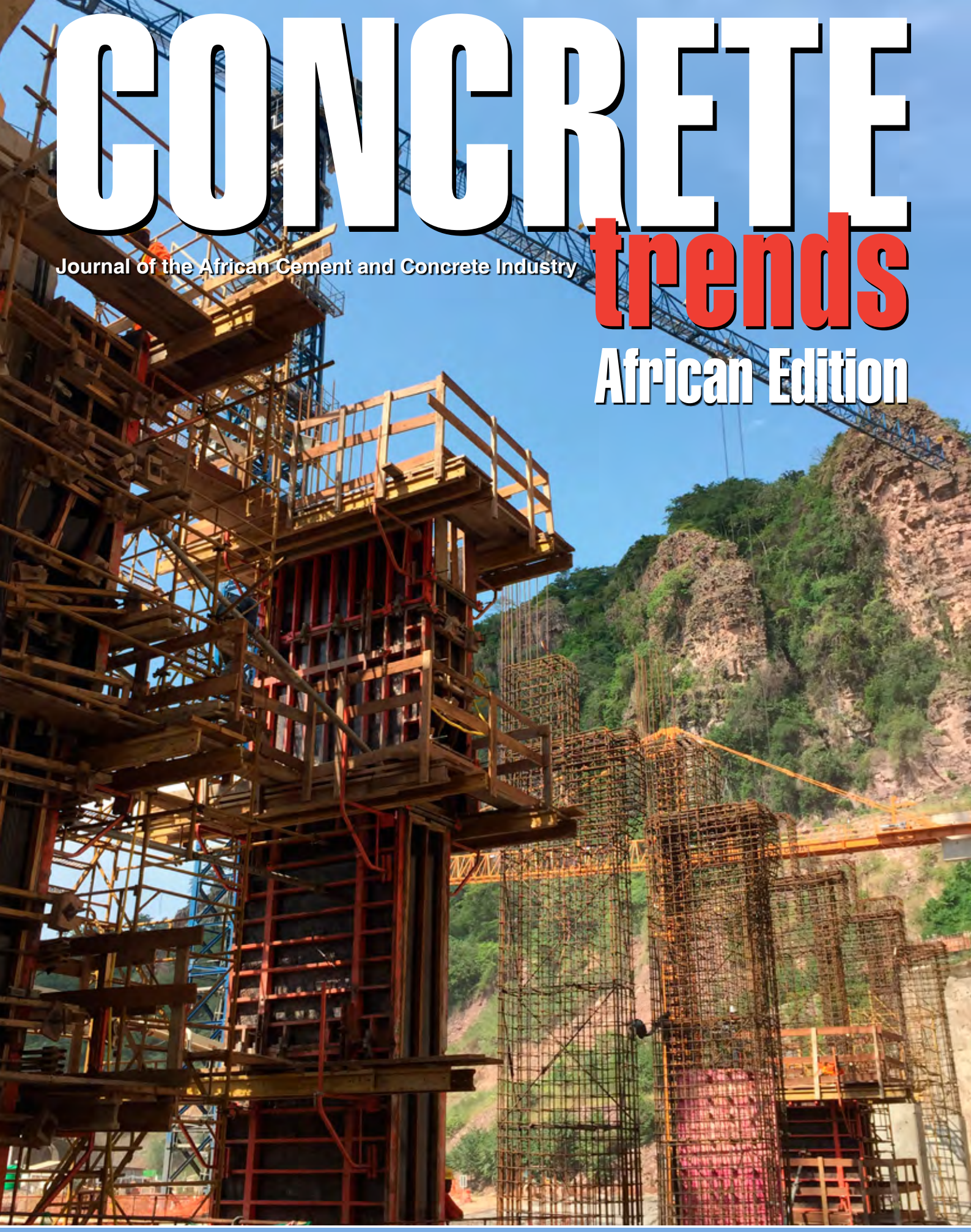
CONCRETE trends

Journal of the African Cement and Concrete Industry

African Edition



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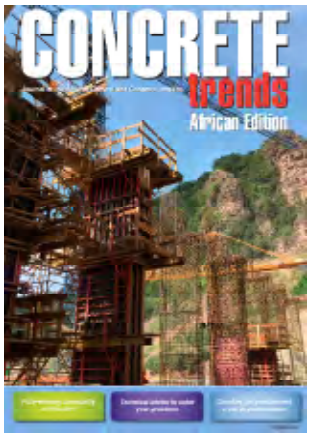

Cover:
Story on Page 16 Linden Comansa tower cranes played a vital role in raising the level of the Cambambe Dam in Angola.

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Host publication of Totally Concrete East and West Africa Expo

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Nairobi, Kenya
26 - 28 October 2015

Concrete Trends is the official quarterly journal of the African Cement & Concrete Industry and is officially endorsed by The Concrete Institute and Master Builders South Africa

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REPRODUCTION & PRINT: RSA Litho

ISSN 1560-2710

African cities of opportunity to the fore

It is no secret that Africa, with its vast populations and the world's fastest-expanding economies, is regarded as the number one place worldwide for investment.

A recent PwC report, *Into Africa: The continent's cities of opportunity*, reflects this and examines the factors affecting the performance of 20 major African cities and their relevance and competitiveness globally. *(Full report at: www.pwc.com/.../emerging-markets/africa/assets/into-africa-report.pdf)*

The report stated that Africa is poised to unlock 12 megacities and 100 new cities housing in excess of one million people by 2025. It explained how increasingly widespread demographic and social changes, shifts in global economic power, rapid urbanisation, climate change and resource scarcity as well as technological breakthroughs were driving the transformation of cities across the African continent.

The PwC report ranked the cities based on society and demographics, infrastructure, human capital and economic indicators, offering potential investors the chance to evaluate investment opportunities based on a city's current development or future potential, its location, 'must-have' or 'knock-out' features and the time to scale.

The number one city of opportunity overall was Cairo, in Egypt, followed by Tunis, in Tunisia. Johannesburg ranked third, with Algiers, in Algeria, and Casablanca, in Morocco, closely on its heels. Accra, in Ghana; Nairobi, in Kenya; Nigeria's Lagos; Ethiopia's Addis Ababa; and Kampala, in Uganda were also listed in the top ten.

In the infrastructure category, Cairo led the way, followed by Tunis and Addis Ababa, while in terms of human capital Tunis was the winner; Johannesburg took second place, with Cairo and Algiers in third and fourth spots.

Assessment by economic indicators placed Casablanca and Tunis top of the list and in the social and demographic rankings Kampala, Cairo, Dar es Salaam, Nairobi and Accra occupied the top five spots.

Dar es Salaam was named number one in the opportunity index, followed by Lusaka, in Zambia; Nairobi; Lagos; Accra; Abidjan, in Côte d'Ivoire; Kigali, in Rwanda; Addis Ababa; Kampala; and Cairo. Accra, Lagos, Nairobi, Cairo, Addis Ababa and Kampala rank in the top ten of both overall and opportunities indexes.

From the PwC report it is clear that when Ramachandran Ottapathu, chief executive of Botswana-based Choppies chain of supermarkets says: "There are opportunities for every retailer in Africa and now is the right time for expansion across the continent", he is reflecting the attitude of an increasing number of businesses who see Africa as the last frontier of opportunity.

With this being so, there can be no doubt that the African Construction and Totally Concrete Conferences and Expos in East and West Africa offer outstanding opportunities to network with the major role players in Africa and gather insight into doing business across the continent.

Gill Owens, Editor

Dangote Cement's output hits 45m tonnes

With Dangote Cement Plc having formally opened its new cement plant in Zambia on 5 August, the company's total output is expected to hit 45 million metric tonnes per annum (mmtpa) on the African continent.

A Dangote investor report showed that, with the company's plant expansion in various African countries as well as moving into Nepal, Dangote Cement's total projected capacity will be 53 mmtpa by 2017.

The company's cement factories in Nigeria lead the way with a combined capacity of 29.25 mmtpa from its three plants.

The Obajana cement plant in Kogi State, the largest single cement plant in Africa, produces 13.25 mmtpa from four lines. This is followed by the Ibese cement plant in Ogun State, which also runs four lines with a combined output of 12 mmtpa.

Dangote's smallest plant in Nigeria is the Benue Cement Company (BCC) acquired from the federal government in Gboko, Benue State, with a capacity of 4 mmtpa.

Dangote's three plants in Nigeria account for 60% of total local cement production, with Lafarge, BUA and UNICEM accounting for the remaining 40%.

Apart from Nigeria, Dangote owns cement plants in Ghana, Cameroon, Senegal, Ethiopia, Congo, Cote d' Ivoire, Liberia, Sierra Leone, Kenya, South Africa, Tanzania, Niger, Mali and finally, Zambia.

While the company is already producing cement in Zambia, Ethiopia, South Africa, Senegal, Cameroon, Ghana and Nigeria, new plants in the other African nations have reached advanced stages of construction, with many scheduled to be commissioned before the end of 2017.

