co. has significantly enhanced efficiency and productivity in these plants," explains Nader.

Recognising the importance of digital transformation, the company offers comprehensive road-mapping services for digital maturity. They assess and implement cutting-edge technologies, utilising a proprietary directive decision-making module that leverages the power of the Internet of Things (IoT). Through this innovative approach, A³&Co. has witnessed notable progress in cement plants across Saudi Arabia, Europe, and a pilot project.

Acknowledging the urgent need for sustainable practices, the company actively engages in climate-focused initiatives. Collaborating with scholars and renowned associations like the Green Building Council and municipal organisations, they advocate for sustainability and raise awareness in the market. With an approved roadmap, they operate in North America, Europe, the Middle East, and Africa, driving the adoption of green building practices.

In their commitment to combating climate change, A³&Co. has forged strategic partnerships with carbon upcycling and carbon reuse organisations. The companies have developed an innovative intellectual property (IP) for retrofitting cement plants and producing active supplementary cementitious materials (SCMs) from noble materials and waste.

"The MENA region has witnessed significant investment in infrastructure development, including the construction of new roads, bridges, and buildings. The demand for cement, concrete, and construction services has been driven by the diverse needs of two categories of countries: economically rich countries; and heavily populated or developing nations in the region," explains Nader.

Nader continues that for the economically rich countries, construction serves as the second major economic activity, driven by two primary objectives:

- Firstly, these countries focus on developing their infrastructure to support national growth and development.
- Secondly, they aim to diversify their economies, reducing dependence on oil revenues.

"Foreign investment plays a crucial role in attracting capital and necessitating robust infrastructure, resulting in significant construction projects. Moreover, countries like Saudi Arabia, the UAE, and Qatar are competing in the development of mega-projects aimed at attracting international tourists, enhancing the tourism sector's infrastructure requirements," he says.

For heavily populated countries in the MENA region, Nader says that construction serves as a strategic lifeline. These nations must invest more in infrastructure to accommodate the growing population and meet their developmental needs. Countries such as Egypt, Morocco, Algeria, and Tunisia are examples of this category. Additionally, countries like Syria, Libya, and Iraq are in the rebuilding phase following major crises and wars. For them, construction is essential to rebuilding their nations and establishing the necessary infrastructure. Thus, construction activities are a significant focus in both rich and developing nations, driven by distinct market drivers and economic factors.

"Irrespective of the specific drivers of the market, there is a clear upward trend in construction and economic activities across both sides of the MENA region. Notably, the construction market in the UAE and Saudi Arabia alone is estimated to be worth nearly USD100 billion. Similarly, Egypt and Morocco boast a similar market size, albeit for different reasons. These figures reflect the substantial investments being made in infrastructure development and construction projects throughout the region," he adds.

GREEN PROJECTS AND BUILDING CODES

Governments across the MENA region have made substantial commitments to sustainability. Although the current indices are still considered below the level of full acceptance in achieving the 1.5°C target, they have improved significantly in recent years. The region has hosted two COPs (Conference of the Parties), one in Egypt and another in the UAE later this year, which have played a vital role in driving these commitments.

"The emphasis on sustainability is also evident from a business perspective. Many new projects in the Gulf Cooperation Council (GCC) countries are labelled as 'green projects', placing considerable pressure on developers, construction companies, and cement producers to adopt environmentally friendly practices. Additionally, several countries, including the UAE, Saudi Arabia, Egypt, and Morocco, have revised their building codes to incorporate sustainability standards," says Nader.

"Implementation of sustainability measures varies across countries due to social and economic factors. Morocco stands out as a leader, with high levels of renewable energy utilisation and alternative fuel adoption in the cement sector. The UAE is prioritising investment in renewable energy infrastructure and green buildings, focusing on operational carbon reduction. Egypt and Saudi Arabia face pressure to align with the EU's carbon market rules, particularly regarding the decarbonisation of cement, aluminium, fertiliser, and steel industries," explains Nader.

He notes that Egypt is currently obligated to comply with the same rules as the EU under various carbon agreements, driving the greening and decarbonisation of cement, aluminium, fertilizer, and steel sectors. In the UAE, there is a commitment to develop an industrial baseline for carbon footprint as a step towards potential taxation or incentives, pending implementation details to be decided later this year. The progress is also influenced by international developments, such as the alignment with the global voluntary carbon market.

Nader notes that the upcoming COP conference in Dubai has had a significant impact on activities within the UAE. He highlights that "the government is exerting pressure, and several actions are underway, including the planned adoption of industry baselines. Dubai specifically aims to introduce a material passport, requiring a green stamp or carbon footprint for incoming construction materials from outside the Emirates. These measures contribute to addressing embodied carbon in the construction sector."

"While 3D printing in construction is still in its early stages in the MENA region, notable developments have taken place. For instance, a city of 200 houses was built in Saudi Arabia using 3D printing technology, with a few houses already completed. Similar progress has been observed in the Emirates, where approximately 100 to 200 houses have been constructed. Although it is not yet a widespread trend, 3D printing holds potential for transforming the industry and improving construction efficiency," says Nader.

Digitisation is gaining traction across companies in the MENA region, particularly in North Africa and the GCC countries, suggests Nader. "Saudi Arabia, in particular, is leading the way with the implementation of regulations related to cybersecurity and digital activities. The country has made significant advancements, moving towards full-scale digitisation and embracing the principles of Industry 4.0. However, other countries in the region are still in the process of developing digital maturity. While there is progress in terms of implementing isolated islands of IoT, Enterprise Resource Planning (ERP), and technical information systems, achieving a comprehensive digital transformation and reaching a high level of maturity is an ongoing endeavour," explains Nader.

REGULATIONS, STANDARDS AND LABOUR

Building codes across the MENA region are undergoing significant changes and improvements. "Sustainability and lessons learned from incidents like the one in Turkey (resulting from the earthquake in 2022) are the driving forces behind these upgrades. While the quality and effectiveness of the new building codes vary, there is a clear trend of enhancement. These building code revisions are expected to drive changes in cement and concrete standards as well. Countries such as Morocco, Saudi Arabia, and the UAE are actively discussing and implementing changes in material codes, particularly concerning embodied carbon," highlights Nader.

