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Journal of the African Cement and Concrete Industry

# trends

VOL 17 No 4 November 2014

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**Cover:**  
 Story on Page 18:  
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# CONCRETE trends

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**Page 27** - The Turkish Mosque in Midrand is a truly magnificent example of Ottoman architecture, reflecting the care lavished upon its construction.



**Page 48** - This Walnut Screen was 3D printed using hardwood sawdust fused with a special glue to create a stunning room divider.

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**Limpopo, 9-11 November 2014**



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# Our industry – unsung heroes

There can be no denying that 2014 has been a difficult year for the entire construction industry.

The absence of the promised infrastructure spending together with crippling strikes – and their ripple effect on the whole industry – have combined to make this an *'annus horribilis'* for everyone throughout the industry.

However, no matter how straitened their circumstances, the construction industry remains generous in giving their time, materials and labour to support good causes. This is especially true of projects that help to uplift communities. Most of these remain untold, quietly being accomplished without any fanfare. To all these, our very grateful thanks.

However, occasionally we hear about an exceptional example of an industry rallying together to support a project – and one that is as ambitious as it is transformative.

This issue features the Devland Community Education Campus, a project being erected in a partnership between the construction industry and the non-profit Growing Up Africa which was founded by Deborah Terhune. Here is an example of many companies, covering the whole spectrum of the industry – architects, engineers, contractors, suppliers of every kind – rallying to support an initiative that will benefit the Devland, Soweto community. And the community has responded with enthusiasm and commitment to make their contribution. On what was a rubbish dump (cleared by the community) is rising a very ambitious education campus.

The industry's contribution has been, and is still continuing to be, of that exceptional quality that makes us proud to be part of such an outstanding community.

This issue's Industry Achiever is someone who, through the generosity of his employer, was sent to work on the Devland Campus. That the experience would be personally transformative was not something Mabisto Hlongwane ever expected.

It was on this project that he learned about 'the power of one' to be an agent of change. His work in teaching and working with the community has left him uplifted and committed to improving the circumstances of himself, his family and the larger community. 'Giving back' will be an integral part of his future.

It is on this positive and uplifting note that I thank the readers and advertisers of *Concrete Trends* for their continuing support and for their contributions that have helped make each issue interesting and relevant.

The team at *Concrete Trends* and Hypenica join me in wishing you all a happy, healthy and peaceful festive season. Our wishes too, are that the coming year will be one in which everyone can thrive.

Gill Owens, Editor

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# Energy saving initiatives reduce AfriSam's energy intensity by 12%

**A**friSam's campaign to achieve exponential energy savings has led to the implementation of a series of focused initiatives that have resulted in the company reducing its energy intensity by 12%, well in advance of the National Energy Efficiency Strategy's 2015 deadline to achieve this target as part of a countrywide initiative.

The main contributor to this achievement has been the introduction of the company's Advanced Composite Cements, which harness by-products from steel manufacturing and coal-fired power stations, together with chemical activators, to improve the characteristics and performance of traditional portland cement. Besides lowering the clinker factor, Advanced Composite Cements only utilise half the amount of thermal energy of conventional cements.

AfriSam's 'Project Green Cement' was launched in 2000, aimed primarily at reducing CO<sub>2</sub> emissions, and since then the company has moved away from Cem I portland cements to embrace Advanced Composite Cements.

Energy saving is AfriSam's number one cost reduction initiative and the company has adopted a holistic approach to ensure steady improvements in the areas of thermal, electrical, transport and explosives. Coal and electrical energy represent the company's biggest costs in cement production, with fuel costs associated with transport logistics a close third.

"To reduce our electricity usage, we've adopted a philosophy that all our future mills will incorporate electrically efficient vertical roller mill technology," Gavin Venter, manager of AfriSam's strategic projects, says. "A notable success was the installation of a vertical roller mill at our Roodepoort operation in 2008. Although this mill was commissioned at a 20% higher cost than conventional technology, it has since achieved a 24% reduction in electrical energy consumption. Vertical roller mills will be installed at the Saldanha and Coega facilities.

"Some time ago we tasked a team of engineers with obtaining maximum energy efficiency out of each plant component and one of the outcomes has been the replacement of old drives with variable speed drives wherever possible, across all our operations.

This initiative has certainly contributed to improved energy efficiencies. Where possible, high-energy-utilisation material transport equipment, i.e. pneumatic conveying systems, were changed to mechanical conveying systems."

Another more recent initiative has seen the implementation of a production and maintenance tool at AfriSam's Ulco facility in the Northern Cape and Dudfield facility in the North-West to assist with electrical load shifting, predominantly during peak demand periods. This tool has contributed significantly to energy saving and will be implemented at the company's other operations. At the Tanga Cement plant in Tanzania, in which AfriSam has a 62.5% shareholding, it is installing a state-of-the-art five-stage precalciner kiln, which will achieve the lowest thermal energy in the Group and contribute to reducing its average thermal energy consumption.

Regarding fuel energy associated with transport, AfriSam requires subcontracted transporters to use trucks made of lightweight aluminium to assist with fuel consumption. It also ensures that the shortest haul routes are selected and that these trucks are loaded to capacity to reduce the number of truck loads. Wherever possible, use of rail transport is maximised.

AfriSam has implemented ongoing efforts at all its aggregate and cement quarries to optimise the company's blasting energy consumption. To achieve real energy savings all operations are having motion sensors, energy efficient lighting, solar geysers and solar panels installed.

"There are initiatives to ensure employees know how they can play a role in energy efficiency," Venter says. "These include switching off lights and air-conditioners, utilising natural or energy-efficient lighting and ensuring that equipment is not kept operational if not required. Our employees are also encouraged to become energy efficient in their own homes by receiving assistance to apply for Eskom-funded energy efficient lighting, showerheads, solar geysers and timers." ■

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# BASF South Africa certified Chemicals Sector Industry Leader



The BASF team receiving the Top Employers Institute award at the recent gala event at Gallagher Estate, Midrand.

**F**or the third time BASF South Africa (Pty) Ltd has been certified as the Chemicals Sector Industry Leader by the Top Employers Institute.

The annual international research undertaken by the Top Employers Institute recognises leading employers around the world: those that provide excellent employee conditions, nurture and develop talent throughout all levels of the organisation, and strive to continuously optimise employment practices.

BASF South Africa (Pty) Ltd has been awarded the exclusive Top Employers South Africa 2015 certification: First in Industry in respect of the chemicals sector.

The Top Employers Institute globally certifies excellence in the conditions that employers create for their people.

Integral to the Top Employers process is that participating companies must complete a stringent research process and meet the required high standard to achieve the certification. To further

reinforce the validity of the process, all answers were independently audited. This research has thus verified BASF South Africa (Pty) Ltd's outstanding employee conditions and earned them a coveted spot among a choice group of certified Top Employers.

The Top Employers Institute assessed the company's employee offerings on the following criteria: talent strategy; workforce planning; on-boarding; learning and development; performance management; leadership development; career and succession management; compensation & benefits; culture.

Samantha Crous, Regional Director South Africa and Benelux for the Top Employers Institute, said: "Our comprehensive research concluded that BASF South Africa (Pty) Ltd provides an outstanding employment environment and offers a wide range of creative initiatives, from secondary benefits and working conditions, to performance-management programmes that are well thought out and truly aligned with the culture of their company", she said.

BASF globally and locally has rolled out an Employee Development Program, which contributes to making it an excellent workplace for employees. BASF has launched an exciting and efficient on-boarding program, which enables employees to immediately feel part of the company culture when joining the team.

Joan-Maria Garcia-Girona, vice president and head of BASF Business Center South Africa and Sub-Sahara says: "At BASF we collaborate for achievement. Therefore, I would like to acknowledge the dedication of the entire HR team and our colleagues who strive to improve working conditions for current and future employees. This reflects one of our four strategic principles: "We form the best team". ■

**More about the Top Employers Institute and certification at: [www.top-employers.com](http://www.top-employers.com)  
More information about BASF at [www.basf.co.za](http://www.basf.co.za)**

## UK postage stamp features Basil Read brand

By Leandi Kolver

**B**asil Read recently noted that it was being featured in a new series of UK postage stamps acknowledging the construction of a new airport on the island of St Helena, a British territory 2,300 km west of Walvis Bay, in neighbouring Namibia.

Basil Read St Helena Airport project director Jimmy Johnston said the stamps, one of which featured the NP Glory vessel with the Basil Read brand clearly visible, celebrated the

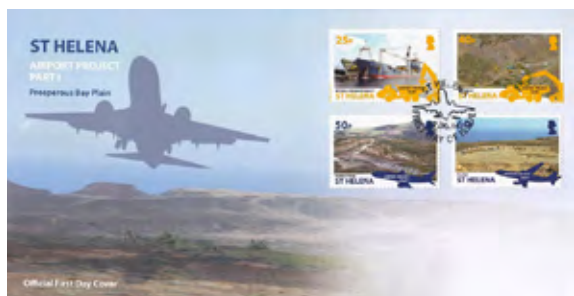
company's role in the design, construction and operation of the airport, while signifying the end of St Helena's isolation from the rest of the world.

Once construction of the first phase of the airport was completed by Basil Read in February 2016, travel time from Cape Town to St Helena would be reduced from seven days to only five hours.

For the Basil Read team, the opening of the airport would mark an end to what Johnston describes as the most logistically complex project ever undertaken by the company.

"The project required skills ranging from civil construction and road works and building, through to opencast mining and marine works, effectively using most of the company's 'in-house' capabilities. Subcontractors, with capabilities that varied from environmental-impact studies to architecture and bulk fuel installation, completed the team," Johnston said. ■

**Read more at: <http://goo.gl/NggBs7>**



# Wits students wow judges at the 2014 Investigative Project presentation

By Lorraine Mpofana

The Department of Civil Engineering at the Witwatersrand University held its Investigative Project (IP) presentation on 1 October 2014 at the John Moffat Building. IP is a part of the national curriculum for final-year civil engineering undergraduate students.

At the event students, who were paired in teams, presented their researched work which was conducted on selected engineering problems before an audience of faculty lecturers, professors as well as students and parents. The panel of adjudicators comprised selected industry leaders and non-engineers, namely SAICE CEO Manglin Pillay, SAICE Past President Peter Kleynhans, Kerwin Strauss, project engineer at Stefanutti Stocks Mining and Eddie Kalili, the digital editor of Destiny Magazine.

The presentations are essentially a report on research conducted on a current industry issue in accordance with pre-set deliverables over a fixed period, leading up to the final-year examinations.



Back row from left: The adjudicators, SAICE CEO Manglin Pillay, SAICE past president Peter Kleynhans, Kerwin Strauss, Stefanutti Stocks Mining, with the winners Pholani Dladla (left) and Tsepho Lethea.

Students wowed the adjudicators and the audience as they attempted to reach a balance of presenting technically sound and generally applicable solutions to complicated engineering problems – while fielding tough questions regarding their research from the audience.

At the end of the evening, the head of the department, Professor Mitch Gohnert, announced Tsepho Lethea and Pholani Dladla as the victorious team. Lethea and Dladla presented a paper titled: *The feasibility of rooftop rain water harvesting in urban schools, in Gauteng East*. The two will now represent Wits at the first national Investigation Project presentation competition, which will be hosted by the SAICE National Office on 1 December 2014, where they will compete against the winning teams from five other universities for a grand cash prize of R10,000 or an internship at a top engineering company. ■

**More information from Marie Ashpole,  
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## Sephaku Cement supports provincial job creation priority

As job creation for youth and artisan development were priorities committed to by Premier Supra Mahumapelo, North West Province Legislature and Mpumalanga Premier, David Mabuza in the State of the Province Address in June, Sephaku Cement chief executive, Pieter Fourie affirmed the company's support of these regional targets and initiatives.

Premier Mahumapelo aims to create 7,407 job opportunities through infrastructure development, the green economy and social economy during the financial year 2014/15 while in Mpumalanga, the ambitious target was 78,000 per year over the coming five years.

Fourie said: "As our business grows, we will do what is in our power to support the people of the North West and Mpumalanga to make a real difference in their lives." To date, the company has recruited over half the employees at Aganang, its flagship plant, from local communities. Most had never been



Sephaku Cement chief executive, Pieter Fourie.

employed or had been unemployed prior to the commencement of the project.

"As we move into the operational phase of the Aganang plant, our employment numbers will reach 170 people at the cement factory and an additional 300 employment opportunities will be created through subcontractors," said Fourie. The majority of the semi-skilled employees will be recruited from communities, adjacent to Aganang.

During the company's construction phase, Sephaku Cement's project contractor spent approximately R500m with local subcontractors, the majority of whom were from the North West Province.

Both Premiers made a firm commitment to developing skills through trade and artisan training. "Development of skills in trades is critical in the two provinces," commented Fourie. While Sephaku Cement built its plants, it invested in artisan development. He explained that in the three years of the construction of the project, they supported training of 10 fitters and electricians, of which whom seven have subsequently been employed as artisans and artisan assistants at Aganang.

Sephaku Cement will also focus on sourcing youth from FET colleges in the two regions to build its pool of learners for recruitment within its artisan programme.