In addition, the company announced on August 4 that it would double its US$450-million investment in Zambia by opening a second plant in that country, also capable of producing 1.5 mmtpa.

To overcome the power shortages that bedevil Zambia, Dangote has commissioned a 30-MW coal-fired power station.

Expansion of some of the already operational plants such as the plant in Ethiopia is currently ongoing.

By 2017 Aliko Dangote's cement plants will produce 45 million tonnes per annum.

Dangote Cement output is: Nigeria, 29.25 mmtpa, Cameroon, 1.5 mmtpa; Congo, 1.5 mmtpa; Cote d' Ivoire, 1.5 mmtpa; Ghana, 1.5 mmtpa; Liberia, 0.5 mmtpa; Senegal, 1.5 mmtpa; Sierra Leone, 0.7 mmtpa; Ethiopia, 2.5 mmtpa operational and another 2.5 mmtpa under construction; South Africa, 3.3 mmtpa; Tanzania, 3.0 mmtpa; and Zambia 1.5 mmtpa. Expected output for green-field plants in Kenya, Niger and Mali are yet to be released. ■

Source: http://goo.gl/hweHHj

Lafarge Africa appoints new CEO

Cement producer, Lafarge Africa Plc, has appointed Peter Hoddinott as the new group managing director/chief executive officer.

The former CEO, Guillaume Roux, will remain on the board as a director.

Hoddinott is a British mining engineer and spent his early career in the mines of Southern Africa before joining cement producer Blue Circle in 1988.

While at Blue Circle, he worked in the Technical Centre and also managed the UK cement plants before going to the Philippines as CEO in 1999. When Lafarge took over Blue Circle he stayed in Manila to integrate the two companies, leaving in 2003 to become regional president for Lafarge in Latin America.

Peter Hoddinott is the new group MD/CEO.

In 2007, Hoddinott became regional president for Western Europe – Cement, which included Morocco. In 2012, he became the executive vice president – Energy & Strategic Sourcing responsible for worldwide energy strategy and managing the sourcing of Lafarge's $12B/y externally obtained inputs.

In September 2013, Hoddinott was appointed group executive vice president – Performance. He is currently president of Cembureau, the European Cement Trade Association. ■

Source: http://goo.gl/T3owi6

PPC Zimbabwe gears for growth with the country

The ground–breaking ceremony at PPC Zimbabwe's new Msasa plant highlights the company's commitment to meet national infrastructure needs while boosting the long-term market potential of the region.

The Honourable Minister of Industry and Commerce, MC Bimha, was the guest of honour at PPC Zimbabwe's official ground-breaking event at the site of its new Msasa plant just outside Harare on August 6. Also present was the Honourable Minister of Harare Metropolitan, M Chikukwa. The company's second manufacturing plant in Zimbabwe, Msasa is expected to be commissioned in the second half of 2016 and will have a capacity of 700,000 tons.

Speaking at the ground-breaking event, managing director of PPC Zimbabwe Njombo Lekula said: "PPC Zimbabwe is looking to the future of the country, with today's event providing a promise of things to come. While our existing factory in Bulawayo has positioned us well in Matabeleland, much of our country's future growth centres around Harare and northern Zimbabwe. PPC Msasa is being built in direct response to the opportunity we see in – and beyond – this region. PPC's investment of over $80 million is a vote of confidence in the country's future and an expression of our commitment to build, grow and contribute meaningfully to the national economy while delivering on local imperatives."

The Msasa plant is being built to world-class standards and will feature bulk-handling and palletising capabilities such as those recently introduced at the Bulawayo factory.

While the Msasa plant is being built by Sinoma International Engineering, PPC was engaging with numerous local suppliers to leverage the scope of opportunities on this project beyond the main engineering, procurement and construction management (EPCM) agreement. "Because almost 70% of the total value of the EPCM is allocated to the supply of plant equipment, it was necessary for us to contract with a provider like Sinoma to ensure we create a world-class plant in and for the region," said Lekula. "Sinoma has contracted local labour as part of its workforce on the project, as well as meeting our non-negotiable local supply requirements."

Work on the new PPC Zimbabwe plant at Msasa has started.

Outlining the future for PPC Msasa beyond 2016, Lekula noted: "As Zimbabwe's largest producer of Ordinary Portland Cement and the only producer of 42.5 cement, we are ideally positioned to play a leading role in developing the country's infrastructure. We have the equipment, processes and tanker fleet in place and are thus able to handle the bulk deliveries that are vital to these big projects. We see ourselves providing not just cement but a total solution to our customers."

Lekula concluded saying: "We look forward to building a legacy we can all be proud of here in Msasa, and invite you to continue partnering with us to achieve this as we bring PPC's brand promise of 'Our strength. Your vision' to life." ■

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Trevor Sawyer appointed Chryso Eastern Africa representative

Trevor Sawyer is the new Chryso Eastern Africa representative.

Trevor Sawyer has been appointed as the Chryso Eastern Africa representative, headquartered in Nairobi, Kenya. Sawyer is a qualified concrete technologist who has over 20 years of experience in the cement and concrete industries and has worked within the Chryso Southern Africa Group for over eight years. He is currently studying towards a MSC in Advanced Cement and Concrete Technology through Queens University in Belfast. The Chryso Southern Africa Group comprises Chryso Southern Africa and a.b.e. Construction Chemicals and has established a distributor network and distribution outlets across the African continent and Indian Ocean Islands. ■

More information from Kirsten Kelly,
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Gateway Engineers hold their maiden Engineering Week

Gateway Engineers under the banner of the Nigerian Society of Engineers held their first Engineering Week, from 24 to 29 January, 2015. The epoch-making week-long event, organised by the branch, served as an effective means for networking among engineers as well as reaching out to corporate organisations, government agencies and highly placed individuals who have distinguished themselves in their respective fields of engineering.

Health Walk by members.

Engr. Dr. K. A. Olonade giving a career talk to the students of Alaba Lawsons Royal College, Abeokuta.

The Branch Chairman, Engr. A. Lawal (right), in the studio of OGBC during public enlightenment.

Some of the events that made the week memorable:

Health Walk

The week started with a health walk, in which engineers trekked a distance of about 15 km. The programme aimed at keeping engineers fit, reflecting the importance the Nigerian Society of Engineers attaches to sound health. The Chairman of the Branch, Engr. A.A. Lawal, led this memorable walk.

Industrial Visit

A number of industries were visited over the week, affording the engineers an opportunity to familiarise themselves with the activities of the industries visited and offer them useful advice. This aimed to facilitate synergy between the professionals and the industries in the interests of national development.

Public Enlightenment

The Gateway Engineers also seized the opportunity of the Engineering Week to enlighten the public about the role of engineers in society and emphasise the need to consult registered engineers for their engineering projects. This will ensure they receive good value for their money, as engineers will always optimise cost and guarantee safety. The programme, led by Engr. A. A. Lawal, was broadcast by the Ogun State Broadcasting Corporation (OGBC).

Career Talk

Following the 'catch-them-young principle', a career talk on the engineering profession was delivered to the students of Alaba Lawson Royal College, Abeokuta. The lecture, which was delivered by the Technical Secretary, Engr. Dr. K.A. Olonade, informed the students about the indispensable role engineers play in nation building. The unlimited opportunities that abound for engineers were also stressed, while information concerning the requirements for becoming a successful engineer was also communicated. Many of the students showed interest in studying engineering as a career.

Induction of New Members

The grand finale of the Engineering Week was the induction ceremony of 55 new corporate members of the Nigerian Society of Engineers, an award made to deserving senior engineers and corporate organisations in recognition of their tireless support of the Society as well as their contribution to the development of engineering practice in Nigeria.

It is understatement to say that the memory of the event still lingers in the minds of all. ■

More information from the Technical Secretary,
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The Federation of African Organisations of Engineers

The Federation of African Organisations of Engineers (FOAE) is an international member of the World Federation of Engineering organisations (WFEO), an establishment of the UNESCO. The secretariat of FOAE is in Nigeria, hosted by the Nigerian Society of Engineers (NSE). FOAE at the moment has 13 Countries as members, namely: Nigeria, Ghana, Egypt, Liberia, Tunisia, Libya, Kenya, Zimbabwe, Zambia, Cameroon, Cote d' Ivoire, Tanzania and Sierra Leone.

Aims and Objectives

To develop, in the spirit of African unity, direct relationships between its several member organisations on a basis of mutual understanding, so that their activities may be fostered and directed to the greater public good and in particular:

- To promote the advancement of engineering science and practice and their applications to benefit mankind.
- To advance the common aims and objectives of its member organisations.
- To support the work of each member organisation in its own territory.
- To provide a focal point for the expression of the professional engineering opinion of its member organisations.
- To collaborate with other national and international organisations, as it may think fit, to support and supplement their work.