"Overall, the enforcement of codes varies across countries. Saudi Arabia and the UAE exhibit strict enforcement, while countries like Egypt still have work to do to improve its enforcement mechanisms. Commitment levels and enforcement effectiveness differ, with some countries demonstrating higher levels of commitment and strict implementation," Nader explains.

The workforce situation in the MENA region varies across countries. In Saudi Arabia, there have been delays in projects in the Giga Province due to labour-related issues. The delays are attributed to a significant increase in labour costs caused by government regulations for residency. The cost to renew residency for foreign labourers has risen dramatically, resulting in budget shifts and project delays, says Nader. The construction sector in Saudi Arabia heavily relies on imported labour, contributing to the labour-related challenges. Conversely, in countries like Egypt, delays are more related to skillset requirements rather than labour availability. Each country faces unique circumstances, impacting workforce stability and project timelines. ■

Middle East and North Africa cement market outlook

This article is an an online presentation delivered at the Virtual Middle Eastern/African Cement Conference 4 on 4 July, by Yassine Touahri, Co-Founder, Managing Partner and 10-year equity research analyst at Exane BNP Paribas, edited by Eamonn Ryan

Looking at the current global cement consumption forecast for 2023, overall, we anticipate a 1% decline in cement demand worldwide, excluding China. This decline is primarily attributed to factors such as higher interest rates and construction costs, which have put pressure on housing and infrastructure projects in Europe, Latin America, and North America.

In terms of the Middle East and North Africa (MENA) region, we expect to see relatively muted growth. In sub-Saharan Africa, for example, we only anticipate a 7% increase in cement consumption due to higher costs, including food and transportation expenses, which have had an impact on household budgets and, subsequently, the economy. Turkey stands out as a country where we anticipate a strong increase in cement consumption, driven by post-pandemic construction activities.

There is a correlation between commodity prices and cement demand - the recent decline in iron ore prices raises questions about the demand for cement in the coming months, as is the case in countries that rely on oil exports, primarily in MENA, wherein we have observed a significant increase in oil prices in 2023 globally. For instance, the decline in cement volume in 2014 following the drop in oil prices adds to the uncertainty of 2024 projections. Fluctuations in commodity prices create uncertainty regarding future cement demand.

Our forecast for cement demand for the next year is based on several assumptions: the continuation of infrastructure investment and government initiatives in North America; potential stimulus announcements from China benefiting emerging markets; a decrease in inflation rates; stabilisation of interest rates; and an efficient supply chain. Under these assumptions, we expect a 2% growth in cement demand, excluding China.

Overall, we expect a strong price increase of nearly 10% in several places, excluding China. In Europe and North America, we anticipate a price increase of 15 to 20%. This level of price increase is unprecedented in the past 20-30 years and is a result of the increase in costs after the war in Ukraine.

There is a distinction between mature markets like Europe and North America, where prices are strong, and emerging markets where prices are increasing at a slightly lower rate. In 2023, we can observe a further decoupling between mature and emerging markets in terms of price evolution for cement.

One possible explanation for the difference in price increase between emerging markets and major countries is government intervention. Many governments in emerging markets are implementing measures such as price caps, investigations, and import-export bans to avoid excessive price inflation.

Furthermore, there has been a decline in coal and petcoke prices over the past five years, with a significant increase in 2022 due to the war in Ukraine. Petcoke prices have moderated, and we anticipate a potential reduction in costs in the second half of 2023. Overall, in 2023, we anticipate a decline in volume due to high construction costs, but also a strong pricing momentum, particularly in developed markets, as energy costs decrease. This should lead to an increase in margin.

Most of the medium-term demand is expected to come from Asia, the Middle East, and Africa due to population growth and infrastructure needs, and mega projects in Saudi Arabia and reconstruction in Turkey. Consumption per capita in MENA is not higher than the world average. There are uncertainties regarding oil prices and geopolitics, involving Syria and Iran. However, we anticipate that most of the growth will come from sub-Saharan Africa, with a much faster increasing population and lower cement consumption per capita, reflecting the need to upgrade infrastructure.

Overall, we expect a growth rate of approximately 2% per year in MENA, compared to 7-8% in sub-Saharan Africa. This has implications for utilisation rates and supply. We believe that the oversupply in the Middle East will persist, as demonstrated by the demand versus integrated capacity. This has led the region to become one of the main cement exporters, representing about a third of the excess capacity. Turkey, Iran, the UAE, Egypt, and Saudi Arabia are the main exporting countries, accounting for over 80% of the surplus.

Credit: Image by wirestock on Freepik

Jebel Hafeet Road. Credit: Image by Arthur Hidden on Freepik

In contrast, sub-Saharan Africa currently has excess capacity of 50-60 million tonnes, but we expect the increase in domestic demand to gradually absorb the surplus over the next decade. As a result, exports from this region may become more important.

In the Americas, there may be some growth driven by the need to upgrade ageing infrastructure. However, in Europe, we anticipate more stable trends, and in China a substantial decline in domestic demand consumption. This decline would result in a per capita consumption decrease from 1 500kgs to 700kgs, and a substantial decline in production from a peak of two billion tonnes to 1.4 billion.

There is a growing trend among governments worldwide to adopt green procurement and use low-carbon concrete and cement. Governments in many countries are becoming more climate-conscious. This means that cement exporters from MENA will need to adapt by offering low-carbon products to remain competitive. Reducing CO_2 emissions will become increasingly important for producers in the region, especially those exposed to markets that prioritise carbon neutrality.

The Middle East has approximately 15% higher CO_2 emissions than the world average, indicating the need for efforts to reduce emissions. The industry can use various strategies, such as alternative fuels, cementitious materials and long-term carbon capture, to achieve carbon neutrality by 2050.