"We are committed to supporting the communities in which we operate by offering skills development opportunities to young people from previously disadvantaged backgrounds," concluded Fourie. ■

**More information from Shalini Ammon,  
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## Solidia Technologies named in the 2014 Global Cleantech 100

Solidia Technologies® has been named in the prestigious 2014 Global Cleantech 100, hosted by the Cleantech Group. The company was recognised for its innovative technology that reduces carbon emissions by up to 70% in cement and concrete and offers a profitable pathway to sustainability.

The Global Cleantech 100 is a comprehensive list of private companies that are best positioned to solve tomorrow's clean technology challenges. These companies have the highest potential to make the most significant market impact and represent the most innovative and promising ideas in cleantech. The 2014 list is collated by combining proprietary Cleantech Group research data with weighted qualitative judgments of hundreds of nominations, and specific inputs from a global 84-person expert panel. To qualify, companies must be independent, for-profit, cleantech companies that are not listed on any major stock exchange.

"We are very grateful for this recognition and to be among those who are helping make sustainable solutions work for industry," said Thomas Schuler, CEO of Solidia Technologies.

"We look forward to commercialising our technology and

delivering significant CO<sub>2</sub> reductions to the building materials industry in a way that is profitable and sustainable. This international recognition will help us to achieve our goal."

Sheeraz Haji, Cleantech Group's CEO, commented: "The Global Cleantech 100 represents the most inspiring array of entrepreneurs across the cleantech space that are at the forefront of innovation. We recognise and celebrate the achievements of each of the top 100 companies as they continue to solve tomorrow's energy and resource challenges and redefine sustainable innovation."

In 2014, nominations were received from 5,995 distinct companies from 60 countries. The 327 short-listed nominees were reviewed by Cleantech Group's Expert Panel, resulting in a finalised list of 100 companies.

"The Global Cleantech 100 each year provides us with invaluable insight into which companies key market players think are most likely to have a significant impact in the next 5 – 10 years," said Richard Youngman, Cleantech Group's Managing Director, Europe & Asia and creator of the programme. ■

**Source: <http://goo.gl/VkBZbu>**



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# A valuable resource for industry

The Concrete Institute's Information Centre is a remarkable resource available to everyone in the construction industry – as well as to members of the public.



Susan Battison (centre) of The Concrete Institute's Information Centre, with visitors to the TCI's stand at the Totally Concrete exhibition in Sandton. Trade exhibitions are used by the Info Centre to promote its wide-ranging services.

Established in 1957 the Info Centre's collection now stands at 119,109 lending and reference items. During the past year, the Centre has dealt with nearly 3,000 enquiries and its portal Website has recorded 10,306 visits.

Martha de Jager, who with Susan Battison runs the Centre in Midrand, says: "The Info Centre continually strives to provide information on the latest innovations in concrete technology and our extensive collection of books, pamphlets, journals, CDs and DVDs are available to industry and the public free of charge. This is a most valuable resource for the construction industry – especially when the astronomical cost of technical publications is considered.

"We increase awareness of the Info Centre at exhibitions, in the media and by presenting library orientation sessions to students attending courses at the Institute. We offer services to keep clients up to date with developments in their field and compile bibliographies on specific areas of research.

"Nor do our clients have to physically visit the Information Centre; they can request the items they require 24/7 from our Portal search engine at <http://www.cciinformationcentre.org/ActiveConnect2002>. We are very grateful to The Concrete Institute's funding members Afrisam, Lafarge and Sephaku Cement for sustaining the growth of this most valuable resource," De Jager adds. ■

**More information from Tel: +27(0)11 315 0300**  
[www.theconcreteinstitute.org.za](http://www.theconcreteinstitute.org.za)

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# Dangote projects Africa's potential

By Friday Atufe



A Dangote cement factory.

Renowned business magazine, *The Economist*, in a 2000 issue, described Africa as a hopeless continent. Eleven years later, the cover illustration of its December edition featured a boy flying a rainbow-coloured kite, the shape of the continent, titled 'Africa rising'.

This sums up just a little of the transformation taking place in Africa. And who better to tell the story of Africa as a fast-moving continent than the Africans themselves.

This is the main reason that the Pan-African conglomerate, the Dangote Group, stepped out to lead the efforts at projecting the positive in Africa through a partnership with, and sponsorship of, 'Marketplace Africa' on the Cable News Network.

Dangote Industries Limited has taken up the sponsorship of the 'Facetime' segment of the international show that offers a unique window into African business.

The programme, which debuted on September 19, will be featuring the advertising campaign showcasing Dangote's expansion drive across the continent. Facetime is a high-profile segment within CNN's Marketplace Africa, where each week a major player from the continent's business community is interviewed.

The show goes way beyond the numbers to bring viewers the new business solutions and industry trends redefining African business. On-air content is complemented by distinctive online editorial at a CNN Marketplace Africa microsite, where popular and innovative content is shared across a range of social channels.

Explaining his group's decision to sponsor the programme, the president and chief executive of Dangote Industries Limited (DIL), Aliko Dangote, said his company was moved to supporting the programme because there are so many misconceptions about Africa. "Lack of information about Africa is holding back foreign investment. Africa also offers one of the highest rates

of return on investment in the world, a fact that discerning foreign investors have since acknowledged. Dangote Industries Limited is delighted to sponsor the Facetime segment in CNN's Marketplace Africa because it tells compelling success stories about Africa. Such content can ultimately position Africa as an attractive investment destination and foster development that lifts communities and nations into prosperity. This is Africa's time," he said.

"The Chinese, who have been smart to move in early enough, are reaping the fruits, especially in the construction industry, in which they possess considerable expertise. They are building factories, roads and railway lines across Africa. In the last eight years alone, foreign direct investment (FDI) has helped create 1.6 million new jobs in Africa. Capital investments are projected to reach \$150 billion in 2015.

Determined not to be outdone by the Chinese, Western companies are now taking more interest in Africa. Nor are African companies sitting back idly – they too are moving into this very attractive investment space.

In 2010, the Boston Consulting Group (BCG) of the United States named 40 African Companies that have the potential to rival Fortune 500 Companies based on their size, geographical spread and turnover. Dangote Group is one of them. Dangote Cement Plc is also the only Nigerian Company that is listed in the Forbes Global 2000 Companies.

"In the last few years, we have invested close to \$4 billion in various projects across sub-Saharan Africa (SSA). We are setting up new cement plants in eight African countries and are also developing import terminals in seven African countries," concluded Dangote. ■



Chief executive of Dangote Industries Limited (DIL), Aliko Dangote.

**This article is adapted from one that appeared in:**  
<http://goo.gl/laOHVn>

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## New port city for Mozambique

**M**ozambique's state petroleum company, Cabo Delgado Ports, will invest in the construction of a new port city that will assist the development of natural gas discoveries in the country.



*Pemba Port: Mozambique is planning for a new port city*

The plan is for an industrial area development spanning 18,000 hectares of land located in the northern Cabo Delgado province. It will also be in close proximity to the liquefied natural gas facilities planned by Eni SpA, Empresa Nacional de Hidrocarbonetos EP and Anadarko Petroleum Corp.

The mixed-use port city development will involve parks, industry, tourist attractions, residences, schools, hospitals and stores and is designed to avoid resettlement of the population.

Construction of the new port city is crucial since the country could become the world's third largest gas producer in 2018. With reserves estimated at 250 trillion cubic feet, the country has attracted investors such as Eni of Italy and Woodlands as well as Texas-based Anadarko.

Maputo-based architectural company, Tracus, started the urban development plan for the new port city last month.

Amad Vally, head of operations at ENH Logistics, said it won't be possible to complete before 2017. They expect to accomplish 25% of the plan in 15 years.

Italian Premier, Matteo Renzi, has indicated that Eni will invest US\$50 bn in Mozambique. ■

**Source:** <http://goo.gl/Hi3Ns3>

## US\$50 bn new Tunisia Economic City in the pipeline

**T**he planned Tunisia Economic City will include academic, research, medical, commercial centres and will also provide residential facilities.

The mega-project, Tunisia Economic City, was announced during the 'Invest in Tunisia: Startup Democracy' conference in September. The planned development will host a variety of facilities, including a range of business and commercial centres to aid international business, research and science centres, university and medical centres, as well as branches of foreign universities.

Tunisia Economic city will be located in the Enfidha district, which is strategically placed in the heart of the Mediterranean and at the crossroads between Europe, Africa and the Middle East. The City will be established on a 90-km<sup>2</sup> piece of land and will be constructed over 15 years.

The plan is to construct a modern global-level economic city that aids regional and international trade. It will have

academic centres, research hubs and economic centres, but the residential and commercial facilities will make it a mixed-use development.

The economic zones will be available for use by international and multinational corporations, financial institutions and insurance firms who can take advantage of it being a tax-free zone.

The academic centre will entail a research hub, Medical City, University City and an agriculture centre. It will thus have 'cities' within a city. Foreign universities will be able to establish branches in the academic centre.

Facilities in the research and science hub include laboratories. Developed countries will also have science institutes and research centres.

The new Tunisia Economic City is also expected to attract and offer accommodation for researchers and international experts. This could help Tunisia solve its escalating brain drain, with reports indicating that the rate of return for students who study abroad is 7%. An international-standard research hub will also aid the country increase high-tech exporters and researchers, as well as aid in scientific discoveries.

Once completed, the city will help provide 250,000 employment opportunities, in particular for university graduates. ■



*The planned Tunisia Economic City will include academic, research, medical, commercial centers and residential facilities.*

**Source:** <http://goo.gl/5XRpvf>

## CESA and Aon produce report on risks and liabilities

A joint collaboration by Consulting Engineers South Africa (CESA) and Aon South Africa Professional Risks Division has produced an annual, comprehensive report profiling a collection of case studies on professional liability claims against consulting engineers in South Africa. This collection of case studies provides invaluable insights into the scope, severity and magnitude of risks faced by consulting engineers in a practical and easily understood format.

This is according to Malcolm Padayachee, manager of professional risks at Aon South Africa, a leading risk consultancy and insurance brokerage company.

"The risks facing engineering professionals are complex, and in many instances understanding and getting a handle on these risks is massively challenging, as they very often arise out of complex interdependencies which may not be immediately visible. These case studies provide a vital tool to study and further explore the potential risks faced by professional companies in this sector with real-life accounts and scenarios providing lessons to be learned," explains Padayachee.

CESA members provided material for the case studies covering cancellation of contracts, faulty design, the value of limitation on liability clauses and negative payment certificates among



*Malcolm Padayachee, manager of professional risks at Aon South Africa.*

others. Another crucial topic is that of legal risk management, ensuring that professional services organisations and individuals fully understand their potential exposure to legal liability.

"Threats provide opportunities for growth in that the best-prepared companies will be the ones that better manage their vulnerabilities and thus can withstand a greater range of threats; that can recover more quickly and can return to commercial activities sooner than their competitors. This case study book provides practical insights that allow for proper planning and pre-empting of the range of threats faced by engineers that could lead to a PI claim," concludes Padayachee.

Aon is the leading PI broker in South Africa with its broking and risk transfer services supplemented by administration of schemes for many of the country's leading professional bodies, including Consulting Engineers South Africa (CESA) and the Attorneys Insurance Indemnity

Fund (AIIF). Aon services from small to large professional services organisations including individual professional practitioners. ■

**For a copy of the case study collection, contact Malcolm Padayachee at Aon on Tel: +27(0)11 944 7897 or e-mail [malcolm.padayachee@aon.co.za](mailto:malcolm.padayachee@aon.co.za)**

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## Four precast concrete standards under review

The CMA's technical committee under the chairmanship of Taco Voogt has formed a working group to revise four precast concrete standards i.e. SANS 1058 (concrete paving blocks), SANS 1215 (concrete masonry units), SANS 677 (interlocking concrete pipes) and SANS 542 (concrete roof tiles). SANS 1215 needs major revision whereas the other three require only minor changes. Once completed and agreed to by various interested parties, the revised standards will be published by the South African Bureau of Standards (SABS).

SANS 1215, first introduced in 1984 has had six amendments. The last two, drafted in 2013, are currently being circulated for comment. CMA's SANS 1215 working group seems likely to adopt European standard BS EN 771-3, a supporting standard for Eurocode 6 – Design of Masonry Structures with a South African annex to reflect local requirements. This will enable local masonry manufacturers to draw on European experience and research.

"A complication, however, is the revision of the National Building Regulations through the addition of SANS 10400XA, which deals with energy efficiency and sustainability. Its introduction would require concrete masonry manufacturers



Taco Voogt.

to comply with stringent energy requirements and no local concrete masonry manufacturer currently meets the standard, especially in single-skin walls.

These regulations will make South African buildings among the most thermally efficient in the world, but at what cost? New buildings, especially in the affordable and low-cost housing sectors, will become unaffordable and double-skin cavity walls will become the norm," said Voogt.

Paving standard SANS 1058 was extensively revised in 2010, replacing a compressive strength-based test with tensile splitting, abrasion resistance and water absorption.