The FAOE has been meeting every year in Ghana and Nigeria at the annual conferences of the engineering organisations of the two countries.

NSE and GhIE (Ghana Institute of Engineers), in line with this cooperation, has signed an MOU which highlights the implementation of the following:

- Development of uniform standards and building codes. Sub-regionally and subsequently, continentally.
- FAOE fosters partnership with ECOWAS, AU & NEPAD.
- Strategic re-engineering of sub-regional groups.
- Establishment of committees in line with what is obtained in WFEO. Various countries will be opportune to chair the committees.■

More information from http://www.faoe.net/index.php

The Institution of Engineers of Kenya

The Institution of Engineers of Kenya (IEK) is the learned society of the engineering profession and co-operates with national and other international institutions in developing and applying engineering to the benefit of humanity.

Ideals and Objectives of IEK

- To represent the diverse interests of all branches of engineering.
- To promote, encourage and improve the application of engineering to technical and other related practices.
- To facilitate the exchange of information and ideas on technical and other related matters.
- To safeguard the dignity and integrity of the engineering profession and safeguard the standards set to guide the application of engineering knowledge to the solution of problems.
- To contribute to and set standards for theoretical, practical and management training leading to acceptance to Membership of IEK and registration by the Engineers Board of Kenya (EBK)
- Commitment to Continuous Professional Development for members of IEK.

Distribution of Membership

Most members of IEK are resident in Kenya but IEK has members outside Kenya. The membership is drawn from practising engineers in local central government departments, parastatals, private industry, consultants, contractors, educators, designers, manufacturers and those interested in engineering.

The interests of all members are represented by the Council of IEK, which coordinates the interests/activities of the regional branches and various other associated bodies. The Council of IEK arranges national conferences, seminars and representation of IEK members in various committees formed in the country and internationally. The regional branches and their committees play a vital role in the membership contract through organising lectures, demonstrations, technical visits and in upholding all professional standards.

The success of the regional branches depends greatly on the support given by members who are encouraged to take a positive part in the activities of regional branches. The regional branches ensure maximum benefit is obtained by members and help to expand the membership of the IEK.

Activities of IEK

IEK offers its members seminars, lectures, publications and training, to enable them to keep up to date with technical and industrial developments, management aspects of engineering, changes in technology and relevant developments in Kenya, on the African continent and around the world.

The *Kenya Engineer* is the bi-monthly journal produced and published by the IEK and is distributed to all members.■

More information at http://www.iekenya.org/about.php

How the Women's Opportunity Center in Rwanda rewrote Sharon Davis' future

By Emily Nonko

What should architecture look like when it is designed specifically for women? That was the challenge architect Sharon Davis took on in the village of Kayonza, Rwanda. Here, the architecture had to address more than the lack of a safe gathering place for Rwandan women – it also had to create economic opportunity and a solid social infrastructure. It was no small task for Davis, only one year out of graduate school, having turned to architecture in her 40s. But the result was astounding, a contemporary, intimate mini-village that punctuates the rural landscape of Kayonza. Known as the Women's Opportunity Center, it is made of interconnected, circular structures that women travel freely between to socialise, learn, and set up business.

The project would go on to change the course of Sharon Davis' architecture career. "Walking around the finished site," said Davis, "I just couldn't believe that someone let me do this one year out of graduate school. No one would have let me do this in the U.S."

Indeed, Davis' path to architecture began with a career in finance and, when she was nearing her 40s, changed direction to architecture. She completed a M.Arch at Columbia's Graduate School of Architecture, Planning and Preservation and graduated in 2006. She decided to start her own business in 2007 and Sharon Davis Design was founded.

An early commission to design the Women's Opportunity Center "changed everything," she explained. The nonprofit organisation Women for Women International received the land to build the Opportunity Centre in Rwanda and wanted a female architect to design it. A member of the board recommended Davis. The project was "uncharted territory." But upon her first site visit to Rwanda, the design focus became clear.

Perforated classroom walls enable passive cooling and solar shading.

A farmer's market is supplied by produce grown in the Center's gardens.

Classroom exteriors. The circular shape encourages interaction and intimacy between the women using the facility.

The concept of the project was to create a 'villiage' that was safe and inviting.

Davis knew the design had to be inviting, like a safe haven, rather than intimidating. The concept of the site, then, was to create a type of village. A series of low-rise pavilions were built in a circular pattern, with classrooms at the heart of the site. A farmers market, community space, gardens, and guest lodgings are all located on the outer edges of the circle.

Davis also wanted the centre to reflect Rwandan design. Davis found inspiration in the historic King's Palace in southern Rwanda "with thatched and woven buildings and small circular spaces within a larger site." It was also important for Davis to use local materials. The circular structures are composed of 450,000 clay bricks made by Rwandan women using a manual press method adapted from local building techniques. Gaps in the brickwork would bring in air and light. The roofs were designed to accommodate a rainwater collection system. The potable water gathered in the collection system could then be sold by women at the centre's market.

Construction on the Women's Opportunity Center lasted two years, ending in 2012. "After it opened, I wanted to replicate that experience immediately, but found that many international, humanitarian projects take a long time to plan, develop, and fundraise. So she founded her own NGO, the Big Future Group, with Julie Farris, Arun Rimal, and Eric Rothstein, other architects and designers who met while working on the Women's Opportunity Center. The idea, according to Davis, was to continue to create "architecture that could change the quality of people's lives." Creating a nonprofit organisation meant that Sharon Davis Design would solely focus on interior design for private clients. Big Future Group continued to work on projects in Rwanda.

Big Future Group is also set to build a K–12 school in Ethiopia. "Coming from Rwanda, there's a very different culture here, and we're meeting it with a new perspective," she said. "It's new people, a new culture, and a new challenge." While Davis has described her late career start as a significant challenge, in retrospect, her timing seems perfect. "I took a risk," she said, "But it all fell into place."

The project won a 2015 Artchitizer A+ Award in the Architecture + Community category. It was both a Popular Choice and a Jury Choice project. ■

Photographs by Elizabeth Felicella.

Source: http://goo.gl/HTjQIx

Armadillo Crèche, Cosmo City, Johannesburg

Winner of the 2013 Architizer A+ Popular Choice Award in the Typology Student Design/Build Project category.

The Armadillo Crèche, designed and constructed by students of Cornell University Sustainable Design, is an early childhood development (ECD) centre in Cosmo City, Johannesburg. It accommodates 80 children and houses a teacher-training centre. Standing on an elevated site, the ECD centre is a beacon for education.

To embrace the necessity of a fence, the design references an armadillo: it curls in on itself, protecting its soft underbelly with a hard shell. The design integrates the boundary condition with the buildings and landscape, creating zones of different scales for various activities. The ECD centre emphasises communal programmes and the communal spaces are angled to open up to views of the natural conservation zone.

The school is the product of a two-year process orchestrated by Cornell University Sustainable Design, an interdisciplinary student-led organisation. Students, with the help of academic advisors and industry professionals, executed the project through a semester of research, another semester of design development integrated into the Bachelor of Architecture comprehensive design studio curriculum, and three months of construction.

Deborah Terhune, based in South Africa and founder of non-profit Growing up Africa (GUA), was contacted by a friend at Cornell University, to act as international business liaison (a role that was created for her) to the group

of Cornell University students who were to build the early childhood development and training centre.

Twenty-eight volunteers from 17 countries travelled to South Africa to construct the school alongside local labourers from the Cosmo City community. When it became clear raising funds was impossible, the GUA business model was initiated. Instead of approaching corporates for money the design was shopped to all relevant national and international corporates, soliciting support in kind.

Strong emphasis was placed on sustainable passive technologies to decrease cost and energy dependency. A year after construction, the ECD centre was still not connected to the grid, but the teachers explained that these passive technologies create a bright, warm, and functional school without the use of electricity. This project was completed with generous support from Cornell University, in partnership with Education Africa, Play-With-A-Purpose, Basil Read Developments, the City of Johannesburg and many South African companies. ■

More information at http://architizer.com/projects/armadillo-creche/

Sustaining the environment when developing engineering projects – a clarion call to professionals

By Olonade, Kolawole Adisa (PhD, Engr.)
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Introduction

As we move towards a globalised economy, it is obvious that what matters is not how many natural resources a nation has, but how much value is added to what nature has bestowed on her. A nation's capability of initiating and sustaining economic growth depends on its ability to provide clean water, good health care, adequate infrastructure, and safe food, which undoubtedly rely on engineering capability (Victoria, 2006).

Engineers have built highways and railroads across continents, dammed mighty rivers, tunnelled under the sea and put men on the moon; hence, engineering is a key profession in implementing society's desires and needs. However, engineering needs to change in response to new social and environmental challenges – from "directing the powers of nature for the use and convenience of mankind" to "working with the powers of nature for the use and benefit of society" (Jowitt 2006).