To stay competitive, the Middle East and Africa will likely need to focus on using alternative fuels and renewable electricity. The Middle East has lower cement production usage compared to Europe, indicating room for improvement. Supplementary cementitious materials will also play a strategic role in reducing CO_2 emissions. Cement companies in the region are targeting lower cementitious advice and higher working factors to improve their environmental footprint.

In the long term, the Middle East's abundance of oil and gas resources and depleted reservoirs make it a potential competitive advantage for carbon capture and storage.

In the medium term, we believe that the region, including Iran, is well-positioned to develop innovative green technical solutions. Additionally, the proximity of these countries to oil and gas fields that have been depleted can provide further advantages in terms of resource availability. Leveraging this advantage, the MENA region can become leaders in sustainable cement production.

By securing long-term sourcing of supplementary materials and embracing sustainable practices, exporters from this region can position themselves at the forefront of the industry. Our analysis highlights the need for proactive measures to address the carbon footprint and cement consumption patterns while tapping into untapped growth potential in sub-Saharan Africa. ■

Concrete infrastructure's durability is the key to sustainability

Sustainability is all about being environmentally responsible and recycling, and it's at the forefront of our minds these days.

When it comes to construction, the materials used and the overall durability of the structure are crucial factors. And that's where reinforced concrete and admixtures come in.

Admixtures, concrete durability, and sustainability go hand in hand to ensure that concrete structures last longer. And the longer they last, the less replacement concrete we need to make. And you know what that means? It means we're saving precious energy resources! Cement, which is the main component of concrete, is responsible for a whopping 8% of global CO2 emissions. So any reduction in the need for replacement concrete has a major impact on sustainability.

In fact, nowadays, you'll hear more and more about structures being built with a service design life of 100 years or more. And that's where additives come in. They've identified corrosion as one of the biggest threats to concrete longevity. You see, under normal conditions, reinforced concrete is at a very low risk for corrosion. But add in factors like cracking, exposure to chlorides from seawater or deicing salts, and long-term carbonation, and a vicious cycle begins.

ADDITIVES ADAPTS TO CHANGING CONSTRUCTION MARKET

A. Shak Construction Chemicals, a prominent cement additives and release agent manufacturer, has been witnessing a shift in its customer base within the construction industry, says owner and marketing & sales director Cindy Engels. *Concrete Trends* interviewed her at the Big 5 Construct exhibition, where A. Shak was represented. The primary challenge is price pressure, she explains, while continuing to maintain product quality to the relevant standard.

A notable trend identified by Engels relating to this year's show was an increased presence of entrepreneurs, small business owners and medium-sized businesses among their customers as opposed to the traditional larger construction companies. "This shift indicates a potential struggle among the larger players in the construction market, which has witnessed liquidations and business rescues. The reasons behind this shift and its impact on the overall construction market remain a concern."

The chemical construction supplier is able to mitigate potential slowdowns in the construction sector, as it has a diversified customer base extending to the retail sector. This collaboration ensures a steady flow of orders, particularly from retail customers focused on renovating their own homes.

The company caters to various segments of the construction market, offering products that range from 25-litre to 1,000-litre containers for precast manufacturers. "Our customer base includes contractors involved in projects of different scales, from individual homeowners to large civils projects, as well as the Do-It-Yourself market. To effectively distribute our products, we have previously elide on traditional distribution channels such as Builders Warehouse and are now exploring alternative distribution methods to improve efficiency and meet evolving market demands, We do our own distribution

Image/Shutterstock.com

and have our own fleet of trucks. We supply directly to the construction market which is where our company grew from. The retail market evolved from our strong presence on building sites," says Engels.

With a reputation for excellence, A. Shak leads the release agent industry in South Africa for the precast industry, she says, rather than additives themselves for precast. "We specialise in producing high-quality release agents which ensure that concrete does not stick to moulds, forms, or beds during the casting process. Not all release agents are the same, and the product plays a crucial role in ensuring the successful demoulding of concrete structures."

A. Shak is a 100% locally-owned company, sourcing raw materials from South Africa. In an industry increasingly seeing the entry of international conglomerates which, Engels says, often do not understand the local market. "Our local presence allows us to maintain quality control and develop products tailored to the unique demands of the South African construction market," she adds.

Its product range has evolved over many years through continuous development and periodic formulation tweaks. The company works closely with independent chemists to optimise its offerings for both bulk construction customers and retail consumers. As market needs change and new or more efficient raw materials become available, A. Shak re-engineers its products to remain competitive while adhering to stringent quality standards. However, the lack of standardised regulations within the industry presents challenges, says Engels, as lower-quality alternatives from competitors can flood the market without achieving what the product is meant to in terms of national standards. She notes that while international standards govern additives and release agents, testing by SABS is a weak link in the chain of governance.

One of the critical aspects where A. Shak's products come into play is waterproofing. "Concrete, once designed and specified by engineers, requires careful consideration of the elements to be incorporated. Accelerators, retardants, and waterproofing agents are all vital components depending on the specific design requirements. Failure to incorporate these additives can lead to concrete-related issues, causing failures and compromising structural integrity. Our additives act as a safeguard, providing a level of tolerance against potential failures arising from the absence of essential components in the concrete mix.

"Concrete handling on construction sites is an area where mistakes can occur. Whether it involves pumping or pouring, numerous factors can impact the quality of the final product. Additives help prevent small errors that may arise during the concrete placement process, reducing the likelihood of issues down the line. By offering products that improve concrete workability and stability, additives ensure a smoother construction process and minimises the potential for costly errors," says Engels.

A. Shak has encountered instances where their products have proven invaluable in preventing significant construction mishaps. In one case, an engineer condemned concrete col-

umns due to a simple yet critical error in the use of a release agent. The wrong release agent was selected, and extreme temperatures exacerbated the issue. As a result, the concrete stuck to the formwork, leading to the failure of the entire column structure. Engels says A. Shak's specialised release agents are meticulously designed to withstand varying conditions, providing an added layer of protection against such incidents.