Many CMA paving manufacturers had found the standard unnecessarily high and the 2012 revision marginally lowered the criteria for tensile splitting and abrasion testing and placed the water absorption test on a voluntary footing. The current initiative seeks to remove all reference to compressive strength as it is deemed irrelevant to paver performance and to place the water absorption requirement into an annex. ■

**More information from CMA,**  
Tel: +27(0)11 805 6742 / [www.cma.org.za](http://www.cma.org.za)

## Madonsela appointed Engineering Council CEO

Sipho Madonsela has been appointed to the position of the Chief Executive Officer (CEO) of the Engineering Council of South Africa (ECSA), with immediate effect.

Madonsela, a qualified mechanical engineer, is currently the chairman of Emzansi Engineers, a multidisciplinary engineering firm which he founded and has managed for over 16 years. His core discipline areas include roads infrastructure, water applications, air-conditioning, ventilation, refrigeration and general industrial services. He has a wealth of management experience in the engineering discipline, having served as president of the National Society of Black Engineers (NSBE) of South Africa for five years. NSBE is one of the Voluntary Associations (VAs) which is recognised as a partner to ECSA. In addition to this, Madonsela serves as member of the SANRAL Board and chairperson of its Contracts Sub-committee.

"As a past-President of ECSA, Madonsela brings solid management and industry credentials to ECSA as the new CEO," said Cyril Gamede, current president of ECSA. "He has served on ECSA's council in the past, and shares a vision for the continued growth of the profession that



Sipho Madonsela.

has positioned him as ideal to take over from his predecessor," Gamede added. He added that Madonsela also served as the chairman of the Council of Built Environment (CBE), from 2006 to 2010.

"As an engineer registered with ECSA since 1996, Madonsela has contributed greatly towards shaping the strategic plan of the council, and as we welcome him into this full-time role, we will give him all our support in steering the profession to new heights", said Edgar Sabela, who has served as acting CEO of ECSA since the 1st of July 2013.

The Engineering Council of South Africa (ECSA) is a statutory body established in terms of the Engineering Profession Act (EPA), 46 of 2000. The ECSA's primary role is the regulation of the engineering profession in terms of this Act.

Its core functions are the accreditation of engineering programmes, registration of persons as professionals in specified categories, and the regulation of the practice of registered persons. ■

**More information from Thoko Machimane,**  
Tel: +27(0)11 607 9500 / [www.ecsa.co.za](http://www.ecsa.co.za)



# Coatings for Africa 2015

In line with the changing face of Africa's growing paint and coatings industries, Coatings for Africa 2015 symposium and expo, taking place 11 – 13 May 2015 at the Sandton Convention Centre in Johannesburg, sets out to drive innovation and education in the paint and coatings industry across the African continent.

The African coatings industry remains key to support the continent's growing development requirements. The future for the paint and coatings sector looks particularly promising, given the strong economic outlook, long-term demographic growth and rising urbanisation across Sub-Saharan Africa.

Recognising opportunities in South Africa and beyond, Coatings for Africa is creating a completely new experience in 2015. With a distinctly pan-African focus and a minimum of 10 African countries represented, the event connects buyers and sellers from across Sub-Saharan Africa as well as globally.

To generate additional synergies, Coatings for Africa is hosted alongside African Construction and Totally Concrete Expos, Africa's biggest gathering of the concrete and construction industry. Africa's only three-storey expo will open more doors for business development.

A comprehensive conference programme caters for all needs across the value chain. A Technical Symposium presents the latest innovations and developments in the global paint and coatings industry. The Coatings for Construction Seminar offers a one-stop solution for construction industry users of paints and coatings. The Protective Coatings Seminar focuses on challenges around corrosion for users from the industrial and automotive



sectors. The programme is completed by a series of free workshops on the exhibition floor.

Coatings for Africa is hosted by the Oil & Colour Chemists' Association (OCCA) and the South African Paint Manufacturers Association (SAPMA) in conjunction with Hyphenica and is the biggest showcase of coatings technologies, paint and related products on the continent. Coatings for Africa connects the entire value chain, from raw material suppliers to end users of finished paints and coatings. Attendees can expect 120+ exhibitors, 2000 attendees, 10+ African countries represented and 30+ expert speakers. ■

**More information from [www.coatingsforafrica.org.za](http://www.coatingsforafrica.org.za) or Stefanie Pillay, email: [stefanie.pillay@hyphenica.com](mailto:stefanie.pillay@hyphenica.com)**

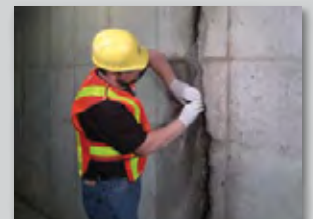
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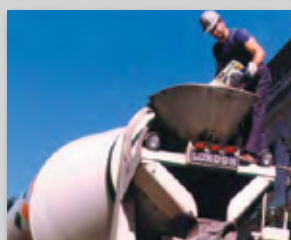
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- KIM® reduces shrinkage during curing stages
- KIM® treated concrete is NSF approved and safe for contact with potable water

## Record Enrolment for 2014 MBA North Small Builders' Course

A record total of 31 students enrolled for the Master Builders Association (MBA) North's popular Small Builders Development course which started on September the 6th this year.

Five of the 2014 students are based in the Mbombela (Nelspruit) area and are so keen to improve their business knowledge that they will drive all the way from the Mpumalanga capital to Midrand for the course's 14 sessions on alternate Saturday mornings. In previous years, the Course had attracted student representation from as far away as Uganda.



The 31 students who enrolled for the MBA North Small Builders Development course.

At the opening session of the 2014 course, Mohau Mphomela, executive director of MBA North, said the increasing involvement and participation in the MBA North offering from the three neighbouring provinces (Mpumalanga, Limpopo, and North West) which fall under the MBA North umbrella, was gratifying.

Mphomela said the value of running your own business had become increasingly important in the building industry and general economy today. "MBA North is on a mission to turn contractors and sub-contractors into business people. It is our vision to create a pool of qualified sub-contractors who MBA can introduce and recommend to the major players in the industry. I would like MBA North to be the link between your small business and big contractors. I would also like to see these major companies providing some input for you in future on the challenges you are likely to encounter as your business develops," he stated.

He also commended the sponsors who helped make the staging of the Course in 2014 possible. These include primary sponsor Federated Employers' Mutual (FEM) Assurance, as well as MBA North members: Archstone Construction, Giurcich Construction, Robenco Construction, Fintrex, and 8J Construction.

The Small Builders Development Course covers topics such as:

- The various facets of running a small business
- Finding and securing work
- How to tender for new business
- Carrying out and efficiently controlling building projects
- Management and legislation for small businesses. ■

**More information from Henk Delen,**  
Tel: +27(0)11 805 6611 / [www.mbanorth.co.za](http://www.mbanorth.co.za)

## Fulton Awards 2015 set for record entries

The Concrete Society of Southern Africa reports that 36 nominations have been made for the 2015 Fulton Awards, which, if all are converted into completed entries, will be a record number for this prestigious event.

The Fulton Awards, held every 2 years, continue to celebrate the legacy of scientific and technological advances in concrete in the built environment, and serve also as a tribute to the late Dr 'Sandy' Fulton for his outstanding contribution to the understanding of concrete, its properties, development and improvement.

John Sheath, CEO of the Concrete Society firmly believes that the new categories, more affordable entry fees, and a more equitable approach to judging, have attracted the increased interest in the awards. The categories for nominations and entries are:

- **Civil Engineering Structure**
  - a) Project up to R100 million in value;
  - b) Projects in excess of R100 million in value
- **Building Structure**
  - a) Project up to R100 million in value;
  - b) Projects in excess of R100 million in value

- **Architectural Concrete**
  - a) Project up to R100 million in value;
  - b) Projects in excess of R100 million in value
- **Innovation in Concrete**

The awards are made symbolically to the structure and are presented to the entire team responsible for its construction, including the owner/developer, all the professionals as well as the contractors.

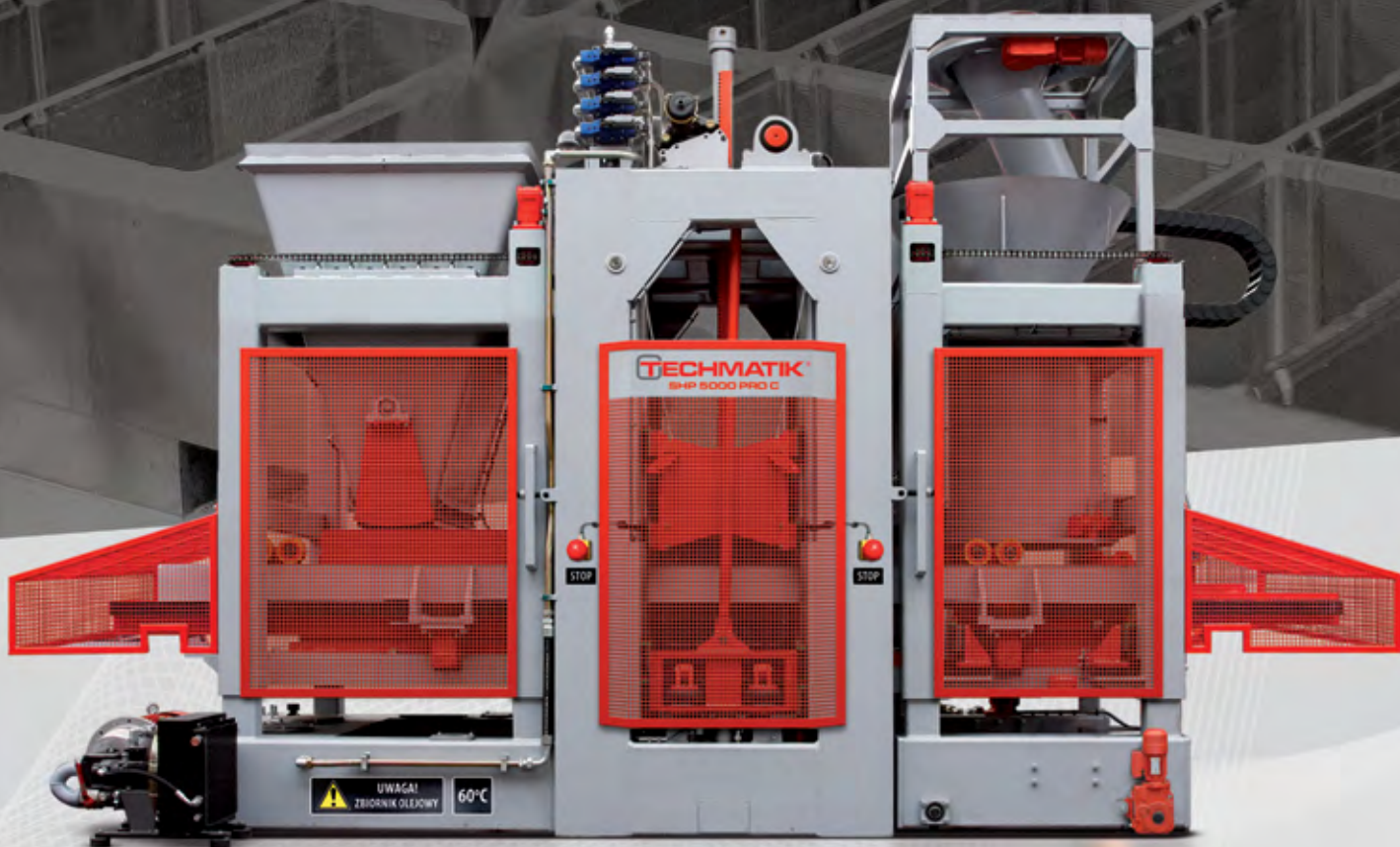
This does not necessarily apply to the 'Innovation in Concrete' category, which is designed to attract new ideas in projects or initiatives involving concrete as the principal material.

Completed Entry Packs have to be submitted to the Society by the end of November 2014, judging will take place during February and March next year, and the 2015 winners will be announced at a special gala dinner to be held in the Drakensburg on the 6th June 2015.

Cement producer PPC is the Anchor Sponsor for the 2015 Fulton Awards. ■

**More information from John Sheath,**  
Tel: +27(0)12 348 5305 / [www.concretesociety.co.za](http://www.concretesociety.co.za)

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# Plug&Grind®: the new solution in small and medium-sized modular and portable grinding stations

By Moisés Rodríguez Nunez

Cemengal, with more than 25 years of experience in building grinding stations, decided to develop a small grinding station to fulfill the requirements of an existing segment of the market that was overlooked by most of the suppliers. This market was looking at works with less than 0.25 million metric tons of cement per year.

Cemengal started developing a small grinding station, but in this case tried to do it differently. That is the reason the company came up with the idea of placing the grinding station into containers and modules to make it both portable and modular. Being the first to develop this concept, Cemengal has patented it worldwide.

## The product

The Plug&Grind® Original was launched to the market two years ago (2012) at a conference in Africa. From there, Cemengal has participated in the most important conferences and conventions all over the world and has given more than 20 presentations to cement producers and companies related to the cement industry to explain its advantages.

Already 14 Plug&Grind® stations have been sold in seven countries on three continents.