Effective engineering projects support economic growth, enhance quality of life and are important for national security (Baldwin, Dixon, 2008). Unfortunately, most developing economies, especially those in Africa, are unable to develop the engineering techniques required to add value to their abundant natural resources; thus they remain in a vicious cycle of poverty. To eradicate this menace, an appropriate technology that can convert the natural resources to more beneficial uses that can positively influence the socio-economic lives of an average citizen is more than optional – it is critical.

What are engineering projects?

Engineering projects are developmental projects that a country establishes in order to facilitate its agricultural, industrial and commercial production, rendering social services and maintaining the security of the community (Adewoye, 2005). It is important to note that no engineering project is intentionally put in place to endanger the populace environmentally, socially, or economically, but to:

i. serve the purpose for which it is established;
ii. be capable of withstanding the elements and normal usage for a reasonable time;
iii. meet pertinent legal requirements and conform with generally accepted engineering standards;
iv. be visually pleasing, and
v. positively impact the environment or well-being of the adjacent community.

For the past 150 years, engineering practice has been based on a paradigm of controlling rather than cooperating with nature. In the control-of-nature paradigm, humans and the natural world are divided, and humans adopt an oppositional, manipulative stance toward nature. Despite depletion of natural systems, this approach has produced remarkable engineering achievements during the nineteenth and especially twentieth centuries. Civil and environmental engineers have played a critical role in improving mankind's living conditions by improving sanitation, and developing water resources and transportation systems. Ironically, these successes have unintentionally contributed to current problems by enabling population growth (Roberts, 1997). Most of the engineering achievements of the past were developed without consideration for their social, economic and environmental impacts on natural systems. Not much attention was paid to minimising the risk and scale of unplanned or undesirable disruptions of natural systems associated with engineering systems.

Engr. Dr. Kolawole Adisa Olonade has a PhD in Environmental and Civil Engineering (Materials and Structures) from University of Lagos, Nigeria.

Effect of engineering projects on the environment

Environmental impact is defined as any change to the environment, whether adverse or beneficial, resulting from a facility's activities, products, or services (U.S. EPA, 2004). Virtually all engineering projects have potential to affect the environment positively or otherwise.

The most energy-intensive electrical engineering projects are electrical power generating stations, which utilise renewable or non-renewable energy sources. The common non-renewable energy sources in power stations are fossil fuels, particularly coal, gas and fuel oils. Environmental hazards posed by these energy sources include oil pollution, acid rain and various forms of land degradation associated with mining.

Nuclear power stations, which produce cheaper energy than coal-fired stations, also produce radioactive wastes that can take hundreds of years to become harmless and have high potential for accidents. For example, the Chernobyl nuclear disaster of April 26, 1986 resulted in the death of scores of people and rendered 150,000 people homeless. It also left contamination that could not be removed (Awake, 2006). The radiation was felt as far as the United States and Japan within two weeks and, because of the long-term effect of this nuclear radiation fall-out, future death toll was estimated at about 100,000 with many European animals and crops at risk of destruction. Hence, fifteen years after, health problems due to Chernobyl continue to be very acute, demanding international attention and action (Rosalie, 2002).

Conversely, the renewable energy sources (such as hydro, solar, wind, tidal and geothermal power stations) are much safer, but are huge in scale. The attendant problems of such

enormous projects include resettlement of large numbers of people. China's ongoing South-North water transfer project (the biggest engineering project in Chinese history) requires the displacement of approximately 330,000 inhabitants (Ecologist, 2010). There is also a possible increase in earthquake activity due to the colossal volumes of water held behind dams, leading to water seeping into rock fragments as happened in Indonesia where 6,000 people died in an earthquake (The Comet, 2006). The irony of hydropower projects worldwide is that despite tremendous losses suffered by the local rural populace (loss of land and water bodies), they do not usually benefit from dam projects since the hydroelectric stations are meant to serve urban areas and factories.

Civil engineering projects such as construction of railways, roads and multi-storey buildings, are common features in modern environments. These facilities are needed to make the ever-increasing urban population comfortable. Apart from changing the natural environment, urbanisation also leads to consumption of natural resources – land, water, food and energy. In the USA, for example, 2.5 million hectares of prime farmland is being lost to urbanisation every decade. In Nigeria, land in Lagos is being reclaimed to provide more space for offices and residential buildings, thus disturbing natural habitats.

The high concentration of people in urban areas due to availability of job opportunities leads to the emergence of slums with their attendant hazards including: higher risk of natural hazards, pollution, increased noise levels and spread of epidemic diseases. One major effect is seen in cases of incessant building collapses in Nigeria. Some of these are due to illegal alterations to existing buildings by property owners to accommodate the ever-increasing population. In some instances, existing bungalows have been converted to two- or three-storey structures without drawings or supervision by qualified personnel (Kingsley, 2010).

Wastes produced by chemical engineering-based industries like breweries, paint factories, cement plants and mineral exploration and exploitation plants usually cause air and water pollution. Globally the cement industry causes concern because of the greenhouse gas emissions that pollute water sources (underground and surface). Air and sound pollution are equally common.

Environmental pollution caused by oil exploitation in the Niger Delta has generated much anxiety, has led to loss of life and crippled economic activity on several occasions. These have led to additional research, planning, mitigation and oversight to ensure that oil exploration and production activities are conducted in a manner that minimises spill risks, maximises response capacity and ultimately prevents adverse impacts on the environment, ecology and indigenous people who rely on a healthy and pristine Ocean (Elise et.al, 2010).

Research over the last few decades has shown a decline in the protective ozone layer due to the release of Chloro-fluorocarbons (CFCs) into the atmosphere as industrial waste. Consequently, humans are exposed to dangerous ultraviolet radiation, causing increased skin and eye cancer, as well as global warming which has led to climate change and rises in water levels resulting in the flooding seen all over the world.

Modern agriculture has become more intensive because the land available for agriculture is diminishing daily while the number of mouths to feed continues to grow incrementally. This has resulted in the monoculture system of agriculture and the use of heavy doses of fertilisers with attendant adverse effects on the soil. In addition, poor planning and management of irrigation systems has led to water-logging, salinisation and alkalisation – damaging or killing plants and rendering the fields useless.

Claudio, 2001 reported that roughly one-third of irrigated land in the major irrigation countries is already badly affected by salinity or expected to become so in the near future. Present estimates for Israel are 13% of the irrigated land, Australia 20%, China 15%, Iraq 50%, Egypt 30%.

Challenges

It is obvious that engineering projects do not of themselves adversely affect the environment or cause negative socio-economic impacts. These can only occur when projects are not well conceived, implemented and maintained. The onus lies with engineers and other professionals who are central to the provision of engineering projects. Clearly, engineers must complement their technical and analytical capabilities with a broad understanding of the soft issues that are nontechnical. Experience has shown that the social, environmental, economic, cultural, and ethical aspects of a project are often more important than the technical aspects.

Conclusion

Engineers and other relevant professionals of the future must be trained to make intelligent decisions that protect and enhance the quality of life on Earth rather than endangering it. They must also make decisions in a professional environment in which they will have to interact with people from both technical and nontechnical disciplines. Preparing engineers to become facilitators of sustainable development, appropriate technology, and social and economic changes is one of the greatest challenges faced by the engineering professional today. It is clear that engineering education needs to be changed (or even reinvented) to address the challenges associated with these global problems.

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Concrete masonry housing is sustainable

Concrete masonry housing offers substantial environmental benefits, says Bryan Perrie, managing director of The Concrete Institute.

"The increasing focus on environmentally-friendly practices and energy-efficiency has resulted in the emergence of global 'green washing' with its inherent unsubstantiated, or misleading, claims about the environmental benefits of products or materials. As a result, it has become necessary to delve deeper into the manufacturing processes of materials to distinguish the truth from fiction in this regard," Perrie asserts.

Bryan Perrie, managing director of The Concrete Institute.

"It is the ability to incorporate recycled and industrial by-products into the concrete masonry manufacturing process that not only reduces the embodied energy of the units significantly, but also has immense environmental benefits. It decreases the demand for non-renewable resources by reducing the amount of virgin aggregates to be sourced.

"Secondary energy consumption generated by long-distance transport of aggregates from quarries to manufacturing plants can be reduced by using locally available building rubble. At the same time, it eases the pressure on landfill sites by decreasing the amount of rubble and waste material to be transported to, and dumped at, landfill sites. Concrete masonry manufacturing plants also have the unique ability to become zero-waste manufacturing sites by recycling their own manufacturing waste back into the process.

"Further to that, any so-called 'green' material should be evaluated against its ability to contribute towards the overall sustainable future of Africa. In order to do that, one needs to consider that true sustainability is the result of a balance between environmental, economic and social factors.