As climate patterns continue to fluctuate and with an El Nino weather pattern expected this summer, Engels emphasises the need for proper planning and adaptability in construction practices. In regions anticipating extremely hot temperatures, she recommends adjusting concrete casting schedules to early mornings or late afternoons to minimise potential issues caused by high temperatures. In colder climates, precautions must be taken to avoid freezing, as it can lead to instant cracking. She suggests using additives such as plasticisers or curing compounds to prevent freezing and maintain the structural integrity of the concrete.

"While site managers and engineers play a significant role in decision-making, planning and attention to detail at every stage remains crucial. Coordination between precast panel manufacturers, site personnel, and truck drivers is vital to ensure that concrete mixes remain consistent and are not compromised due to delays or prolonged exposure.

"A laden cement truck sitting too long in the heat may compromise the additives and premix. Everything has to be designed correctly and thereafter planned – or one of many factors can go wrong," she adds. "Planning, planning, planning."

ENHANCING CONSTRUCTION PRODUCTS WITH SAVANNAH

The industrial division of **Savannah Fine Chemicals** is making its mark in the construction industry with an innovative range of additives. It imports raw materials and distributes them to manufacturers who incorporate these additives into their products.

While Savannah Fine Chemicals is renowned for its expertise in pharmaceuticals, cosmetics, and food ingredients, its industrial division has expanded its portfolio to cater to the construction sector. The company imports a range of essential materials, including redispersible polymers and liquid polymer emulsions from a global manufacturer based in Istanbul. "The unique chemistry used in the manufacturing process sets Savannah apart from competitors and offers distinct advantages in terms of water repellency, resistance, and hydrophobicity, particularly in waterproofing applications," explains account manager Desiree Maritz, at the Big 5 Construct exhibition. She explains that in respect of liquid dispersions "we offer products with various technologies such as Silanated Styrene Acrylics, Styrene Acrylics, Alkali Swellable Emulsions and hydrphobically-modified Swellable Emulsions".

Savannah Additives does not sell its products directly to end-users but works closely with manufacturers to ensure the integration of their additives into various construction materials. Their additives contribute to the formulation of robust and durable construction materials, enhancing their performance and longevity. This is all propelled by research and development facilities staffed by a team of 85 chemists. This commitment to innovation and product development ensures that Savannah Additives can offer cutting-edge solutions to the construction industry, says Maritz.

"Additives play a crucial role in enhancing the properties of various construction products. Our portfolio focuses on redispersible polymers and cellulose ethers, which provide flexibility, strength, and improved adhesion. These additives offer a wide range of benefits, including increased initial adhesion, product strength, and specific application properties. The unique rheology of the cellulose-based additives optimises the performance of construction materials during application and concrete's curing processes.

Introducing new additives to the market is not always a straightforward process. "Many manufacturers are accustomed to using traditional technologies that have served them well for years. Convincing them to embrace new solutions can be challenging. However, Savannah has gradually gained the trust of customers by proving the efficacy of our additives through rigorous testing and showcasing successful results. As our products become more established, they have become a trusted source for high-performing additives in the construction industry," she adds.

"We bring a fresh perspective to the construction industry by offering innovative additives. Our diverse portfolio of imported materials is focused on quality and performance. Through collaborative distribution with manufacturers, we achieve the integration of their additives into various construction products, enhancing their strength, durability, and overall performance."

A.B.E. PRODUCTS REVEAL WIDE USE OF ADDITIVES

Written by Jan de Beer on behalf of a.b.e. Construction Chemicals, edited by Eamonn Ryan

a.b.e. Construction Chemicals offers a wide range of specialised construction products that are designed to enhance the performance, durability, and aesthetics of various construction projects.

a.b.e. Construction Chemicals, part of Saint-Gobain Africa, for instance has provided a wide variety of its products for the construction of Balwin Properties' R9 billion Munyaka Estate in Waterfall City, Midrand.

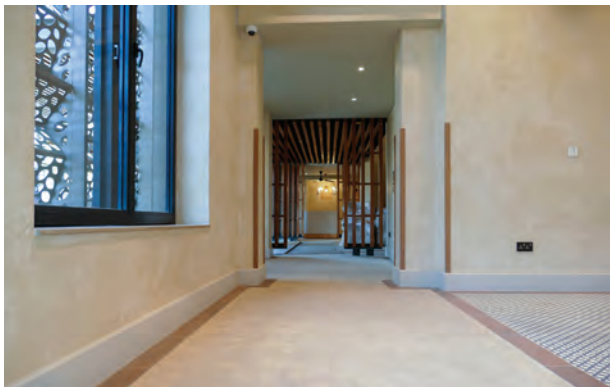
The ultra-luxurious, award-winning project features apartments surrounding the spectacular Crystal Lagoon, which has the equivalent size of seven rugby fields and is the largest man-made lagoon in the southern hemisphere.

a.b.e.-approved polyurea applicator, Akhanani Services, was contracted to handle the Crystal Lagoon contract at Munyaka Estate.

Lagoon aerial view.

Warren Trew, a.b.e.'s Regional Manager: GCN Inland, says to provide the high-build, durable, elastomeric coating which was essential for the beach areas and retaining walls of the lagoon at Munyaka, a.b.e. supplied two VIP products: VIP QuickPrime Epoxy SF 2K primer; and VIP QuickSpray Supreme AL, which contains a special aliphatic colour-fast material to protect the white colouring against potential discolouration by the Highveld's fierce UV rays.

"To provide the flexible, durable, tough protection essential at the new lagoon, the specified product was VIP QuickSpray Supreme AL (pure aliphatic polyurea), an exceptionally fast-setting, 100% solids coating/elastomer, based on the almost instantaneous chemical reaction of a special aliphatic pre-polymer resin blend. VIP QuickSpray Supreme AL's intricate pore density provides excellent corrosion protection to all substrates and, once cured, ensures exceptional and durable protection at the lagoon."