Today, the company proudly introduces the new Plug&Grind®XL, of which two units have already been sold. This new XL follows the same concept, and here too Cemengal is paying close attention to the smallest details. The capacity of the new product is 30tph compared with the 12tph of the Original. This enables the machine to reach a production output of nearly 0.25 million MT of cement per year. And this quantity of cement is being produced from small modules, all preassembled in Spain.

Cemengal has always worked with the best European suppliers and with the new Plug&Grind®, nothing has changed. The best machines and components are used to satisfy the client and avoid any difficulties – especially in isolated places where nothing is easy, and fixing a machine could pose a substantial problem.

## The Order

As soon as an order for a Plug&Grind® is received, Cemengal's Civil Engineering Department starts to prepare a Civil Engineering Study. This is supplied to the client well in advance of installation to enable them to have the land ready before the Plug&Grind® arrives on site. Extensive experience in the field helps Cemengal to provide the best layout configuration for the available surface. At the same time, the Procurement Department begins purchasing the components for the machines that have longer manufacturing lead times. The containers are specifically manufactured and homologated for Cemengal to their specifications and delivered very speedily to their workshop outside Madrid.

## The pre-assembly

The order of the containers' assembly has been carefully studied, taking account of both the delivery time of the equipment and resources required for its installation. Also the experience acquired after 14 units have been sold, helps the company improve the process and reduce the lead time.

When the containers arrive in the workshop, the mechanical works commence. Once this is finished, the containers go to the electrical fitters, and the electrical components of the





Plug&Grind® are installed. It should be pointed out that in this stage, the mill drive frequency drive is assembled together with the rest of the electrical works and the control room. The three local cabinets enable an easy and fast connection between containers. The “plug concept” is always borne in mind.

When the mechanical and electrical works are complete, cladding is placed and the containers are prepared for transportation by road and sea. The advantages of having homologated containers with standard measurements are manifested in savings on time and cost of transport.

In parallel, elements that should be set up on site, such as ladders, platforms, handrails, transfer chutes, belts, liners, balls and ducts that connect the equipment between containers, are packed. Everything is labeled in order to allow the client to start the P&G® erection on site himself, thereby reducing the expenses associated with having a Cemengal supervisor on site.

### The transport

As soon as everything is prepared in the workshop located close to Madrid, containers are moved to the port and made ready for their dispatch. The port will be chosen from the various options that are available in Spain and depend on the final destination of the Plug&Grind®. Nevertheless, an average of one month could be considered as a correct estimation for LATAM and Sub-Saharan Africa.

### The erection

The erection of the Plug & Grind® on site takes a month. When containers are levelled and fixed to the concrete slab, mechanical technicians start to join the containers to each other, the mill internals are mounted and platforms and ladders are installed. This work is done by the client’s workforce, supervised by Cemengal engineers.

The Cemengal supervisors must, at this stage, also face one of the most important and relevant activities: the alignment between the mill and its special planetary gearbox which is responsible for reducing the mill speed to the rpm needed for the correct distribution of the grinding media inside the mill.

The electrical cabinets and the mill, fan and separator motors, are wired to the electrical room while the Plug&Grind® is connected to the main electrical network of the global plant and all the signals are tested. If the network is not available, the client always has the possibility of connecting the Plug & Grind® to a diesel generator.

After the mechanical and electrical assembly comes to an end, this stage concludes with cold tests and verification of the correct

performance of all the equipment when the start and stop sequences of the Plug&Grind® are checked by the automation technician from the control room.

### The first cement

During the next couple of weeks, the mill is filled with the grinding media and P&G® starts to work in order to advance to the most highly anticipated moment – its first cement.

Once the plant is under control, Cemengal prepares the guarantee test, where the Plug&Grind® should be working for 24 hours and producing cement of the quality and quantity agreed to in the contract.

At this moment, and only few months after the beginning of the project, the Plug&Grind® is totally commissioned and ready to yield enormous profits, as it is doing in various countries for a number of clients.

Today clients from three continents are closer to their end consumers with a low-risk investment and working with the world’s best quality.

### The future

The first steps for the Plug&Grind® has been taken, but this is only the start of a long journey as 2015 will herald the launch of a new line of Plug&Grind® equipment. Watch this space! ■

### Our Clients

Cemengal is proud to have all types of clients for the Plug&Grind® system.

**Cement Producers:** Mombasa Cement, Cementos Intercoceánico and Lafarge

**Concrete Producers:** Saudi Readymix Concrete Ltd.

**Others:** We have also clients coming from various businesses related to, or not connected with, the cement industry.

**More information from Moisés Rodríguez Nunez,  
email: [moises.nunez@cemengal.com](mailto:moises.nunez@cemengal.com)  
[www.cemengal.com](http://www.cemengal.com)**

# Futuristic concrete: Learning Hub for Singapore's Nanyang University

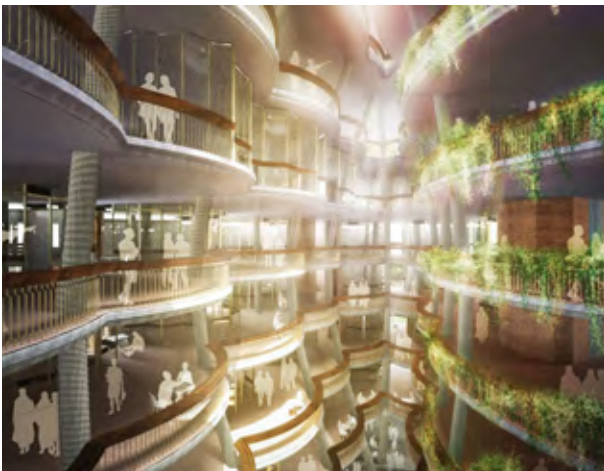
By Daniel van der Merwe, Architect, PPC Ltd



Apart from its futuristic form, the Hub brings together 55 tutorial rooms into a structure without conventional corridors, which have traditionally created social separation and isolation.



The Hub's dramatic design is emphasised by the ribbed effect of alternating smooth and exposed aggregate concrete.



Open galleries on each level encourage free interaction among students, lecturers and visitors.

Making learning an interactive and social experience, British architect Thomas Heatherwick has designed a space encouraging collaboration across all levels. To achieve this he pushed the boundaries of what can be achieved with concrete as a structural material and finish.

While in Singapore to attend the WAF2014 international conference, I went on a site visit to experience, first-hand, this almost completed building, and to interview the design team on a revolutionary building which, inspired by biomimicry, takes its inspiration from plant structures.

Heatherwick believes that since the advent of internet and low-cost computers, there has been a distinct shift in how students approach educational facilities. Nowadays students often use alternative areas to study and work on group projects. As a result of this, Heatherwick Studio has designed a Learning Hub to draw students back to university buildings. "The studio's approach was to redefine the aspirations of a university building, and to once again make it an essential part of the tertiary education experience," says Heatherwick.

The Hub's function is to bring together 55 tutorial rooms into a structure without the conventional corridors, which have traditionally created social separation and isolation.

The Learning Hub has one door whereby students can access the central space through a 360-degree entrance that connects and links all the separate towers. Each tower is made up of a stack of classrooms, which build up gradually, with gardens on selected floors.

Instead of corridors, each level features open galleries where students can circulate and meet. The students can meet their fellow entrepreneurs, scientists or colleagues in this space that encourages free interaction among all. Students work together around shared tables, with the teacher as facilitator and partner in the voyage of learning, rather than 'master' executing the traditional top-down model of pedagogy. Each of the tutorial rooms faces the large shared central space, allowing students to continually feel connected to all the other activities going on in the building.

## A Green Concrete Building

The Learning Hub was awarded the BCA Green Mark Platinum Award for sustainability by the Singapore government earlier this year. The award recognises best practices in environmental design and performance.

The upper floors and green rooftop park enjoy views of the Singapore Strait with natural light filtering through into the atrium and classroom spaces virtually eliminating the need for artificial lighting. Other award-winning measures include the use of hydrophilic polymers in the planting scheme, a material process that eliminates the need for an irrigation system; water efficient urinals and basins; ubiquitous T5 lighting; vertical greenery and the use of ground granulated blastfurnace slag and recycled concrete aggregate.

Air-conditioning is minimised to only the classrooms' periphery, where the cooled 8°C air falls down the curved precast concrete outer skin. Condensation is captured and used in conjunction with recycled grey water and rainwater harvesting as part of the irrigation.

*continued on page 22*

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**Concrete Aesthetics**

A major challenge was the budget – “just a little bit more than a car park” – which necessitated concrete as the economic material of choice for all aspects of the building, namely the floor slabs, columns, cores and cladding.

“But we realised that we had one inch of love that we could give. This went towards the concrete aesthetics with the Studio using concrete pigments, exposed aggregates and form liners to create a palette of finishes fully utilising concrete’s diversity.



*Bands of smooth concrete alternating with exposed aggregate concrete create some of the building's drama.*

“Polyurethane form liners for the columns create undulations the size of a human belly. The very slight pervert in each of us will want to touch them,” said Heatherwick, contrasting that experience with a corporate developer’s column. The columns taper and grow from a 600-mm-diameter base into thinner elements to achieve structural and material efficiency. To achieve the façade ten rounded modular precast forms were



*Form liners create undulating curves that “the pervert in each of us will want to touch”.*

used. Pigmented concrete was used to ensure a stone-coloured no-maintenance finish, with retarders to create exposed concrete as textural lines for additional variety. Heatherwick jokingly adds that the rounded protrusions were done to create a pigeon-proof façade – and it works!

Staircases are clad with 600-mm-wide zig-zagging precast pigmented concrete panels illustrated with more than 500 illustrations by artist Sara Fanelli, sparingly coloured with 0.75% of pigment. Her drawings were extrapolated into 3D and CNC base cut into polyurethane form liners which allow for remarkable detail to be captured.



*Drawings by Sara Fanelli formed the basis for form liners that capture very fine detail in pigmented concrete*



*Heatherwick’s design breaks down the traditional square-facing classrooms with a clear front hierarchy, and moves to cornerless spaces where teachers and students mix on a more equal basis.*

**Conclusion**

This remarkable building not only creates a new architectural typology for education in terms of its layout, but its unique form and creative use of concrete will ensure that it becomes an iconic landmark once completed by the end of this year. It will inspire its users and designers from around the world. The building is, in fact, a showcase of what holistic design thinking can achieve, when it combines sustainable principles with a visionary insight into human sociology, and bold form making to achieve the objectives. Concrete was the only material which could manifest this masterpiece. ■

**More information from the author on email:**  
**[Daniel.Vandermerwe@ppc.co.za](mailto:Daniel.Vandermerwe@ppc.co.za)**

*Pictures courtesy of Daniel van der Merwe.  
 Renderings courtesy of Heatherwick Studios.*





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# AfriSam delivers on one of its biggest supply contracts in recent times

**S**ANRAL's project to improve National Route 7 between the Melkbos and the Atlantis intersections is one of the largest roads projects currently under way in Cape Town. It also represents one of the biggest contracts awarded to AfriSam in recent times, involving the supply of 650,000 tons of layer-works material and 750,000 tons of overburden over the 30-month project period, as well as 15,000 m<sup>3</sup> of readymix for bridge construction at the two new interchanges.

The N7 connects the Western Cape to Namibia via the Vooldsdrif border post, carrying traffic in large and steadily increasing volumes. The section between the Melkbos and Atlantis intersections had become a notoriously high accident zone and one of SANRAL's primary objectives in initiating this upgrade is to improve road safety by replacing dangerous intersections with grade-separated interchanges and closing all other access to the freeway.

The project, scheduled for completion in November 2014, will also increase road capacity by creating a divided freeway with a 120 km/hour design speed. The dual carriageways are 10,9 m wide with a lane width of 3,7 m. The road reserve is 60 m wide.

On any given day, AfriSam delivers an average of 3,000 tons of material to the project site.

AfriSam's contract with main contractor Haw & Inglis also requires it to maintain stock levels up to 10,000 tons of each type of layer-works material to ensure that, in the event of



*Each day AfriSam delivers an average of 3,000 tons of material to the project site.*

a breakdown, these critical supplies will not be interrupted. AfriSam has also needed to factor in often lengthy delays en route to the project site caused by logjams at the N7 weighbridge. "The Western Cape is a highly competitive market for us and to secure a contract of this size is a gratifying indication of Haw & Inglis' confidence in AfriSam on this project," Bevan Cornelius, AfriSam territory manager for building construction material in the Western Cape, says. "We have a sound longstanding relationship with Haw & Inglis that has proved the extent of our services, infrastructure and value-added capabilities. Past major contracts for this construction company include the N2 Settlers Way hospital bend upgrade and the N7 widening of Piekenierskloof Pass.

"Having secured this latest contract, we're well-positioned in the Western Cape to field future projects on the N7, having fully demonstrated that we have the knowledge and experience to manage such strategic developments."

Prior to commencement of the project, AfriSam worked alongside Haw & Inglis to develop durable readymix designs that complied with the specifications for the interchange bridges. Mix testing was carried out by AfriSam's technical laboratories in Cape Town, and test beams were cast using various mixes and sent for independent verification by the Engineering Department at the University of Cape Town to achieve durability criteria as specified. Test beam verification was initiated three months before the project began because the concrete's compressive strength characteristics had to be validated over 28 days.