"The inherent cost-effective, durable and low-maintenance qualities of concrete masonry have long made it the material of choice for the African context. The labour-intensive nature of concrete block-laying provides the opportunity to create numerous jobs in the unskilled labour market – all of which contribute immensely towards social and economic sustainability.

"Furthermore, it is the thermal mass quality of concrete masonry that provides it with the ability to improve environmental sustainability by aiding passive climate control design. From this perspective, it is clear that concrete masonry is an inherently 'green' material which is ideally suited to improve sustainability in Africa," Perrie concludes.■

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Removing stains from concrete surfaces

The Concrete Institute is often asked how to remove stains from concrete. Bryan Perrie, MD of the Institute, offers advice on removing fungal growth, efflorescence, and chewing gum from concrete driveways.

Fungal growth: Wet the concrete surface, apply chlorine bleach, scrub vigorously, and rinse thoroughly. Dead fungal residue will usually be noticeable in a few days. Brush this off with a stiff bristle broom and repeat the bleach process, if necessary. Alternatively, use a high-pressure water cleaner to remove fungal growth, broom chlorine bleach over the surface and rinse well with clean water.

An attractive concrete driveway can be kept stain-free using the correct procedure, says The Concrete Institute.

Efflorescence: Remove excess salt deposits with a stiff bristle broom. If this is not satisfactory, scrub with clean water and rinse the surface. To remove any remaining deposits, the concrete should cleaned with acid. Handle acids with extreme care. Diluted hydrochloric acid, chlorine bleach or chemically based cleaning agents can be hazardous, particularly to your skin. Always wear protective clothing, especially gloves, and work in well-ventilated areas.

To remove efflorescence, use one part hydrochloric acid diluted with 20 parts of water. When diluting acid, always add the acid to the water, never the reverse.

The surface to be cleaned should then be saturated with water. The surface should be moist, but without any free water, before applying the acid solution. The diluted acid should be allowed to react on the concrete surface for ±15 minutes. The surface should then be thoroughly rinsed and scrubbed with clean water. Repeat the process at least twice or until all traces of the acid solution have been removed.

Chewing gum: If chewing gum dropped on a concrete surface has been smeared by footprints or car tyres, solidify the gum with ice cubes and scrape off as much as possible. Then apply a poultice (cat litter or a similar inert absorbent material) saturated with methylated spirits. Apply the poultice and allow to dry. This should turn the gum residue brittle, making it possible to remove it with a stiff bristle brush. Finish by washing the area with hot soapy water, and rinsing with clean water. Alternatively, scrape off as much chewing gum as possible and remove the rest with a solvent such as amyl acetate.■

Improving final concrete finish quality through appropriate curing

QUESTION: What is the role of curing in the final finish quality of concrete?

ANSWER: Curing has the greatest effect on the surface and near-surface zone of concrete. The objective of curing is to maintain satisfactory temperature and moisture conditions in order to improve the final product's strength, impermeability and durability.

Temperature is an important factor in curing since the rate of hydration, and therefore strength development, is faster at higher temperatures. Ideally, the temperature of placed and compacted concrete should not be allowed to fall below 5°C since this will result in slowing or even halting the hydration process. Concrete will freeze at temperatures below 2°C, resulting in concrete that will take longer to gain strength, delaying form or mould removal and subsequent construction.

If concrete is expected to drop below 2°C, an air-entraining agent from the CHRYSO® Air range should be added to the mix to protect it from freezing or thawing. Air bubbles provide a pressure relief valve, enabling moisture within the concrete to freeze and expand into the bubbles, thereby preventing cracking and spalling.

In addition to protecting the new concrete from extremely low temperatures, it is important to reduce the temperature differential between the core and outer surface of the concrete to an acceptable level while the concrete is gaining strength to avoid thermal cracking.

Moisture loss is another aggravating factor caused by sunshine, wind and humidity. Curing will protect concrete from these elements until a strength that is adequate for countering shrinkage stresses is reached. Plastic shrinkage cracks will occur if the evaporation rate exceeds the rate of bleeding.

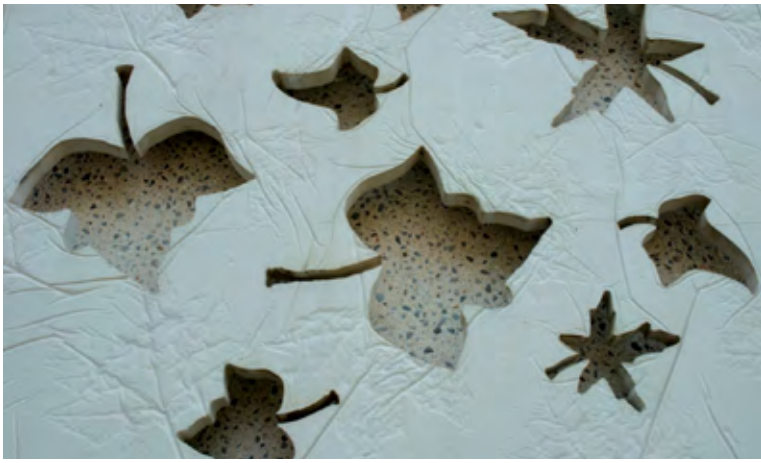
Moisture should be kept within the concrete for the hydration process to continue until the concrete achieves its 28-day strength.

QUESTION: When and how should one cure concrete?

ANSWER: Curing can be performed during two phases of the hydration process; firstly prior to initial set, while bleeding is taking place, secondly, after initial set and final surface finishing, but ideally before final set occurs.

Remember that bleeding occurs up to a point prior to the initial set of the concrete. When this point is reached, the surface will change from shiny to matt, whereafter surface finishing can commence. Once surface finishing is completed, curing compounds can be applied. Premature application of curing compound may result in it becoming disproportionately diluted.

An example of concrete bleed and plastic shrinkage cracking.



A perfect finish.

High-pressure water spraying using a mist or fog sprayer provides the earliest possible method of curing but is not always ideal as water has to be sprayed continuously up to initial set. The objective is to create a 100% humidity zone in contact with the exposed concrete surface. However, the use of water may create a wet environment, preventing other trades from operating in that area and if there is surplus water, complications can arise.

Plastic sheeting is typically applied after compaction and initial striking of concrete. This is suitable for most elements and is effective, provided the plastic is applied with precision and is in constant close contact with the concrete. Early application on flat slabs may damage the surface finish.

A reliable and controlled way of preventing rapid evaporation of water is the application of a product such as CHRYSO® Profilm 19 after compaction and initial striking. This product reduces the evaporation rate and forms a continuous barrier film over the concrete surface.

When curing after initial set and final surface finishing, one can use the methods outlined for curing before initial set as well as some additional methods. Firstly, one can leave formwork in place to prevent evaporation from surfaces which are in contact with the formwork, while covering exposed surfaces with plastic sheeting. Once formwork is removed, other curing methods should be implemented.

Curing compounds are membrane-forming liquids that are sprayed onto the concrete surface to inhibit the evaporation of water. They are applied as soon as bleeding has stopped and the bleed water has evaporated from the surface, or immediately after stripping the formwork from the columns, walls and beams.

The choice of curing compound is especially important if concrete is to receive further treatment. Some compounds will interfere with subsequent concrete surface treatments (paints, plastering, emulsions, sealants, adhesives and renders). Chryso can advise customers on the most appropriate curing agent to use for specific applications, by referencing a large number of successful projects.■

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Reducing plastic shrinkage cracking using micro-fibres

Plastic shrinkage cracking (PCS) is one of the earliest forms of cracking in concrete and can be a major headache for engineers, contractors and property owners. These cracks occur within the first few hours after the concrete has been cast and are not only unsightly, but they also reduce the durability and serviceability of a concrete structure by serving as pathways whereby corrosive agents, for example air, water and chlorides, can enter the concrete. PSC is caused by the loss of pore water from the concrete surface due to evaporation resulting in an internal capillary pressure build-up.

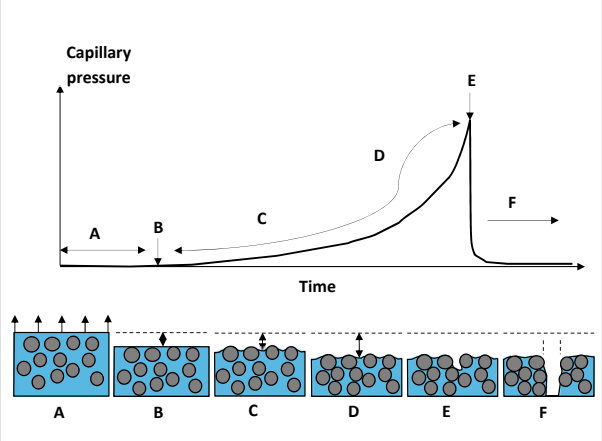

Figure 1: Typical capillary pressure build-up before the onset of plastic shrinkage cracking in concrete

Figure 2: Direct tensile test on fresh concrete clearly showing the fibres bridging the crack even after extensive crack opening.