Abescreed duraTop tinted 'Livingstone Beige'.

Other a.b.e. products were supplied for the beaches and walls at the Munyaka Estate project.

"a.b.e. and VIP provided technical support to ensure application of the highest standard, and the Quality Assurance programme implementation by Akhanani Services also helped to ensure the top-quality end-result," Trew adds.

A wide variety of a.b.e Construction Chemicals products were specified and supplied to main contractor, Stefanutti Stocks, for the construction of the upmarket, Radisson Blu Mosi-oa-Tunya Resort at Livingstone, Zambia.

The ultra-luxury resort hotel was recently completed on the banks of the Zambezi, 5km south of Livingstone, and 4km north-west of the Victoria Falls, in the Mosi-oa-Tunya National

Park. Trevor Enerson, Export Manager for a.b.e., part of Saint-Gobain Africa, says a.b.e. supplied a wide range of products for the project through the company's official Zambian distributor, Mart Solutions. The applicator was a.b.e.-approved Tredstone Construction.

The a.b.e. products supplied included: 19 000m² abelite finishing plaster; 3 500m² Chryso Béton Ciré decorative finishing system, including, Chryso Concrete Primer and Finisol topcoat; 5 200m² double layer a.b.e. Unigum 4mm and viscous 3mm torchon waterproofing membrane; and much more, such as super laykold, super laycryl, Painter's Mate, durarep FC, duragrout, abeprime SLC and SLC P acrylic primer, as well as durarep 60.

Enerson says the highest number of 40kg a.b.e. abelite bags in a single order in Africa were required to cover the 19 000 m² of surfaces at the Radisson Blu Mosi-oa-Tunya Resort. "abelite is extremely popular as a combined base coat and finishing plaster for internal surfaces of upmarket commercial projects as well as home improvements. Only water need to be added to abelite powder to make a multi-purpose, lightweight, and high-strength finishing plaster that produces highly polished smooth, brush, or textured finishes. Consisting of formulated calcium sulphate hemihydrate – commonly known as 'plaster of paris' - abelite can be applied on brickwork, concrete blocks, drywalling, ceiling boards, and as a finishing coat over sand-cement renderings. The pot life of the mixed plaster is up to 70 minutes and typical drying time is 2.5 to 3.5 hours."

a.b.e. duraflex, a flexible cementitious waterproofing slurry was used to waterproof all the hotel's bathrooms, balconies, and "back of house" wet areas, totalling 6 300 m².

PARKING DECKS PRESENT PARTICULAR CHALLENGES

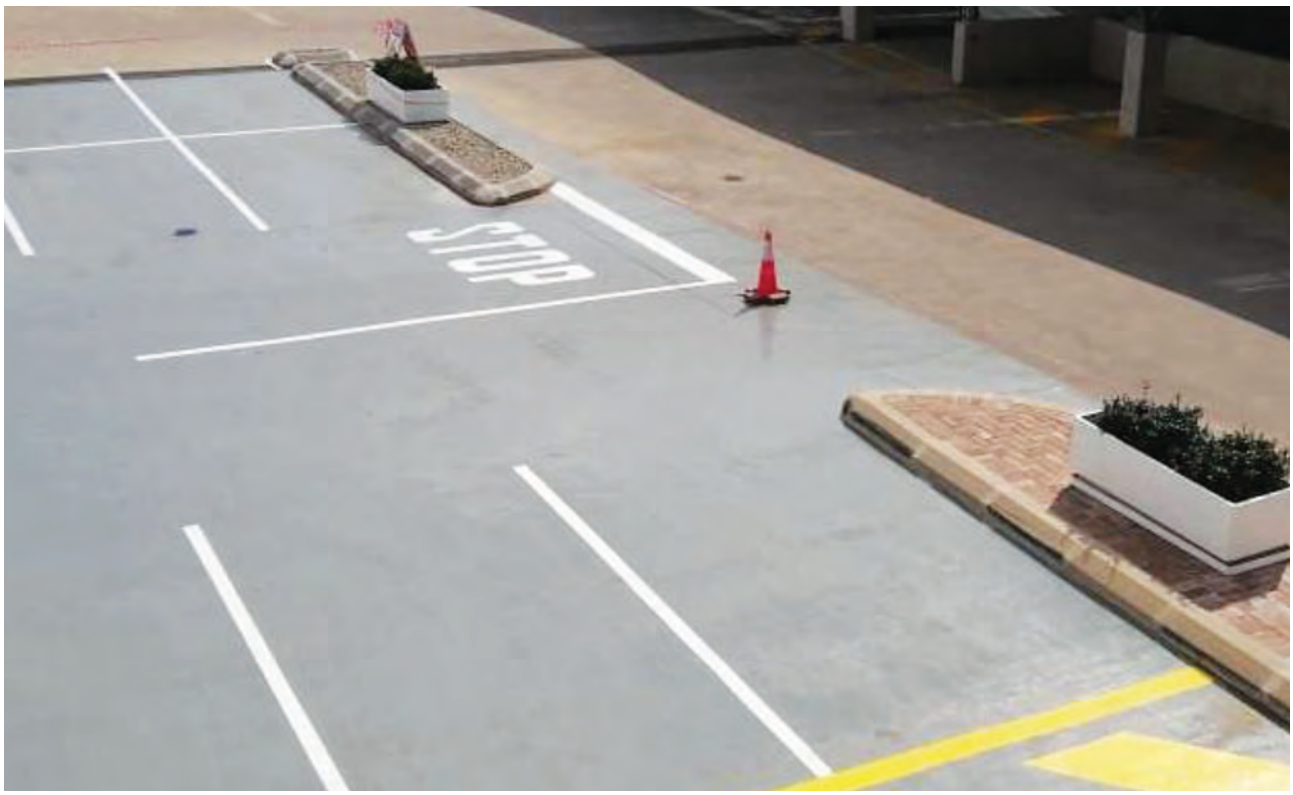
a.b.e. Construction Chemicals waterproofing systems for parking decks – one of the most challenging processes in waterproofing – have proved highly successful in several high-profile installations in recent years.

a.b.e.'s Trew, says apart from preventing water ingress, a parking deck waterproofing system must also protect against wear and tear by natural forces, vehicles and pedestrian traffic as well as the movement of expansion joints. "Parking decks must be durable, resilient, elastic, skid-resistant, and aesthetically designed. a.b.e.'s extensive and proven range of waterproofing systems fulfill all these requirements.