Since construction began in May 2012; AfriSam continues to provide regular back-to-back testing with Haw & Inglis' on-site laboratory to ensure the specifications are maintained through the project.

AfriSam operates a fleet of 40 readymix trucks in Cape Town, transporting this material from its five readymix plants in the area, including a newly established plant in the Saldanha Bay Industrial Development Zone, to customers across the Western Cape. Its aggregates are supplied from quarries in Durbanville and Malmesbury. ■



*Prior to commencement of the project, AfriSam worked alongside Haw & Inglis to develop durable readymix designs that complied with the specifications for the interchange bridges.*

**More information from Maxine Nel,  
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# The Turkish Mosque: construction of a unique kind

**W**ith its minarets gracing the skyline of Midrand in Gauteng, the Nizamiye Masjid, as the Turkish Mosque is known, is the largest mosque and also the only true example of Ottoman architecture in the southern hemisphere.

Built on a ten-hectare site, the Mosque is the heart of the Nizamiye complex that includes a variety of community and educational institutions. The basic plans were designed in Turkey as an 80% scale copy of the 16th-century Ottoman Selimiye Mosque in Edirne, Turkey, now a World Heritage site. Some adjustments were made by a South African architect to ensure compliance with local building regulations. Construction of the Mosque began in September 2009 and it was opened in October 2012 by President Jacob Zuma and Turkey's Minister of Economic Affairs, Zafer Caglayan.

The development is the realisation of 79-year-old Turkish businessman, Ali Katircioglu's dream of introducing Ottoman-style architecture to places that had not experienced it. Fondly called 'Uncle Ali', this humble man came with his wife each day to watch his project take shape. The local children knew him as the kind man who handed out sweets – time was not the priority: it was ensuring that the Mosque truly reflected its Ottoman origins and that meticulous attention was paid to quality workmanship and detail.

To achieve this, 600 specialised craftsmen were brought from Turkey: at the peak of activity there were 500 on site, working with local artisans and passing on their knowledge and skills to them. More than a thousand local people benefitted from this unique construction experience.

Lafarge South Africa, the local presence of the international Lafarge Group, a world leader in building materials, was chosen to supply all the readymix concrete for the construction of the Nizamiye complex.

"We had to ensure that the concrete came from a reliable and consistent source," says project manager, Orhan Celik, a Turkish Civil Engineer who also managed the Turkish construction team. The project was carried out without appointing a main contractor. "We chose Lafarge because they are respected both internationally and locally."

"It proved to be the right decision as the speed of delivery from their Chlookop batch plant and their general service could not

be faulted," he adds. "When we needed help, they were there for us and worked hard with us. For example, the Mosque's 1,630-m<sup>2</sup> floor space has a 700-mm foundation slab joining the four 55-m-high minarets. For this mass concrete pour, Lafarge supplied two pumps and delivered readymix around the clock to complete the 1,000-m<sup>3</sup> continuous pour. Another critical construction task was pouring the concrete for the main dome, which is 32 m high and 24 m wide. As we did not have a tower crane, Lafarge organised the largest mobile pump in South Africa at the time and completed the job in a 20-hour non-stop pour."

Interestingly, formwork for the dome was done in the traditional Turkish way with carpenters brought from Turkey to build it out of timber. "It was our old way of building, but still cheaper and faster than today's methods. The same technique continues to be used for constructing small buildings in Turkey," comments Celik. Another traditional building method used on the dome was applying 48 tons of 1,6-mm-thick lead sheeting. While lead sheeting is expensive, it has stood the test of time: 1,700-year-old buildings in Turkey still have their original lead-covered roofs.

The total concrete requirement for the Mosque and associated buildings was 13,800 m<sup>3</sup> using mainly Lafarge's pumping and column mix designs, which are based on 70/30 cement/fly ash to achieve a 30-MPa concrete. With the extensive use of pumps, the pump mix required a minimum slump of 120 compared with 90 for the general work. The cement used was Lafarge's versatile premium technical CEM II product, Powercrete Plus 42,5N, that can be blended further with fly ash to achieve a range of customised mix designs. As recommended by Lafarge, the high-quality classified siliceous fly ash DuraPozz® from Ash Resources' Lethabo Plant was used as a cement replacement in the mix designs.

When asked whether the recent earth tremor experienced in Gauteng had been a cause for concern, Celik smiles and says that there are two main differences between building in Turkey and building in Gauteng, the main one is earthquakes. The biggest challenge for the design of structural and architectural concrete in Turkey is the fact that the country has had over 20 earthquakes in the last 100 years, most of which were way above 6 on the Richter scale. The centuries-old Selimiye Mosque



*The structure begins to take shape with 600 craftsmen brought from Turkey working on its construction.*



*The mosque complex has welcomed over 100,000 visitors to date.*



*The breathtaking interior is a tribute to the care and attention to detail that was lavished on every aspect of the Mosque's construction.*

stands unharmed despite having been subjected to a massive 9,7 earthquake. It means that building design is more complex and involves more concrete in Turkey. The second difference is that Turkey has heavy snow in winter.

The Nizamiye complex is more than a truly magnificent example of Ottoman architecture, it also opens its doors and extends warmth and kindness to all visitors – there have been more than 100,000 to date. The school is open to all cultures and religions and can accommodate up to 850 pupils, who are taught the South African education syllabus in English. Pupils are also offered Islamic studies, as well as Arabic and Turkish language lessons. The Nizamiye Clinic has been built – Nelson Mandela's personal request when 'Uncle Ali' showed him plans for the Mosque. Once equipped, the clinic will provide day-care health services for local communities. A small shopping centre offers a delightful introduction to Turkish shops, a bakery and a restaurant. A university is scheduled for construction in the next two years.

Benefactor, Uncle Ali has quietly moved on to his next project and handed over the Nizamiye complex to be run by the Fountain Educational Trust, a registered S.A. Non-Profit Trust run by South Africans. "Lafarge South Africa is proud to have been involved in this fascinating project," comments Lafarge key accounts manager, Mohammed Hajee.

"It was not the usual fast-track contract but rather an extremely specialised project, in which we worked closely with the Turkish experts. It reflects the Lafarge brand baseline of Building better Cities, which embodies the Group's ambition to use its innovative products and solutions to help construct more durable and beautiful cities." ■

**More information from Chantál Stewart,  
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## Traditional Ottoman design

*The logistical challenge of getting all the specialised finished materials at the right stage of construction, involved shipping over 50 containers from Turkey. Some of the materials and the attention to detail that have gone into achieving the beautiful features of the Nizamiye Masjid include:*

- Handcrafted marble tiles with 24ct gold leaf to ensure they will shine forever
- Ceramic tiles with over 40 different flower designs signifying peace and love. They were copied from old mosques and took a year to make in Turkey
- Stained glass windows are formed from three layers of coloured glass
- The dome is decorated with Turkish paintings and the ceilings with exquisite calligraphy
- To ensure everyone can hear throughout the Mosque, over 100 loudspeakers are built into the walls and hidden from view by the tiles
- Custom-made carpets of 100% pure Turkish wool

# Jeffares & Green's exclusive Cape Town residences

## Completed Projects

50 VICTORIA ROAD



This seven storey refurbishment on Clifton First Beach was completed in 2009. Now operating as a high-rental boutique hotel, the architecture and interiors of this structure are of exceptional elegance.

Location: Victoria Road, Clifton

Project Value: R62 Million

Architect: SAOTA3

NETTLETON ROAD



J&G recently completed this seven-storey refurbishment in Cape Town's exclusive Nettleton Road, reportedly the most expensive street in Africa. The eccentric architecture of the original five-storey structure on the site was not of value to the clients, who commissioned the architects to develop a sleek modern design requiring innovative structural engineering solutions.

Location: Nettleton Road, Clifton

Project Value: R40 Million

Architect: SAOTA

HOUSE DE FERN



This modern and minimalist holiday home for a Belgian client relies on large-span cantilevering concrete elements and carefully designed architectural finishes to achieve its goal of bringing the outdoors inside.

Location: Fiskaal Close, Camps Bay

Project Value: R12 Million

Architect: Luis Mira Architects

## Work in Progress

919 OCEAN VIEW DRIVE



Set just below Lions Head, this prestigious site overlooks the entire Atlantic Seaboard. The lower parking and services levels lead up to distinctive architectural living areas, relying on highly complicated and innovative structural engineering solutions to maximise the views.

Location: Ocean View Drive, Fresnaye

Project Value: R45 Million

Architect: SAOTA

38 NETTLETON ROAD



This minimalist four-storey residence uses large eccentric cantilevers to float above the tree line and capture the site's panoramic views over Clifton's beaches and the Twelve Apostles.  
 Location: Nettleton Road, Clifton  
 Project Value: R45 Million  
 Architect: SAOTA 145

KLOOF ROAD



This extremely challenging site has required innovative lateral support solutions to enable the project to move forward.  
 Once complete the site will nestle into the mountainside and offer panoramic views of the Clifton Beaches and Bantry Bay.  
 Location: Kloof Road, Clifton  
 Project Value: R55 Million  
 Architect: SAOTA

CLIFTON TERRACES



This 13-storey apartment block is approved and set to start on site soon. Its concrete frame is to be tucked into the mountainside on Victoria Road overlooking the Clifton Beaches, with the highest attention being paid to its environmental sensitivity.  
 Location: Victoria Road, Clifton  
 Project Value: +R300 Million  
 Architect: SAOTA ■

**More information from Charmagne Denny,**  
 Tel: +27(0)11 231 2200 / [www.jgi.co.za](http://www.jgi.co.za)

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# The 'Walking Wonder', an award winning bridge



*The structure is well used with some 9,000 commuters crossing each day.*

**T**he Isando Pedestrian Bridge, better known as the 'Walking Wonder', stands as a visible marker to the current efforts to overhaul and upgrade the freeways in and around Johannesburg. With a total length of 446 m, the bridge and its approaches connect the Isando Rail Station with the OR Tambo International Airport (Johannesburg).

The structure is well used with some 9,000 commuters crossing each day. The new bridge replaces two sub-standard footbridges that were a legacy of apartheid planning in the early 1970s. Commuters predominately used one of the two-metre-wide bridges with the other remaining unused. The new footbridge's 4.5-m-wide walkway now provides a much improved level of service to the stream of commuters who exit the trains during the morning peak hours.

The central section of the bridge has a four-span configuration with spans of 25.4 m, 14.8 m, 22.2 m and 64.0 m. The total bridge length is 126.4 m.

The superstructure consists of a continuous composite steel box girder with a 5.4-m-wide concrete deck slab. The 64.0-m-long main span is supported by two vertical planes of fanned cables that are anchored into back spans. A main feature of the bridge is its two unbraced cigar-shaped steel pylons. One leans forwards at 11 degrees and the other backwards, hence the bridge's name.

The design was the winning concept from SMEC South Africa in an invited design competition. In submitting the entry the team was cognisant of the client's desire for aesthetics at a reasonable price. A self-anchored cable-stayed bridge was chosen as the most economical form. The bridge's individual character was added thereafter. The strategy was successful and the construction costs of the main span proved economical at a rate of USD\$1,800 /m<sup>2</sup>.

The use of a torsionally stiff structural steel box girder proved an economical means of supporting the 5.4-m-wide

concrete walkway. It also allowed for the unsymmetrical cable arrangement on either side of the deck. The depth of the deck section enabled a cable spacing of 11.4 m, which reduced the number of cables required. This in turn reduced the risk of visual clutter from crossing cables.

Attached to the box, the sculpted outriggers create integrated and flowing forms. These elements were galvanised and painted to reduce future maintenance activities over the highway. The towers for the bridge are constructed from welded circular sections that taper according to the golden ratio.

The urban planning inputs to link the rail, taxi and pedestrian transport modes played a large part in the structure's final form. Significant effort was invested in conceptualising the functionality of the bridge to ensure it can be used and accessed by all. Safety and security concerns were also mitigated by providing multiple access and egress points.

"The most satisfying aspect of the project is to witness the daily use of the bridge by thousands of people and the improved space that commuters now have," stated SMEC South Africa's Functional Head of Structures, John Anderson. "It's fulfilling to see a form that is conventional in construction yet unconventional in design, as such a functional piece of infrastructure."

The project is one of the larger pedestrian bridges built in South Africa and involved numerous interconnecting elements. The design team invested energy in connecting these components into a detailed coherent form. In walking round the 440-m-long structure, it is hoped that this effort is evident and is intuitively appreciated.

The project was awarded a Commendation at the recent 2014 CESA Aon Engineering Excellence awards, in the category of projects of less than R50 million. ■

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# SA's new mega mall – Mall of Africa – well under way

The 1,6 million square metre mixed-use new Waterfall City is being widely regarded as the most ambitious commercial development being constructed in southern Africa to date. Close to the N1 highway's Allandale Road off-ramp in Midrand, Gauteng, Waterfall City is set to epitomise the eat-shop-work-play integrated living environment. At its centre is the Mall of Africa.



Set to become the largest mall ever built in a single phase in South Africa, Mall of Africa raises the bar for retail centres on the African continent. Earthworks for the Mall began in October 2012, with the opening scheduled for April 2016.