Environments with high evaporation rates will increase the capillary pressure in the concrete and are characterised in South Africa by conditions with a low relative humidity, direct sunlight as well as high wind speeds and high ambient temperatures. Concrete elements with large exposed surfaces, for example slabs or pavements, are especially vulnerable to evaporation and therefore also to PSC. The process of capillary pressure build-up due to evaporation and the consequent cracking are illustrated in Figure 1.

The position of cracks depends on the geometry of the slab. If the slab is of uniform thickness, crack patterns are mostly random. However, if the slab has a non-uniform thickness, as a result of a varying depth or rigid inclusions such as reinforcing steel, crack patterns are normally linked to the positions of these slab non-uniformities.

There are several external and internal measures that can be applied to prevent or reduce PSC. External measures influence the external environment of the concrete slab and are aimed at minimising water loss through evaporation. These include: casting during favourable conditions with low evaporation rates, shielding the concrete from wind and direct sunlight, spraying a fine mist of water continuously above the concrete surface as well as cooling the concrete aggregates and/or mixing water.

Internal measures influence the internal structure and the behaviour of the concrete. Tests at Stellenbosch University have shown that the most common and successful internal measure to reduce PSC is the addition of a low volume of polypropylene micro-fibres to the concrete. The fibres reduce crack widening by transferring the stress induced by capillary pressure across the crack. Figure 2 shows a direct tensile test on plastic concrete, which clearly shows the fibres bridging the crack even after extensive crack opening. In general, the higher the dosage of fibres the less severe the cracking will be. However, the addition of fibres also influences fresh concrete properties such as bleeding and workability. It is therefore important to conduct trial mixes, especially at higher dosages, although a typical dosage of 0.6 kg/m^3 can be prescribed as a proven dosage that effectively reduces PSC without negatively influencing the workability of the concrete.

Finally, although fibres provide resistance to PSC, they do not always result in a 100% crack reduction and the addition of fibres does not justify neglecting the application of external preventative measures.

Another common and worrying practice in the construction industry is the use of steel mesh to reduce PSC. This is a misconception as the steel mesh may, in certain cases, even aggravate the PSC of the concrete by providing vertical and horizontal restraint. The steel mesh is meant to control cracking due to drying shrinkage which occurs long after PSC has finished.

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

This article was supplied by Prof Billy Boshoff and Riaan Combrinck, Unit for Construction Materials, Stellenbosch University.

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East Africa's longest cable-stayed bridge nears completion

A semi-fan system of single-plane cable stays connects the superstructure to two 55-m-high pylons.

The deck is a prestressed box girder 32 m wide accommodating a six-lane dual carriageway and two sidewalks.

The 680-m-long Kigamboni Bridge, the longest cable-stayed bridge in East Africa, will be joined in two months, a Chinese manager of the project said on Tuesday.

This cross-sea bridge, which connects the Kurasini and Kigamboni areas in Tanzania's commercial capital of Dar es Salaam, is an important link that joins the two areas across the water channel that separates them.

The ACE Group is involved in this important project in all its stages, from planning and design to construction management and handing-over. ACE Project Management is a firm that provides management services for the construction sector across the whole range of a development's life cycle.

The project comprises planning, design and construction works over a total length of around 8.5 km, with the bridge and its approaches constituting a total length of 680 m. The cable-stayed part of the bridge comprises five spans of 40, 60, 200, 40 and 60 m length. A semi-fan system of single-plane cable stays connects the superstructure to two pylons rising 55 m above the deck. The deck consists of a prestressed concrete box girder with a total width of 32 m, accommodating a six-lane dual carriageway and two sidewalks.

The bridge is currently under construction by the China Railway Construction Engineering Group (CRCEG) and the China Railway Major Bridge Engineering Group (CRMBEG).

"If all goes well, the sections of the bridge will be joined in two months," said Zhang Bangxu, business manager of the project which also includes a 5.7-km-long road connecting the bridge.

"After its completion, the Kigamboni Bridge will offer people one more choice to travel between the two areas which are divided by a narrow gulf," he said, adding that through the advanced toll collection system on the bridge, people will spend much less time than travelling by ferry.

According to Zhang, a number of new materials and techniques have been used in constructing of the bridge.

"We're using cables with the highest strength in the world, which were tested at a material testing laboratory in Chicago," said Li Haihong, production manager of the project.

"Because this is a single-plane cable-stayed bridge, the cables have to be very strong to bear the full weight of the bridge deck when it is carrying traffic," he explained.

As for concrete, he said that the use of a special concrete mix has made the bridge towers extremely strong.

"This is the No. 1 cable-stayed bridge in East Africa," Li said. The construction of the US$135-million bridge is expected to be completed by the end of this year.■

Sources: www.ace-consultants.co and http://goo.gl/TGsFqW

Tower cranes help raise Cambambe Dam's height by 20 metres

By December 2015 the work on Angola's Cambambe hydroelectric power station, in the Kwanza River, 180 kilometres southeast of Luanda, will be completed. This dam currently supplies power to the cities of Luanda, Ndalatando, Cacuaco, Malanje, Gabela, Porto Amboim and Sumbe, benefiting a population of eight million people.

Built in 1962, the station is being renovated and expanded since 2009 to increase its energy production by 80%. From the current 180 MW per year, this infrastructure will then produce 960 MW, becoming the largest power production plant of the Kwanza basin. In 2014, Cambambe obtained ISO 9001, 14001 and 18001 certification, the first hydroelectric project in Africa to obtain such recognition.

Part of the project which is being conducted by the Brazilian construction company Norberto Odebrecht is to raise the dam's height by 20 metres. This will increase the capacity of the reservoir from 2 to 5.5 km^2, and enable the four existing generators to produce 65 megawatts each instead of the present 45 megawatts.

In order to place the over 65,000 cubic metres of concrete needed to raise the dam, Odebrecht is relying on three Linden Comansa tower cranes: two 21LC750 with maximum load capacity of 48 tonnes acquired in 2012 and a 21LC400 with maximum capacity of 18 tonnes leased by IBERGRU, the exclusive distributor of Linden Comansa in Angola.

The first 21LC750 was located on the left bank of the Kwanza River, erected with fixing angles on a special concrete foundation which, given its short width, was anchored to a rock on the river bank. It was mounted with a freestanding height of 78.8 metres, the maximum possible height with 2.5-metre-wide mast sections (fourteen D36 sections), and a jib length of 80 metres.

On the right bank, a second 21LC750 was erected with a freestanding height of 87.2 metres, achieved with 12 sections D36 – as her 'sister' in the left margin – increased by three 5-metre-wide D56 sections at its bottom. Another concrete foundation was anchored on the riverside to allow this crane's assembly on fixing angles.

After 18 months of working at concreting and materials lifting tasks, the first 21LC750 (left bank) was relocated within the jobsite and substituted by a 21LC400 from IBERGRU's rental fleet, which was erected with a freestanding height of 80 metres and a jib length of 70 metres. This crane was assembled on the same fixing angles of the previous 21LC750, so it was necessary to have two transition sections to allow the progression from the 4-metre-wide fixing angles to the 2.5-metre-wide D33 mast section.

The relocated 21LC750 is currently working on the construction of the power house (or power generation centre) where it was assigned to move precast segments weighing up to 19 tonnes for the new water tunnels, as well as lifting and placing all the electromechanical gear that will enable the production of energy, such as turbines and generator sets.

The assembly and jacking-up of the first 21LC750 was performed by Linden Comansa's technical assistance service team, while the remaining assemblies, jacking-ups and technical service were entrusted to IBERGRU.

IBERGRU has been the official distributor of Linden Comansa in Portugal since 2002. In 2008, the company opened offices in Angola, where it offers its tower crane rental services as well as technical planning and coordination for all kinds of projects.■

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Chryso entrenches presence in Africa with new subsidiary in Kenya

Kenya is one of sub-Saharan Africa's fastest growing economies, with a tremendous focus on infrastructure development in roads, railways, seaports, airports, water and sanitation. Cement sales in the East African region are equal to South Africa's cement sales and are currently growing at double-digit rates annually. In a concerted effort to remain close to its customer base, the Chryso Southern Africa Group has established a subsidiary that will be headquartered in Nairobi, Kenya. The facilities will also be used to supply products to Tanzania, Uganda, Rwanda, Burundi and Ethiopia.

With the capability to service roughly 80% of the African continent, Chryso products are readily available and can be transported to customers using the most appropriate mode of transport; road, air or sea freight.

An in-house laboratory in Johannesburg, where specialised mix designs are tested to determine the most appropriate solution for each project, is complemented by alliances with a number of concrete laboratories in various African countries.

"Servicing customer needs is our primary driver and the establishment of Chryso Eastern Africa further underlines our strategy to further expand our footprint in Africa," says Trevor Sawyer, Chryso Eastern Africa representative.