"Parking decks are costly to build, repair and replace. To have a durable deck, water management is vital. Designing, installing and then testing waterproofing systems are the keys to diverting water from the structural elements. Water is the major cause of concrete deterioration and steel corrosion. The quality of the waterproofing membranes is critical and the waterproofing system should only be specified after consideration of the type of the finished wearing surface. The specification could call for traditional waterproofing systems or new developments, all of which are provided for by a.b.e. waterproofing systems," he adds.

The waterproofing of parking decks should only be specified after consideration on the type of the finished wearing surface required. All substrates - post-tensioned or coffered – should be cast or graded to fall to outlets, and should be smooth and free of voids or protrusions.

"Whether choosing a blacktop or premix that can be hot or cold applied, or brick pavers and interlocking blocks, a double-layer waterproofing system is recommended. This usually comprises an application of a.b.e.'s Index 3mm membrane followed by an Index 4mm membrane, laid with staggered side laps and end laps. The 3mm membrane should be fully sealed by torch fusion to the primed substrate and overlaying 4mm membrane. ■



Abe parking lot waterproofing.

View of plant from far

Surface plant commissioned at Mali's Loulo mine

Technical information supplied by Avinash Andhee, senior project leader and mechanical engineer at BBE, edited by Eamonn Ryan

Bluhm Burton Engineering (BBE) Projects has commissioned a turnkey surface cooling plant at Société des Mines de Loulo (SOMILO) SA gold mine in Mali, West Africa.

The refrigeration plant as well as other infrastructure will enable the mine to expand its operations and maintain its gold production output. It was a full turnkey project commencing with a hole in the ground and ending with the handover of a fully commissioned HVAC cooling plant.

Defining the character of the project was its remote location: the Loulo gold field, which includes the Gara, Yalea and Gounkoto deposits, is less than 2km east of the border with Senegal (marked by the Falé river) on the West Mali gold belt. The refrigeration plant as well as other infrastructure will enable the mine to expand its operations and maintain its gold production output.

THE CHALLENGE

After commencing with open pit mining in 2005, the mine took the opportunity to start looking at mining underground which at Loulo mine is relatively shallow. Being at low altitude in an equatorial region, the mine experiences a challenging climate of both humid and hot, through the various seasons, particularly when hot and humid occur at the same time, which is most of the year.

These challenging climate conditions necessitated the turnkey construction and commissioning of a refrigeration plant at both Gara and Yalea dedicated downcast ventilation holes, in 2016, to cool the underground workings. Since 2016, both the Gara and Yalea underground mines have expanded production towards the south requiring further underground cooling.

The Loulo Mine project involved the multidisciplinary BBE team, each specialising in their respective areas. The design phase took place in South Africa, with a dedicated division handling electrical control and instrumentation design. Local sub-contractors were also engaged to assist with the civil and structural design aspects. The mechanical design and process were managed by Andhee, who oversaw the specifications, procurement, and shipment of necessary equipment and materials to the site.

THE SOLUTION

SOMILO awarded BBE Projects a second turnkey contract to build a refrigeration plant at the Yalea South dedicated downcast ventilation hole in 2021. This time SOMILO requested that all equipment supplied by BBE Projects must be compatible and interchangeable with the existing refrigeration plants to minimise spares holding and to allow the mine to implement the same corrective and preventative maintenance schedules used at the existing plants.

"Standardisation of equipment was another crucial requirement, given the remote location of the mine. Working in Africa presents unique challenges due to remote locations and the need for self-sufficiency. By utilising standardised components

BAC overview

The duct. Picture credit: Bluhm Burton Engineering

and maintenance procedures, the mine could streamline operations, minimise spare parts inventory, and ensure ease of future maintenance," says Andhee.

The most notable innovation is the five-metre diameter steel inlet duct that connects the bulk air cooler to the dedicated downcast ventilation hole complete with self-closing dampers positioned directly above the shaft that vent shockwaves that occur during certain times of day due to blasting underground. The damper blades are of a relatively light construction allowing the blades to open with little pressure and close using adjustable counterweights.

To manage the challenges of Andhee remotely overseeing the project site, a site manager (a South African civil engineer, Humphrey Maluleke, was seconded to Mali to provide a constant presence at Loulo Mine supported by a junior civil engineer recruited locally in Mali. Andhee supplemented this with regular meetings and periodic in-person visits, while inspections were conducted by the site manager and the project team, ensuring effective communication and quality control throughout the project.

"During the period of sanctions, efforts were made to limit visits to the site, relying instead on the site manager's daily reports and photographs for quality control, as well as bi-weekly online meetings."

Andhee points out that logistics played a crucial role in the project's execution. The team encountered obstacles not only in the region but also faced delays at the port in Durban following the historic floods in KwaZulu Natal. However, by adapting to the circumstances and exploring alternative solutions such as changing shipping ports, the team managed to overcome these logistical hurdles.

"Health and safety considerations were paramount throughout the project. While Mali is known as a malaria region, the team took appropriate precautions to minimise health risks, and the quality of food was to a high standard," he adds.

BBE's expertise in multiple disciplines enabled them to adopt a holistic design approach, covering civil, structural, mechanical, piping, and electrical control and instrumentation aspects. The project's design phase took into account lessons learned from previous projects, addressing past challenges and incorporating innovative solutions. For instance, previous issues with blasting necessitated a shift from insulated panel structures to robust steel ducting, improving ventilation effectiveness and worker safety. Additionally, prefabricated components, such as an operator cabin with excellent thermal properties, were utilised to streamline on-site construction and enhance energy efficiency.