The 130,000-m<sup>2</sup> retail mall's distinctive design was meticulously planned by MDS Architects. Aurecon was contracted by Atterbury Property Developers to undertake both civil and structural engineering on this iconic project, focussing on optimised design solutions through continuous value engineering, working closely with the Quantity Surveying team, to ensure budgets are adhered to in support of the feasibility of the project.

With the threat of a strike in the metals and engineering sector, detailed design documentation had to be fast-tracked to

enable the WBHO/Group Five JV, to pre-order rebar and steel formwork ahead of the strike. This mitigated many potential delays resulting from the strike.

Because the underlying geological profile of the mall's 16,5 hectare site footprint presented challenges, the project teams needed to tailor the founding solution for each column or wall in accordance with its specific site condition,

using either piling or conventional spread footings, or a combination of both.

The Mall's scheduled opening at the end of April 2016 has placed the professional team and the contractor under tremendous pressure, calling for close cooperation and collaboration with the full professional team.

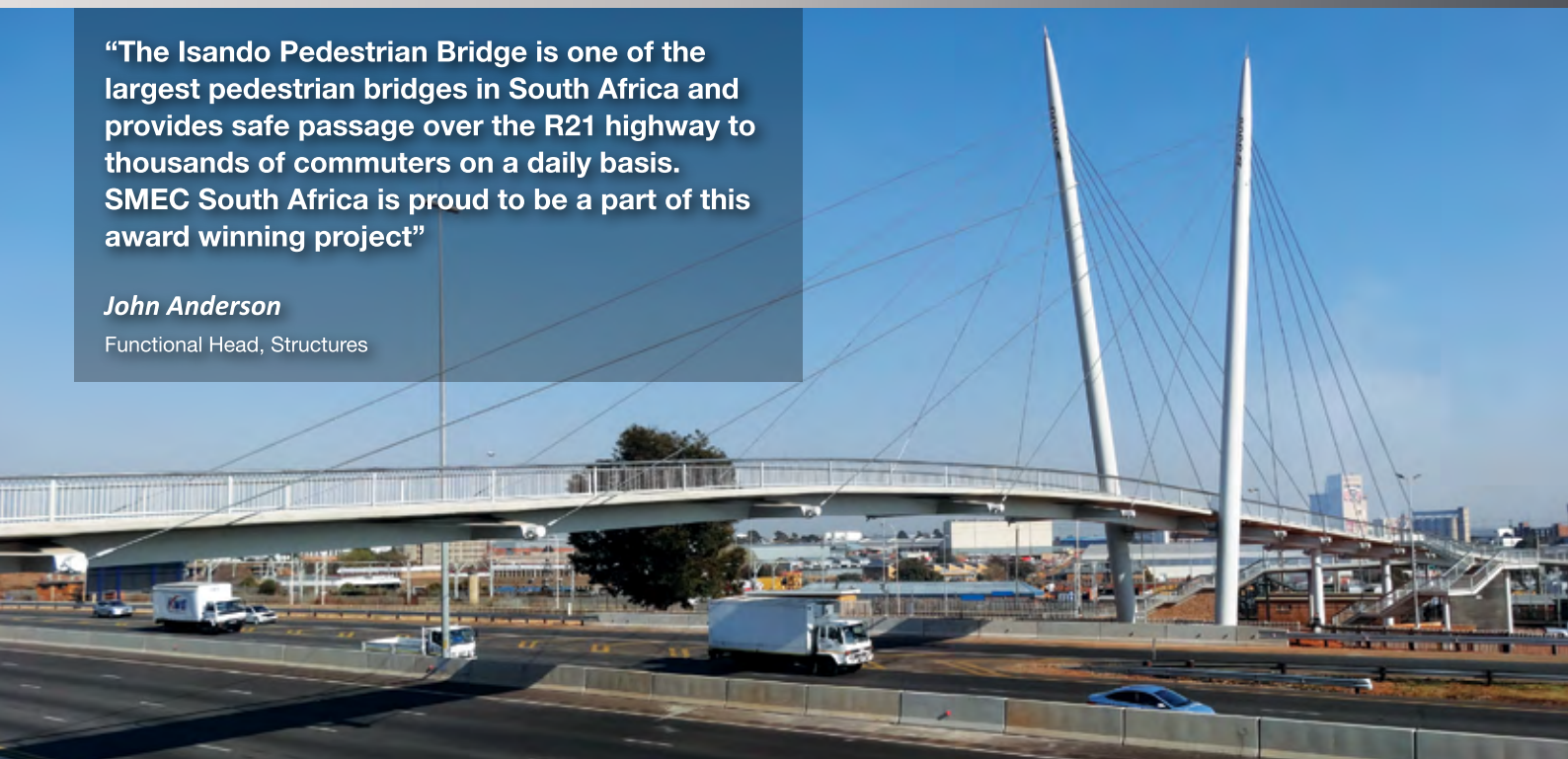
The fast-track nature of the construction programme saw Aurecon using reinforced concrete flat and coffer slabs for the retail areas and post-tensioned flat slabs for most of the parking decks to speed construction. ■

**More information from Jody Boshoff ,  
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**“The Isando Pedestrian Bridge is one of the largest pedestrian bridges in South Africa and provides safe passage over the R21 highway to thousands of commuters on a daily basis. SMEC South Africa is proud to be a part of this award winning project”**

**John Anderson**  
Functional Head, Structures



# Projects and construction: Kenya Vision 2030 Flagship Projects

By Jonathan Lodompui, Director, Enablers & Macro Directorate, Kenya Vision 2030 Delivery Secretariat

## Introduction

The Kenya Vision 2030 is the national development blueprint that aims to transform Kenya into a newly industrialising, globally competitive and middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment.



The Nairobi-Thika Highway.



Four of the many current road construction projects in Kenya.



Berth 19 at Mombasa Port.

The Vision comprises three key pillars: Economic; Social; and Political. The Economic Pillar aims to achieve an average economic growth rate of 10% per annum and sustain that until 2030. The Social Pillar seeks to engender just, cohesive and equitable social development in a clean and secure environment, while the Political Pillar aims to realise an issue-based, people-centred, result-oriented and accountable, democratic system. The three pillars are anchored on the foundations of macroeconomic stability; infrastructural development; Science, Technology and Innovation (STI); Land Reforms; Human Resource Development; Security, Public Sector Reforms and a National Value System.

The Vision was officially launched in July 2008 and is implemented in successive five-year terms called Medium Term Plans (MTPs). Kenya is now implementing the second MTP which extends from 2013 to 2017.

Kenya is strategically positioned geographically, and is the logistical hub for the East African region. It plays a significant role in regional trade, investment, infrastructure development and general economic growth. Kenya serves as a distribution hub for the East African market through Mombasa Port, and provides connections to landlocked Ethiopia, South Sudan and Rwanda.

## Vision 2030 Flagship Projects – Completed and Ongoing

The Vision identifies certain projects called ‘flagship projects’ in each pillar. These are high-impact and transformational projects which directly address priorities in key result areas.

### Nairobi-Thika Highway

This is part of an international trunk road connecting Nairobi City with Ethiopia to the north. The total project length is 50.4 km and was officially opened in November 2012. It has contributed substantially to reducing traffic congestion on the road, while connecting Kenya to Ethiopia for economic development.

### Other Roads

Other roads have been completed, including the expansion of JKIA-Uhuru Highway (22 km), Limuru Road from Museum Hill Junction up to Gigiri (10km), Nairobi Northern by-pass (31 km), Nairobi Eastern Bypass (40 km), Narok-Mai Mahiu Road, Isiolo Merille Road, and Emali-Loitoktok Road. The Arusha-Namanga-Athi River road as part of the priority corridor of the EAC regional roads network from Tunduma in southern Tanzania to Moyale in northern Kenya, and onward to Addis Ababa, Ethiopia.

### Construction of Berth 19 at Mombasa Port

The construction of Berth 19 will see the port of Mombasa benefit from expanded container capacity of 250,000 TEUs (Twenty Equivalent Units). The new berthing area became operational in April 2013 and has since provided ample berthing capacity for docking up to three ships of up to 250 m in length. The harbour channel has also been deepened and widened while berths 16 -18 have been dredged to 12.2 m to the navigation channel. This project has further enhanced and helped to sustain Mombasa Port’s competitiveness in the region.

*continued on page 34*

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Terminal 1A at Jomo Kenyatta International Airport (JKIA).

**Terminal 1A at Jomo Kenyatta International Airport (JKIA)**

The new terminal covers an area spanning 178,000 m<sup>2</sup> and will have 50 international and 10 domestic check-in points, 32 contact and 8 remote gates and an associated apron with 45 stands and linking taxiways. It will also have a railway terminal, a bus park and street lighting as well as other amenities.

**Kisumu International Airport**

Phase 1 involved reconstruction and extension of the runway from 30 to 45 m, and from 2 km to 3.3 km. It included construction of a new passenger terminal of 5,400 m<sup>2</sup>. This was completed in 2011 and officially opened in February 2012.

**Lamu Port South-Sudan-Ethiopia Transport (LAPSSET) Corridor**

This is a Project initiated by the Kenya Government to strengthen the country's position as a gateway and transport and logistics hub to the East African sub-region and the Great Lakes region



An illustration of the extensive LAPSSET corridor.



The new Kisumu Airport Terminal building.

to facilitate trade, promote regional economic integration and interconnectivity between African countries. The project extends over half the country and has a planned investment resource equivalent to half of Kenya's Gross Domestic Product (GDP) for the core investment alone.

In LAPSSET lie numerous construction opportunities. There are seven components in total, railway, highway, port, oil refineries, pipelines, resort cities, airports.

**The future is brighter for Kenya's Infrastructure**

Over the last few years, Kenya has seen a significant rise in infrastructure development in roads, ports, airports, as well as in real estate.

The Vision 2030 blueprint strongly emphasises infrastructural development as a foundation for socio-economic development. This, coupled with rising demand for housing occasioned by population growth, means that the momentum for Kenya's infrastructural development is only set to increase in the short term.

According to the Economic Survey (2014), Kenya's building and construction sector expanded by 5.5% from a growth of 4.8% in 2012 while cement consumption, a key indicator in the construction industry, grew by 6.9% from 3,937.3 million metric tonnes to 4,266.5 million metric tonnes in 2013.

This is expected to grow even more with projects such as the LAPSSET which has sub-components in roads, railway, pipelines, resort cities, ports and oil refineries.

However, cement imports have been very costly, and have continued to impact negatively on the cost of doing business in the construction industry.

However, good news is that the International Finance Corporation, a member of the World Bank Group, has shown interest in funding the National Cement Company Ltd to the tune of US\$70 million both as a debt from IFC and equity from IFC African, Latin American and Caribbean Fund to expand the company's operations, increase the local supply of cement and promote infrastructure development in Africa.

It is expected that this will close the 6 million tons per year cement production gap in the country, needed to stabilise cement prices, while creating over 6,000 jobs.

Kenya's construction industry can only grow from here, and the consequent Medium Term Plans of Vision 2030 will greatly rely on sound infrastructural development to realise the economic, social and political aspirations outlined in the development blueprint, Vision 2030. ■

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# Innovative thinking generates new retaining wall concept

**A** new concept in retaining wall systems, Echo Gravity Retaining Walling (EGRW), which utilises precast concrete hollow-core slabs in combination with geotextile membrane, has been introduced by South Africa's leading hollow-core slab producer, the Echo Group.

The first EGRW system was built at the recently constructed Green Cross Medical Centre, one of the very first property developments to have been completed at the newly proclaimed Lords View Industrial Park, situated in Chloorkop, Kempton Park.

The idea behind the Green Cross EGRW wall, which is 135 m long and varies between 2,5 m to 5,7 m high, was the brainchild of Echo's engineering team.

"The original intention had been to construct an in-situ retaining wall. Echo's engineers, however, believed that a precast concrete wall would offer a more cost-effective option and submitted an alternative design proposal based on the use of prestressed hollow-core slabs in combination with geotextile membrane. The design offered substantial savings in reinforced concrete and formwork, not to mention considerably faster construction times," said Echo technical director, Daniel Petrov.

"When the decision to opt for the EGRW route was taken an in-situ wall foundation and steel starter bars were already in place and to minimise costs, we incorporated these elements into the EGRW design," said Petrov.

The top of the wall was finished with precast concrete coping to add further aesthetic appeal.



*The completed Green Cross EGRW wall.*

Petrov says that precast retaining walls are generally built considerably faster than in-situ walling.

"Moreover, because our hollow-core slabs are manufactured in a factory environment in compliance with Echo's stringent quality control measures, we are able to provide a top-quality end product on a consistent basis." ■

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# Elematic SA doubles its capacity thanks to ongoing demand

**E**lematic South Africa (ESA) is doubling its output capacity with the construction of a second manufacturing plant. The operation, which currently has eight 120-m-long extruder beds in its existing factory, will add another eight with the construction of the new factory, bringing the total to 16 extruder beds. The new plant is expected to be ready for production early in 2015.