As a leading construction chemicals specialist, the Chryso Southern Africa Group continues to implement plans that will see customers in Eastern Africa having direct and immediate access to both the entire product range as well as a team of technical product specialists. Comprising Chryso Southern Africa and a.b.e. Construction Chemicals, the Chryso Southern Africa Group has established a distributor network and distribution outlets across the African continent and the Indian Ocean Islands.

"Through its market share and product performance, Chryso has been a leader in Southern Africa for its concrete and cement additives, while a.b.e. has been a major supplier of high-performance systems and products to the building, civil engineering, maintenance and manufacturing sectors as well as builders merchants and hardware stores. As a combined force, the two companies have an enormous advantage when entering the African market as a one-stop shop," says Sawyer.

Sawyer is a qualified concrete technologist who has over 20 years of experience in the cement and concrete industries and has worked within the Chryso Southern Africa Group for over eight years. "Kenya has shown impressive sales growth for the Group over the past nine years, so it made good business sense to solidify our presence in the country.

With logistic networks, warehousing facilities and clearing agents already established, Chryso Eastern Africa will now focus on building a manufacturing plant in the next year. "Entrepreneurship, empowerment and decentralisation are a part of the Chryso Group's core values. We therefore do not want to establish a French or South African business in Kenya. Our vision is for Chryso Eastern Africa to employ Kenyan people, and to develop them to the standards that we maintain in the Chryso Group," says Sawyer.

"We aim to have a competent local staff complement with an intimate knowledge of local conditions that can assist customers with troubleshooting problems on site, optimising mix designs, improving processes and precast turnaround times. Chryso Eastern Africa will therefore provide a service that provides best practice in concrete technology and allows us to become an integral part of our customers' businesses," Sawyer points out.

Chryso Eastern Africa is one of 17 CHRYSO subsidiaries globally. Last year, LBO France acquired the Chryso Group from Materis, along with its incumbent management team. "This has resulted in an exciting phase of global growth for the Group and has assisted in increasing the pace at which Chryso Southern Africa is becoming the Chryso springboard into the African continent," concludes Sawyer.■

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Design fraternity welcomes a.b.e. waterproofing loading on REVIT

Architects and other designers have welcomed the fact that the specifications for a.b.e. Construction Chemicals' waterproofing products have now been preloaded on Autodesk REVIT software.

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

Ivor Boddington, a.b.e.'s product manager: Concrete Repairs & Protection & General Construction, says Autodesk REVIT is an innovative building information computer program that has transformed building design from drawing flat sketches on paper to creating virtual, three dimensional designs.

"It enables architects; structural engineers; mechanical, electrical and plumbing (MEP) engineers, designers and contractors to design a building and its components in three dimensions, annotate the model with 2D drafting elements – such as used for waterproofing – and then access construction information from the building model's database," Boddington stated.

"Three-dimensional modelling itself is not new but in the past the 3D models would merely illustrate what a building would look like when completed. Now, thanks to the Autodesk REVIT program, architects and other parties involved in designing and construction can plan ahead when it comes to the finer details of their design, including the annotation of the a.b.e. waterproofing the new structure will require.

"The fact that a.b.e. waterproofing specifications can now be extracted and inserted to a project at the design stage means that the designers can automatically generate a Bill of Quantities containing all the products and measurements required, the extruded elevations to be provided for, as well as the final conceptual visualisation," Boddington explained.

Autodesk REVIT also enables designers to extract energy analyses and environmental impacts, as well as waterproofing requirements, prior to the construction of a building, thereby saving important additional unforeseen costs later in the construction schedule.

Boddington added that a.be. is planning to preload all other applicable a.b.e. products onto Autodesk REVIT software, including a.b.e.'s flooring, specialised adhesives, structural glazing, concrete repair, silicone and sealants, and construction commodity products.■

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Fast track quality waterproofing with Mapei Plastimul 2K Reactive

MAPEI South Africa's comprehensive range of market-leading solutions for waterproofing now includes Plastimul 2K Reactive, a solvent-free, eco-compatible, bitumen waterproofing emulsion. Another of the technology innovations from the international Mapei group, Plastimul 2K Reactive has no equivalent in the local market and is attracting strong interest from waterproofing contractors.

Immediate waterproofing: Plastimul 2K Reactive is a two-component emulsion that is applied by airless spray to give immediate waterproofing of structures below ground such as the outside of foundations and retaining walls, as well as virtually any horizontal and vertical surfaces that are not exposed to UV. The product is suitable for all types of concrete and cellular concrete surfaces, limestone, pumice, lightweight brick and breeze-block masonry, render and screeds.

Extremely tough and highly elastic: Applied using an airless spray that keeps the two components separate until they emerge from the spray nozzle, Plastimul's blended components immediately begin setting. A partially-hardened membrane is formed which is highly flexible, waterproof and resistant to leaching. The tough, fully-cured membrane has a high elasticity and crack-bridging capacity, and prevents ingress of water even at high positive pressures.

User and environment friendly: A primary concern of Mapei in developing its products is the health and safety of users and care for the environment. Being solvent-free, Plastimul 2K Reactive is non-flammable and eco-compatible, user-friendly acrylic paint systems can be used for overcoating.

Final finish seals the guarantee: When sealing or refurbishing concrete roofs exposed to UV sunlight, the Plastimul 2K Reactive membrane is protected from UV with a suitable reflective finish such as two coats of Mapei Aquaflex Roof HR reflective paint.

Plastimul 2K Reactive has been a very well-received solution for waterproofing retaining walls and concrete roofs that frequently present challenges for traditional waterproofing systems. If a project is undertaken by a Mapei South Africa-approved applicator, then the waterproofing membrane will be guaranteed against deterioration for 10 years and a full quality control system is provided free of charge by Mapei South Africa technical personnel.■

More information from Mapei South Africa on
Tel: +27(0)11 552 8476 / www.mapei.com/ZA-EN

LATICRETE has the concrete construction industry covered

For close to 60 years, LATICRETE has led the industry with pioneering advancements and the development of high-performance building materials for architects and construction professionals worldwide.

While the company is best known for its tile and stone installation and care systems, LATICRETE has significantly expanded its portfolio in recent years to include many concrete-related lines and systems. This portfolio now includes the LATICRETE® SUPERCAP® System, a suite of concrete construction chemicals and resinous decorative finishes.

As a manufacturer of globally proven construction solutions, LATICRETE offers exceptional quality and value to its worldwide customer base.

Concrete construction chemicals

The LATICRETE portfolio of concrete construction chemicals is designed to improve the long-term durability, performance and appearance of concrete surfaces and work hand in hand with the complete line of the company's concrete protection and repair solutions.

The company offers a full line of products including curing and sealing treatments, floor hardeners and densifiers, polished concrete systems, and stain protection products work together to ensure concrete floors are safe, resilient, and easy to maintain.

In 2014, LATICRETE expanded this line of products with the acquisition of L&MTM Construction Chemicals. L&M Construction Chemicals is a diverse line of concrete construction chemicals, including coatings, sealers, construction grouts, patch and repair mortars, and colour hardeners for polished concrete. These brands complement LATICRETE DRYTEK® to offer unparalleled integral colours, textures, and finishes with high-performance coatings, over-layments, and restoration solutions that give owners exceptionally attractive, durable and decorative floors. LATICRETE decorative finishes deliver vivid colour and gloss with high impact and wear resistance, quick turnaround, and low maintenance.

Please contact the LATICRETE Africa representative Joedi Brown at the email address jsbrown@laticrete.com for more information on the L&M Construction Chemicals product line.

Resinous decorative finishes

The LATICRETE portfolio of resinous decorative finishes for concrete floors offers unparalleled integral colours, textures, and finishes with high-performance coatings, overlayments, and restoration solutions that give owners exceptionally attractive, durable, decorative floors.

LATICRETE decorative finishes deliver vivid colour and gloss with high impact and wear resistance, quick turnaround, and low maintenance.

In 2014, LATICRETE added to this line of products through the acquisition of HP SPARTACOTE®.

HP SPARTACOTE offers a full line of patented high-performance polyaspartic concrete floor coatings. The product line has superior abrasion resistance, next-day return to service, UV stability and the ability to install in wide range of temperatures.

Please contact the LATICRETE Africa representative Joedi Brown at the email address jsbrown@laticrete.com for more information on the HP SPARTACOTE product line.

LATICRETE® SUPERCAP® system

Finally, there is the revolutionary LATICRETE SUPERCAP System – a time-saving, cost-effective method for finishing new concrete or capping existing slabs by combining a

LEED-contributing, UL GREENGUARD Gold Certified, low-alkali, self-levelling, cement-based technology with a computer-controlled mobile blending unit (pump truck).

This proven lean tool provides benefits right from the start of concrete placement. With the ability to blend 13,608 kilograms per hour and deliver material up to 50 storeys high, this revolutionarysystem benefits the entire project by providing predictable results that

save time, money, and improve overall quality.