"To optimise construction efficiency, the components were meticulously designed and fabricated in South Africa. The steel sections were cut into sizes that could be easily transported in containers, while the panels were assembled on-site based on detailed drawings provided to the contractor."

BBE Projects is currently working on the Gara South Refrigeration plant that will be commissioned later this year, and the project is on track for completion in the third quarter of 2023. Once complete, the refrigeration system will enable mining in the largely untapped southern area of the orebody, extending the life of the mine significantly. ■

Terraforce supplies large-scale retaining walls in India

Written by David Beer on behalf of the Concrete Manufacturers Association

Terraforce, a longstanding Concrete Manufacturers Association (CMA) member, supplied over 110 000 L12 blocks for the construction of retaining walls on both sides of Terminal Boulevard, a newly constructed 10-lane thoroughfare which feeds directly into India's Kempegowda International Airport at Bengaluru.

Terminal Boulevard retaining walls under construction.

Completed in November 2022, Terminal Boulevard has been widened from an existing 2+2 lanes to 5+5 lanes to cater for the addition of a second airport terminal and an anticipated increase in traffic. Approximately 1.2km of the road has been lined with retaining walls on both sides which cover a total surface area of 9 000m².

Running on an east/west axis, the new road was constructed by cutting a corridor, which at its deepest, is nine metres below existing ground level. This has enabled the new road to pass under the airport forecourt roads to facilitate junction-free traffic flows.

The excavated corridor resulted in embankments which varied in heights of between 0.5m to 9m and in slope angles of 52° to 77° off the horizontal.

After considering various retaining wall options, the Bangalore International Airport Limited (BIAL) project team – comprising Prasenjit Biswas, General Manager Landside Planning, Monnappa BC, General Manger Projects, and Prasannamurti Desai, Vice President Landscape - chose the Terraforce retaining wall system for several reasons, aesthetics having been a major consideration. The blocks also allowed the planting of flowers and other vegetation, while the inclusion of hume pipes facilitated the planting of trees. In addition, the Terraforce option required less soil excavation and was more cost-effective than either reinforced concrete or reinforced earthen walls would have been.

The slopes were cut to allow for the insertion of five-metre hume pipes to facilitate planting of trees on the vertical slope at four-metre intervals. Placed on concrete foundations, the pipes were filled with soil to allow for root penetration into the soil below.

Where additional cutting was required, for instance near bridge abutments or the retaining wall ends, these sections were backfilled with gabion blocks and clad with Terraforce blocks to maintain the required slope angles.

A planted section of one of the walls.

A planted section of the wall showing some of the hume-pipe trees.

One of the main challenges of this project was the fact that additional cutting into the embankments for the installation of geogrid reinforcement was not possible. This was because the top sections of the excavated embankments were only two metres from the upper-level roads and there was no space for the additional cutting. Moreover, most of these sections were operational areas. In addition, the required loading on these roads was up to 45 tonnes for fire-brigade trucks and other heavy vehicles. Therefore, soil nailing was specified as an alternative to geogrid to keep the slopes stable.

This involved drilling 115mm diameter holes of up to nine metres deep, perpendicular to the embankment slope. Nails, 28mm in diameter were inserted into the holes and grouted with a non-shrinkable cement slurry. Once the nails had been inserted, PVC drainage pipes up to 2.5m long and wrapped in a geotextile membrane, were installed in pre-drilled holes in the embankment at a slight upward incline to the horizontal plane. The drainage pipes were installed in a 3m x 2m grid to release entrapped water and to reduce the hydrostatic pressure in the embankment. The slopes were then covered with layers comprising a geodrain membrane, two layers of 8mm steel mesh and 100mm of shotcrete. The geodrain membrane was installed to prevent the leaching of soil and fine material.

Steel plates with metal hooks were bolted to the nails and tied to the 8mm steel mesh layer with 100mm of shotcrete. The hooks were used for tying into a second layer of steel mesh after which a second 100mm shotcrete layer was applied. The steel plates ensure the nails are affixed firmly to the steel mesh and the shotcrete layers to form a monolithic structure and to prevent the nails from penetrating through the wire mesh and the shotcrete layers.

Reinforced concrete shear-key blocks, which arrest both the vertical and lateral forces acting on the Terraforce blocks, were cast to form the foundations of the Terraforce walls. Steel rods were inserted into the hollow portion of the blocks for interlocking between each vertical layer of blocks, while the

spaces between the block facades and the shotcrete layers were filled with lean concrete.

The bottom block rows followed the slope of the road and, similarly, the top rows were adjusted to match the profile of road or the ground at the upper level. This was done either by stepping the top row or by adding a concrete layer to match the required road or ground profile.

The sections between the top of the Terraforce walls and the upper-level road kerbing were paved with precast concrete paver blocks to prevent water ingress into the retaining wall structure and the soil behind it. However, any water trapped within the embankment structure will drain through the PVC drainage pipes.

The construction of these embankments required a mock-up section to identify constraints in the installation process and to improve the installation methodology and sequencing during the actual installation.

Some of the other challenges were the varying friction coefficients of the embankment soil which was the deciding factor in determining the length of nails. Managing the levels of the walls when the both top and bottom roads sloped at different angles was another. ■

Exposed aggregate pavers complement new lifestyle centre

By David Beer on behalf of the Concrete Manufacturers Association

Coarse-exposed Brownstone pavers, supplied by Concrete Manufacturers Association (CMA) member C.E.L. Paving Products, have been used to pave the driveways of Bahari Lifestyle Apartments, a secure residential estate situated just off the N2 highway in Somerset West.

Developed for the rental market by Century Property Developments, this attractive residential offering comprises 11 apartment blocks with 40 one-, two- and three-bedroom units in each. All residents will have access to a basket of lifestyle activities at the estate's clubhouse, gym, studios, water park and swimming pool, children's' play area, and restaurant.