According to Craig Webber, director at ESA, the expansion is due to high demand for the company's products. "Property developers and building contractors have seen the benefits of using precast concrete floor slabs and demand has been surging," he says. "The product is becoming more widely used as it is known to save time and money during the construction process. In addition, we have always aimed to provide a good and reliable service to our customers." This has not only secured the company word of mouth business, but also many repeat clients.

ESA has been manufacturing the precast hollow-core concrete slabs at its manufacturing plant on Gauteng's East Rand since 2007, using internationally respected precast technology. "The extrusion methods we use are well known in the industry to produce the best quality hollow-core slabs," Webber adds. Elematic itself is a well-established international brand. It was founded in Finland in 1959 and currently has a presence in over 100 countries on six continents. Added to this is the fact that Elematic South Africa's production facility is ISO 9001 certified and all its products carry the SABS mark of quality.

It is a testament to ESA's high-quality products and superior service that the company has continued to grow despite difficult economic circumstances. Recession struck South Africa just a year after the company started operating. Nevertheless, it has managed to grow its market share steadily and demand is at an all-time high. "Our intention from the outset was always to grow the market and we certainly believe we've done that. It is always healthy to have competition in the market," Webber comments.

ESA now supplies slabs to customers throughout South Africa and beyond its borders. Slabs are available in thicknesses of 120 mm, 150 mm, 200 mm and 250 mm. To ensure that its expanded production line will have minimal delays, it is important to have as reliable a supply of raw materials as possible. To guarantee a long-term reliable supply of aggregate, Elematic's holding company acquired Atoll Mining, a dolomite quarry situated about 500 m from the company's main factory. Apart from ensuring a reliable aggregate supply, additional



*Elematic's new factory layout will mirror their current factory, shown above and below.*



benefits are the high quality and consistency of the aggregates supplied by Atoll. "The quality of the 'classified sand' produced by Atoll using air separation technology from the USA is of particular importance for Elematic in the manufacturing process. The classified sand has a very defined and controlled 'cut point' due to the sand being classified in a dry process. The use of this dry-classified sand dramatically reduces the water demand in the batching plant and produces a very constant high-strength concrete," explains Webber.

Hollow-core concrete slabs continue to grow in popularity as construction timelines are pressured and contractors require reliable solutions. Customers can be assured that all ESA's products are manufactured in a controlled environment, to the highest standards and finishes. The products also have a degree of environmental friendliness – their acoustic and thermal properties are better than those of a solid slab, and conform to the new, more stringent requirements in the building regulations for these properties. The slabs can also be recycled.

ESA has built a solid reputation and a large customer base over the years. The company has a long track record of successfully completed projects, some of the most prestigious of which include the Gautrain Station parkade at Rosebank, the parkade for the new registration hall at the UNISA campus in Pretoria, and the 50,000-m<sup>2</sup> Stella Park shopping centre in the south of Johannesburg.

## More about Elematic SA

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## Echo security wall built at Waterfall Estate



*Electric security wiring was fastened to the steel supports.*



*Cladding steel supporting columns with gabions added aesthetic appeal.*

A huge security wall, just under one kilometre long and up to 4,2 m high, has been built with prestressed hollow-core panels manufactured by Echo Prestress. The wall is situated at the 640-Ha Waterfall Estate in Midrand, currently under development by Century Property Developments.

Rising on the eastern perimeter of the property on gently sloping ground just above the Juksei River, the wall forms a secure boundary between what will become a wooded parkland and a new public road, yet to be built.

The wall is an example of Echo's full-service security-wall solution offering which involves column and foundation designs, civil and construction work and wall panel installation.

The Waterfall project was a joint venture between Echo Prestress, Encon and V-Con Civils and the wall was built in two sections, one at 540 m and 3,6 m high, the other at 400 m and 4,2 m high. This height variance is not readily apparent to the naked eye, mainly because there is no stepping and the wall follows the natural slope of the land. To facilitate this, ground-level panels were cut trapezoidally (at the same angle as the gradient of the site).

The panels were secured between H-section galvanised-steel columns which were bolted onto cast-in-situ concrete foundations. The columns were spaced at six-metre centres which allowed for 25 mm installation tolerances on either side.

Echo Group marketing director, Melinda Esterhuizen, says there are several advantages to this type of walling, speed of construction and cost being major considerations.

"Eight to 10 bays or 48 to 60 linear metres were completed daily (eight hours). A conventional masonry wall would have taken two to three times as long with no advantage gained in strength or durability. In fact, because our panels have a compressive strength of 50 MPa, they are virtually indestructible.

"The cost of building a security wall using prestressed hollow-core slabs is considerably more economical than an in-situ wall offering the same properties. Moreover, precast walling requires no shuttering or propping, on-site curing, formwork or grouting," explains Esterhuizen.

Commenting further Esterhuizen said that the Waterfall wall had added architectural features such as gabion cladding on the inner-facing steel columns, textured painting and the attachment of electrical wiring on top of the wall.

"We are currently researching additional architectural finishes for future wall projects," she said.

Esterhuizen concluded by saying that the concrete slabs and steel support columns are both 100% recyclable and re-usable.

"The wall itself has a very long life span, is maintenance free, and other than occasional cleaning, no other maintenance is required. It can also be dismantled and re-used. Our involvement on projects begins with the drawing-board and ends with the finished product. We have worked closely with this client to ensure success.

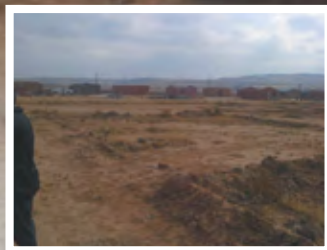
"The Echo team hold service excellence and timeous delivery in the highest regard. We provide hollow-core floor slabs and security and retaining wall solutions that are cost-effective, durable and aesthetically appealing."

When completed in 2020, Waterfall Estate will include the largest shopping mall in southern Africa, the Mall of Africa, as well as residential estates, retirement villages, business parks, a hospital, five-star hotels a private school, and a Gautrain Station. ■

**More information from Melinda Esterhuizen,  
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# Mammoth culverts used for stormwater channel rehabilitation



One of the mammoth culverts is lowered into position.



An internal view of the culvert channel.

**M**ammoth culverts, manufactured by Aveng Manufacturing Infraset, have been used for the rehabilitation of a corrugated metal pipe which collapsed under Andre Greyvenstein Rd near Gauteng's Oliver Tambo Airport in November last year.

The channel had been gradually eroded over decades by chemical and other industrial effluent and the whole section collapsed during some particularly heavy rainfall in November.

Ndodana Consulting Engineers was appointed by Ekurhuleni Metropolitan Municipality to design the new culvert and a decision was taken to widen and deep the stormwater channel to cope with an anticipated increase in flooding incidents.

According to Coenraad Groenewald, technical marketing manager of the construction products division of Aveng Manufacturing Infraset, one design option had been to construct the culvert using in-situ concrete and this route would have been chosen had the mammoth culverts not existed.

"However, given that this was a public road which needed to be re-opened as soon as possible, opting for a precast concrete solution made more sense. In fact one-and-a-half months' construction time was saved by using the mammoth culverts, which were supplied from our Brakpan factory."

Weighing 12,8 tons apiece and reinforced with 600 kg of rebar, the culverts stand 3.5 m tall, are 5.3 m wide and one metre deep. "

Excavation work began in March after wayleaves had been granted by Sasol, Eskom, Telkom and Neotel. A total of 32 culverts were delivered by flatbed trucks and lowered into position by a mobile crane onto a concrete platform measuring 35 m x 6 m.

The platform was constructed with 500 mm of dump rock, two 150-mm layers of G7, a 50-mm layer of blinding, and 350 mm of reinforced concrete.

Concrete wing walls were attached to the first culvert using in-situ concrete and the culverts were waterproofed using a normal concrete grout. Sub-soil drainage pipes were installed on the outside of the two culvert walls to prevent water build up under the road.

Once the concrete work was completed the culverts were covered with G7 material and then compacted. Some areas were too narrow for the compacting equipment and in these instances soilcrete was used as an alternative filling material.

Groenewald concluded by saying that the Andre Greyvenstein rehabilitation project has opened up new opportunities for faster and more economical construction of large stormwater culverts.

Aveng Manufacturing Infraset Infrastructure Products are currently manufactured at five factories countrywide which produce a comprehensive range of reinforced concrete pipes, culverts, manholes, robust toilet structures and other custom built precast products. The company's products are also manufactured in neighbouring countries – in Swaziland, Zambia, Botswana and Zimbabwe.

Aveng Manufacturing Infraset is committed to maintaining the highest standards of innovation, quality and service, fulfilling the most demanding requirements and meeting the needs of a wide range of infrastructure projects. ■

**More information from Coenraad Groenewald,  
Tel: +27(0)11 876 5100 / [www.infraset.com](http://www.infraset.com)**

# New Terracrete paver mats solve tricky erosion control

In some cases, sites that need erosion control are difficult to reach or are fully submerged under water. With this in mind, Terraforce recently developed pre-assembled inter-linked Terracrete mats which are designed for installation by means of a crane.



Mould box with rods.



Filling the mould on a vibrating table.

The mats are produced using a wet-cast method with custom-designed Terracrete moulds that are made of a durable, non-stick polyethylene and weigh between 2 and 3 kg each.

The moulds are then drilled (with a long drill) with 10-mm holes at predetermined positions, to accommodate 10-mm steel rods with handles.



Freshly demoulded block with 10-mm holes.



Compressive strength testing.

Next they are filled with a relatively dry 35-MPa concrete mix on a vibrating table, the steel rods are withdrawn, and the mould box is turned over on a smooth surface, and de-moulded. Finally the finished block is pressed lightly with a 400 x 400 mm plywood pallet to even out the top surface and close off any hairline cracks that may have formed due to deformation.



Crushed block after testing.

After curing for 21 days, the blocks are ready for testing and should achieve a 25 MPa compressive strength. They are now ready to be assembled into a mat, using two 2-mm steel or stainless steel wires, threaded through the horizontal holes.



Mat lifted on two sides.

The mat size may vary, from approximately 1,6 x 2,7 m to 1,9 x 3,5 m, depending on site conditions and the nature of the lifting gear available on site. The blocks can also be wired together after placement, if necessary. ■

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# Rice husk ash as a constituent material for low-cost housing in Africa

By MSc. Nsesheye Susan Msinjili\*, Dr. Dipl.-Ing Wolfram Schmidt  
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It is common practice to use alternative local materials in cement and concrete construction. Natural and artificial mineral admixtures possessing high pozzolanic properties have been employed as a cement replacement in many countries. This can significantly enhance the physical and chemical characteristics of cement and concrete. Such admixtures originate from various industrial and agricultural by-products, and can be processed accordingly as shown in Table 1. The most commonly used admixture is fly ash (FA). In addition, ground granulated blastfurnace slag (GGBS) is well established in countries affiliated with steel industries, due to its cementitious properties. However, both FA and GGBS have limited and only regional availability. Hence, rice husk ash (RHA) is the most sustainable, eco-friendly and durable alternative option for cement replacement. RHA usage in concrete is mainly practised in India, Indonesia, Malaysia and Sri Lanka. These countries have similar climatic conditions to some countries in sub-Saharan Africa (SSA). Therefore there is potential for acquiring similar or newly researched technologies for the market in SSA.

## Rice husks and Sub-Saharan Africa

The cement and concrete market in SSA is rising, but the price of cement is still exceptionally high, ranging from US\$8 to 25 for a 50-kg bag in most SSA countries. This is very expensive for extensive use in low-cost housing and cement replacement is thus a logical solution. Agriculture is one of the leading economic sectors in most SSA countries. Linking agriculture with civil engineering is beneficial as eco-friendly by-products (e.g. RHA) can be utilised as local materials for low-cost housing, helping to reduce the cost of cement in construction. Unfortunately, RHA is not yet extensively utilised in the construction industry, probably due to a lack of knowledge of the material's characteristics when blended with cement or used in concrete.

SSA produces ±20 million tonnes of rice annually<sup>[1]</sup>. The leading rice producer in SSA is Nigeria, followed by Mali, Guinea and Tanzania. Thirty percent of dried paddy rice is made up of rice



Figure 1: Burning of rice husks in Tanzania.

husks and is treated as a waste material (especially in East African countries). Tanzania, the leading rice producer in East Africa, produces about 1.1 million tonnes of rice, which equates to over 300,000 tonnes being classified as 'waste'. Since the by-product has negligible protein content and cannot therefore be used for livestock fodder, the dried paddy is often dumped or disposed of by burning<sup>[2]</sup>.