As a leading manufacturer of globally proven construction solutions for the building industry, LATICRETE has the concrete construction industry covered.

For additional detail on LATICRETE products and systems, be sure to visit www.laticrete.com or contact Joedi Brown, Email: jsbrown@laticrete.com■

For information on the LATICRETE SUPERCAP System, please visit www.laticretesupercap.com.

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BASF opens concrete admixture production plant in Kenya

BASF has established a production plant for concrete admixtures in Nairobi. The production enables BASF to better meet the increasing demand for construction chemicals from customers in East Africa. In Nairobi BASF produces standard and custom-made performance admixtures from the MasterRheobuild® as well as the company's innovative MasterGlenium® product line.

"We are now able to rapidly supply our customers with admixtures for all cement and aggregate types, whether their construction projects are located in the urban areas or in more remote sites," said Dick Purchase, head of BASF's Regional Business Unit Construction Chemicals Middle East, West Asia, CIS and Africa.

Launching BASF's production plant in Kenya are from left: Laurent Tainturier, Ambassador Amina Mahomed and Dick Purchase.

BASF's admixtures produce concrete with higher strengths and increased workability retention. This is critical in urban areas like Nairobi or Kampala in Uganda, where heavy traffic can delay delivery of concrete to the construction site.

Kenya is a particularly strong growing market for construction chemicals in East Africa. "Growth in emerging markets is an integral component of BASF's 'We create chemistry' strategy," said Laurent Tainturier, senior vice president Europe East, CIS, Middle East and Africa at BASF. "In line with this, BASF's Africa strategy aims to double sales on the continent by the year 2020. The new production facility will strengthen the product portfolio in the region, and meet the demands for multi-storey buildings, durable infrastructure and more energy-efficient construction techniques," he said.

Cement is expensive and scarce in East Africa. With BASF products, it can be partially replaced in concrete mix designs. The solutions available from BASF also assist with achieving compliance to the energy efficiency certifications for LEED or GBCSA Green Star-rated buildings.

The production site in Nairobi is a further step in strengthening the Master Builders Solutions® global network. The solutions offered by this brand will also be of benefit to contractors from other regions working on construction projects in East Africa, as they may be familiar with the company's product portfolio. At the opening ceremony, Kenya's Cabinet Secretary of Foreign Affairs and International Trade, Ambassador Amina Mohamed, said: "Not only will BASF now be able to further contribute to building sustainable structures in East Africa, it will also bring employment opportunities and expertise to the region's construction sector."

Located in the Mlolongo area of Greater Nairobi, the production plant has good access to the road network and Mombasa Port to receive raw materials, deliver to customers in Kenya and to export to South Sudan, Uganda, Rwanda and Tanzania. BASF has been actively selling construction chemicals to the East African market for over 25 years and has production sites in Africa in South Africa, Algeria, Egypt and Morocco.

About BASF

BASF is the world's leading chemical company. Its portfolio ranges from chemicals, plastics, performance products and crop protection products to oil and gas. BASF combines economic success with environmental protection and social responsibility. Through science and innovation, our customers in nearly every industry are enabled to meet the current and future needs of society. Our products and solutions contribute to conserving resources, ensuring nutrition and improving quality of life. We have summed up this contribution in our corporate purpose: We create chemistry for a sustainable future.

About the Construction Chemicals division

BASF's Construction Chemicals division offers clients advanced chemicals solutions for new construction, maintenance, repair and renovation of structures. The comprehensive portfolio encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing systems, sealants, concrete repair and protection systems, performance grouts and performance flooring systems, tile fixing systems, expansion control systems and wood protection solutions. The Construction Chemicals division's 5,700 employees form a global community of construction experts. To solve customers' specific challenges from project conception through to completion, BASF draws on the experience gained in countless construction projects worldwide. BASF's global technologies are leveraged, as well as the in-depth knowledge of local building needs, to develop innovations that help make our customers more successful and drive sustainable construction. The division operates production sites and sales centres in over 50 countries and achieved sales of about €2.1 billion in 2013.

About BASF in Africa

The BASF Group has been active in Africa for 90 years. The company has been exporting colorants and intermediates to Kenya from its headquarters in Ludwigshafen, Germany, since the end of the 1920s. Today, the BASF Group has more than 1,000 employees in Africa (excluding the oil and gas business). In North Africa, the company is represented in Egypt, Algeria, Morocco and Tunisia. The key industries are construction, textiles, agriculture, automotive and the health care and plastics sectors. ■

More information on BASF is available at www.basf.com

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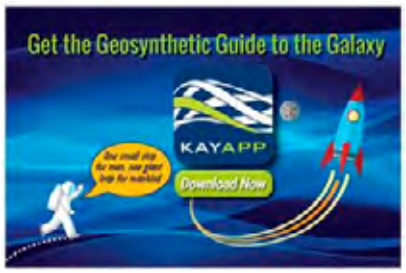

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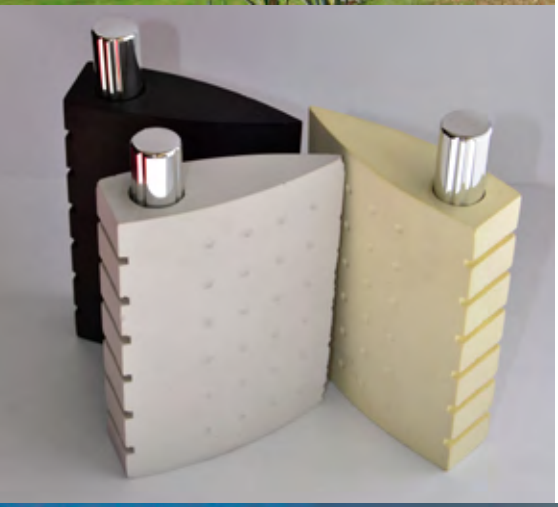
More information on Kaytech products and systems at www.kaytech.co.za

Thierry Bogaert: a warrior for concrete

Thierry Bogaert, the renowned architect and lecturer, is a headline speaker at the African Construction + Totally Concrete East Africa conference and exhibition being held in Nairobi from 26 to 28 October.



The architect and founder of Bogaert Architecture, Thierry Bogaert, was born in Grenoble, France. He is a graduate of the Ecole Nationale Supérieure des Beaux Arts national school of fine art in Paris (1979) and the Georgia Institute of Technology in Atlanta, Georgia, USA (1976).

He is a member of AFEX (Architectes Français à l'Export – French Architects in Export Markets) and AIVP (The Worldwide Network of Port Cities), and has been a visiting lecturer at the ESTP (Ecole Supérieure des Travaux Publics, IGESP, the French Construction Industry Graduate School) in Paris since 1998.

Bogaert is a very regular speaker at international heavy industry and seaport events. His area of expertise is industrial architecture, and he is particularly involved with architectural projects focused on the use of cement and concrete. In fact, a substantial number of projects have been for cement factories or grinding plants.

He works at bringing together modern architecture, engineering, construction and technology using high-strength concrete to produce leaner structures, achieve cost savings and provide more usable space.

Of the plant of the future, Bogaert says: "It is both logical and appropriate to think of an industrial plant as a City within a City. The original master plan for an industrial site is no different from any other urban plan. Sooner or later, all industrial plants will be incorporated into the unavoidable urban development we see right around the world."

The architectural practice, Bogaert Architecture, according to their website, "helps the decider to determine, formulate and accomplish his objectives relating to the spatial environment of industrial site and mines: landscaping, town planning, architecture and design."

Bogaert leads a multidisciplinary team that comprises architects, landscapers and designers working together with local partnerships in many countries throughout Europe, as well as in North America, South America, North Africa, Asia and the Middle East.

In a striking departure from industrial architecture, Thierry Bogaert has also been the creator of 'Voile de Beton' (Veil of Concrete), a perfume whose core concept was based on the idea of creating a "synthesis of a love for matter, form and the sensuality of perfume." Voile de Béton is an artisan made concrete object designed by Bogaert who is passionate about the material and has used extensively it in urban and industrial design. Each of the unique concrete 'veils' resembling that of a boat shelters a bottle of the perfume going by the same name.

The eau de toilette was created by Only Fragrance in Grasse. The scent is described as being a unisex fragrance with head notes of lemon, blackcurrant and apple; heart notes are floral with jasmine, white rose and cedar wood; and base notes are ambery and musky. Voile de Beton places the emphasis on the sense of touch. While concrete does not immediately evoke a sense of softness, but rather its opposite, in this case the surface of the concrete veil has been created to feel finely grained and sensual to the touch.

With Voile de Beton Thierry Bogaert has created an expression of his love of concrete as well as his keen appreciation of its tactile possibilities.■

More information on Thierry Bogaert at www.voile-de-beton.com and www.bogaert-architecture.com

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