The development is being built in six phases: Phase 1 was completed in June and Phase 2 is due for completion in November 2023.

C.E.L. is supplying 6 000m² of its coarse exposed Brownstone pavers for all six phases. In addition, 500m² of its charcoal Vintage paver were used for paving the walkways and play areas in Phase 1 and a further 200m² of the block were used for Phase 2. C.E.L. also supplied precast slabs for paving the area around the swimming pool which were laid in two sizes, 440 x 440 x 50mm and 440 x 216 x 50mm.

The parking sections were paved with tan-coloured bond pavers supplied by N1 Paving. Covering 2 100m² in Phase 1 and 1 400m² in Phase2, they were edged with C.E.L.'s Vintage pavers.

Century Property site agent, Gert Pretorius, said C.E.L.'s exposed pavers were specified for their durability. "We also liked their warm colouring and natural stone finish which enhanced the appearance of the entire estate," he said.

All the paving was laid by DP2 Construction and the vehicular sections were laid on a sub-base of 300mm calcrete, 150mm G5 aggregate and bedding sand. ■

C.E.L. Paving's coarse-exposed Brownstone pavers.

C.E.L. Paving's charcoal Vintage pavers.

C.E.L. Paving's charcoal Vintage pavers flank N1 Paving's tan-coloured bond pavers and C.E.L.'s coarse-exposed Brownstone pavers.

Precast panelling embellishes new HQ building façade in Paarl

Written by David Beer on behalf of the Concrete Manufacturers Association

Textured precast concrete panelling has been used to dress the street-facing façade of new headquarter premises of fruit export company, Delecta Fruit. Completed in 2022 and fronting onto Paarl's Main St, the 1 700m² building comprises two office floors and a parking basement.

Concrete Manufacturers Association member, Cape Concrete, produced 15 panels for the project. They were cast with granite aggregate and bush-hammered for a textured finish.

"Delecta decided on a textured precast concrete façade due to the manner in which this finish and a traditional lime-washed finish, as seen on the Cape Dutch buildings in the area, interact with sunlight," said the building's architect, Gideon Malherbe of Malherbe Rust Architects. "Moreover, the colour of the concrete and the aggregate were chosen on the basis of their similarity to Paarl Granite.

"The building is located on what was one of the last undeveloped plots along Main Street and the site falls within the Paarl Central Special Character Protected Area Overlay zone.

"This, and the fact that some foundation walls of a building older than 60 years were visible above ground level, meant that the new structure's design had to be vetted by provincial and municipal heritage authorities. We were fortunate that the site falls toward the back of the property and this enabled us to install basement parking and still maintain a small street-facing façade.

"As part of our objective to break up the mass of the facade, the main set of panels appears to float across the upper-floor facade. This illusion is achieved through a ribbon of windows and aluminium cladding which run below the main set of panels. The wall below the ribbon window is covered in a thick plaster band detail which references the plaster work of some of the older buildings on Main Street.

"Cape Concrete's dedication to the quality and consistency of the scabbled finish delivered a very pleasing result," said Malherbe.

Eleven panels were installed on the top-floor façade and four were used to cover a two-sided section of the ground-floor façade. The upper-level panels span 5.3m (height) by 2.6m (width) and are 115mm thick with a 300mm beam section at the top of the panel. Abutting a 230mm brick wall, the panels provide an additional layer of thermal insulation for what is a west-facing elevation.

The ground floor panels measure 2.37m (height) and up to 5.37m (width) and cover three walls of a small annex adjacent to the entrance of the building.

Using steel shuttering, the casting was done horizontally on a tilt-up table which was adjusted to an 80° angle after 18 hours, by which time the panels had reached a strength of 20MPa. They were then lifted and stored vertically before being transported to site on A-shaped steel frames mounted on flat-bed trucks.

Panel installation required a high degree of accuracy in casting and placement.

The upper-level façade panels were cast with a support-beam section at the top of each panel. They extend 185mm from the inner panel face and provide an inverted ledge from which the panels were hung when lowered onto the supporting in-situ beam.

Galvanised steel brackets were used to ensure that the panels were permanently affixed to the in-situ beam. The right-angled brackets were first attached to the support-beams with bolts threaded into fixing anchors, which Cape Concrete had cast into the beams. Then, once the panels were accurately aligned, holes were drilled into the in-situ beam and knock-in anchors, similar to rawl bolts, were hammered through the bracket bolt holes into the in-situ beam and tightened with a spanner.

The panels were also secured at the bottom ends for added stability by galvanised angle brackets which were pre-fixed to the upper-level floor deck and two galvanised steel pockets which were cast into the bottom of each panel. As the panels were lowered into position the galvanised angle brackets were slotted into the pockets and grouted after the alignment process had been completed.

The panels were cast with window sections as well as pockets for the attachment of timber-screened pergolas. The pergolas shade the west-facing windows from the direct sunlight during office hours. They were supported by steel I-beams, which were attached to the superstructure through panel pockets.

After being lowered into position, the ground-floor panels were temporarily supported by push-pull props while they were permanently secured to a steel I-beam along the top ends with cast-in fixing anchors and galvanised steel pockets at the bottom ends.

The building's completed street-facing front façade.

A galvanised steel bracket is attached to a support beam.

Cape Concrete director, Johan Nel, said that some of the panels had to be cast with mitered ends for corner installations and that one of the panels was cast with an embedded Delecta logo which required the fabrication of special moulding.

The embedded Delecta logo.

"The project required great accuracy during casting to ensure the required level of precision in the installation of the panels. Extensive planning had to be undertaken to make sure that the installation was trouble-free and the installers spent a day using as-build lines and levels to set out the placement of each panel. This enabled accurate first-time placements which only took small adjustments to achieve perfect alignments. Therefore instead of taking the planned two days to complete the installation it was done in one day," concluded Nel. ■

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