## Rice husk ash as a cement replacement material

RHA at proper incineration conditions is found to contain 85 – 95% amorphous silica with high pozzolanic properties suitable for cement replacement. Addition of high-quality RHA in cement and concrete not only increases the compressive strength but also improves corrosion resistance and durability<sup>[3]</sup>. For ash with a low carbon content, a loss on ignition (LOI) of less than 4% and high pozzolanic properties, the following incineration conditions are crucial:

- Temperatures not exceeding 650°C with constant air access
- Duration of burning to be between 20 and 30 minutes
- Natural cooling of the burnt ash for a minimum of 24 hours in a dry area immediately after burning

Table 1: Agricultural and industrial by-products, production and pozzolanic properties

Agricultural/Industrial by-products	Production process / Pozzolanic properties
Sawdust (from sawmills)	Incineration at maximum 600°C in an open furnace. Produces 60% amorphous silica.
Bagasse (from sugarcane)	A high-quantity amorphous silica is produced when bagasse is incinerated at 600°C for 3 hours.
Bottom ash (from coal)	It is coarser than fly ash and less reactive. Typically used as fine aggregate replacement.
Fly ash (from coal)	Contains calcium oxide, aluminium oxide, and silica in a variety of ranges. It shows latent hydraulic and pozzolanic properties.
Burstfurnace slag (from steel)	If the slag produced is cooled rapidly and finely ground, it exhibits hydraulic properties.
Rice husks (from rice mills)	Incineration at maximum 650°C for a maximum of 30 minutes and natural cooling for 24 hours. Produces 25% rice husk ash with 90% amorphous silica.

continued on page 46



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Preliminary tests were conducted at BAM laboratories to investigate the chemical and mechanical properties of RHA. Rice husks collected from Tanzania were incinerated in a kiln in Germany at a maximum temperature of 650°C for 25 minutes, and a heating rate of 100°C/hour followed by natural cooling. Manmade kilns are also feasible for production of the ash provided that the environmental conditions can be controlled. The physical and chemical properties of the ash are presented in Table 2.

Table 2: Properties of RHA

Silica Content (SiO <sub>2</sub> )	≈ 90%
LOI	2.95%
Colour	Light Grey
Specific Gravity	2.33

RHA produced was ground to ca. 1µm and replaced with Ordinary Portland Cement (OPC) at percentages of 10, 15, 25 and 30 by volume for production of mortar specimens. The replacement was done by volume instead of by weight due to the difference in densities between OPC and RHA. The compression test at 7 days produced results higher than the control (i.e. 0% replacement), with the highest strength occurring with 25% replacement, whereas tests for 28 days showed strength results much higher than the control.

Further tests of 90 days for the above mortar specimens are underway. Research demonstrates that concrete containing RHA as a replacement for OPC exhibits a high early strength and can produce a long-term strength development resulting in a compressive strength higher than the reference OPC mix.

**Challenges, appropriate solutions and conclusions**

Rice husks have a low bulk density, which makes it very difficult to transport especially considering that only 25% by weight of the husks can be utilised. Hence, it is important to introduce a manmade kiln on site for production. RHA has a high water demand because it has a higher surface area than OPC, hence tends to absorb water faster. A water-reducing admixture can be used to counteract this effect and improve the workability. The water absorption can furthermore be used beneficially,

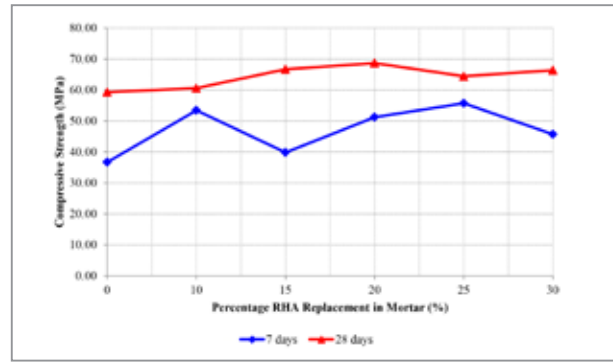


Figure 2: Compressive strength of RHA.

particularly at high temperature casting conditions, by avoiding drying induced shrinkage cracks at early ages.

RHA can also be mixed with other local materials and similar by-products to optimise the properties of concrete produced. It is important to investigate the optimum quantity of replacement to achieve the desired results. Valorisation of agricultural by-products for cement and concrete construction is a reasonable and feasible solution for SSA, as most by-products do not require a sophisticated approach to produce optimum raw materials available locally.

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**About the Author**



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*She is a registered professional Structural Engineer with over three years of experience in concrete design in Tanzania and has recently successfully managed a three-year international engineering project funded by the European Commission worth over €1.2 million.*

*Nsesheye is familiar with the British Standards and Eurocodes for concrete and steel design, as well as having further experience in prescriptive and performance-based Structural and Fire Safety Engineering design.*



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# Architects create a 3-D printed column that survives earthquakes

By Joseph Flaherty



*Quake Column can withstand seismic shocks.*

The aptly named Quake Column is a knurled pillar of 3-D printed concrete that combines an ancient Incan masonry technique with state-of-the-art manufacturing tools to create a structure that can withstand seismic shocks without mortar or rebar.

In the last half decade there's been a Cambrian Explosion of 3-D printers, filling every axis of competition from price to size to print resolution. Most engineers and designers have been fixated on tuning up the machines, but a California-based architecture firm called Emerging Objects is focused on pushing the limits of 3-D printer materials. The result is a structural column designed to withstand earthquakes.

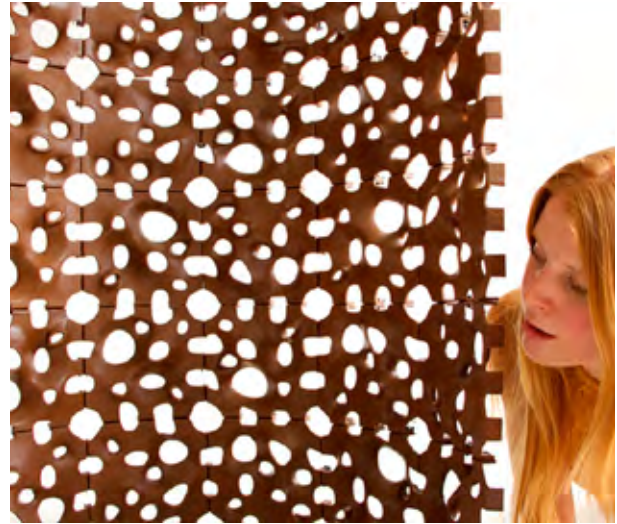
In this system, bricks are designed in CAD tools to fit together like a 3-D puzzle and then printed in cement. Once assembled, interlocking features make the column resistant to earthquakes by preventing horizontal movement.

It's an interesting proof of concept, but utilising a 3-D printer, rather than traditional ceramic manufacturing technique also unlocked a host of other advantages. The bricks are hollow, creating a high strength-to-weight ratio. Each brick is printed with a code that explains to the mason how the bricks should be configured. Moulded handles in each brick make on-site assembly as easy as snapping together Legos. And according to the architect's calculations, this technique could be used to fabricate building-code-compliant, load-bearing walls.

"While this was an experiment in connectivity, we have been able to create 3-D printed parts that are much stronger than reinforced concrete in compression," says architect Ronald Rael. "We are also working on increasing the tensile strength of our materials using reinforcement fibres."

## **Bone, Salt, Sawdust**

What's especially interesting is that the designers didn't set out to design a shake-resistant structure. Instead, it came out of a material exploration that explored using sawdust, ground-up tires, salt, and pulverised bone into effective, if strange, construction materials.



*Walnut Screen made of hardwood sawdust.*

Printing with such atypical materials might seem a bit gimmicky, but Emerging Objects' principals – Ronald Rael, an Associate Professor of Architecture at the University of California, Berkeley and Virginia San Fratello, an Assistant Professor of Design at San Jose State – take the pursuit of novel materials seriously. Together with a 10-person team, they have begun fabricating small objects, like tiles, screens, and home goods, but are quickly scaling production capacity to match their architectural ambitions and potential demand.

Emerging Objects employs off-the-shelf machines that typically use glue, or heat from lasers, to solidify layers of specially formulated plastic powders. However, these printers are more than capable of fabricating a complex shape, like a Klein Bottle from coffee grounds, if the designer is sufficiently experimental and willing to void the warranty on a six-figure machine.

Their approach is a little off-kilter and some experiments, like bone and rubber printing, have yet to materialise into anything of note. When a breakthrough occurs, it tends to be spectacular, as is the case with their Walnut Screen. Made from hardwood sawdust, this waste product was given a second life when fused with a special glue and arrayed in a series of panels to divide a room. The screen boldly combines a 21st century form with a 17th century patina.

"Most of our research takes a look at the past as so much has already been done," says San Fratello. "We love to stand on the shoulders of the brilliant technologies that came before us and learn from them."

Half a dozen architects and engineers are seriously experimenting with 3-D printing at an architectural scale, but almost all of them are focused on size. They share a goal to build full-size homes – walls, ceilings, the works – all in a single shot. Rael and San Fratello see their work differently, as a catalog of systems and components to meet varied architectural needs. While others busy themselves trying to prove that it's possible to 3-D print a house, Rael and San Fratello are occupied with trying to design one that people would actually want to live in. ■

**Source:** <http://goo.gl/XZufPM>

# New cement formulation could dramatically cut carbon emissions

By Nick Lavars



An MIT study suggests that altering the composition of cement could reduce CO<sub>2</sub> emissions substantially.

As one of our most relied upon construction materials, concrete makes a significant contribution to our overall carbon emissions. By slightly altering the quantities of materials used in cement, scientists from MIT have uncovered a new method of concrete mixing that could reduce these emissions by more than half.

To produce cement, calcium-rich materials such as limestone are burned, typically with clay, at temperatures as high as 1,500° C (2,732° F). The energy to heat up the mix combined with a resultant chemical reaction generates carbon dioxide, a process responsible for between 5 and 10% of total industrial greenhouse gas emissions.

The MIT team, led by senior research scientist Roland Pellenq, found that reducing the ratio of calcium to the silicate-rich clay substantially reduced the output of carbon dioxide. Typically, calcium to silica ratios can vary between 1.2 to 2.2, though 1.7 is seen as the standard.

By compiling a database that compared the chemical makeup of the different ratios, the researchers determined that 1.5 ratio was in fact the optimal mix. According to the researchers, this slight change in calcium levels could reduce carbon emissions by as much as 60%.

With the altered ratio the mix also had a higher resistance to fractures. The researchers claimed this is due to the molecular structure transforming from a tightly ordered crystalline to a disordered glassy structure. Pellenq describes the mix of 1.5 to be the 'magical ratio,' with twice the mechanical resistance to fractures of normal cement.

Analysis of the cement mix was undertaken at a molecular level, so further research would be necessary to ensure it can apply to engineering-scale applications. ■

The research was published in the journal *Nature Communications*.

Source: <http://goo.gl/qYeHAX>



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# Re-usable building debris should not end up in landfills

**M**assive quantities of construction and demolition waste (C&DW) are being dumped in landfills without the recycling of such a potentially valuable building material being considered, says Bryan Perrie, managing director of The Concrete Institute.

Perrie says significant volumes of C&DW – including large volumes of concrete – are ending up in municipal solid waste landfills in South Africa. “There is currently growing concern worldwide about this wastage of materials such as concrete, wood, gypsum, metals, bricks, glass, plastics, and salvaged building components like doors, windows and plumbing fixtures.

The waste debris usually originates from the demolition of buildings or civil infrastructure and could also contain hazardous materials such as lead, asbestos or even radioactive materials,” he stated.

“Yet there is tremendous potential to recycle so many elements of demolition waste, particularly concrete, which can



*Bryan Perrie, MD of The Concrete Institute.*

be crushed and reused in construction projects instead of occupying valuable landfill space.”

Perrie says the European Union, for example, has identified C&DW as a

priority waste stream, recognising the high potential for the recycling and re-use of such debris, particularly concrete. C&DW annually amounts to around 510 million tons (equivalent to 30% of all waste generated) in Europe. “In the USA, C&DW totals about 325 million tons per year, and in Japan, 77 million. C&DW totals in countries such as China and India, which together produce about 50% of the world’s concrete, must be substantially higher. In Europe, the EU has decreed that all aggregates derived from C&DW in roads, drainage, and other construction projects, must be recycled. In fact, the technology for the separation and recovery of construction and demolition waste is now well established in European countries. It is readily accessible and is generally fairly inexpensive.

“In the USA, the Federal Highway Administration (FHWA) actively promotes the recycling of concrete from pavements and roads, and such recovery programmes are now in operation in just about every state in America. Uncontaminated concrete pavements can serve as substitute for most natural aggregates. The economic benefits are enormous. In Anaheim in the USA, 700,000 tons of concrete were reused on a freeway project, providing a cost saving of US\$5 million. Similar economic benefits of concrete recycling have been experienced in Melbourne, Australia, where 15,000 cubic metres of concrete were recovered for the construction of the city’s Western Link, yielding cost savings of over Aus \$4 million,” Perrie asserts.

He continues: “Controlled demolition, incorporating a sorting system which would separate reusable elements on site – and also taking the quality and history of the concrete waste into account – is a vital component of sustainability.”

“All concrete that is deemed suitable for recycling should be used for new concrete production. A properly structured demolition waste recycling programme would also create new employment opportunities and reduce the exploitation of natural resources.”

Perrie also believes that more attention should be paid to the re-use and recycling of building materials such as concrete at the design stage to more actively promote sustainability in the construction industry. ■



*Large quantities of construction and demolition waste (C&DW) are being dumped in landfills without the recycling of such a potentially valuable building material being considered, says The Concrete Institute.*

**More information from Bryan Perrie,  
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# ProAll Reimer gets to mix with the best

History was made at this year's SARMA Readymix Conference by ProAll and Reimer SA when the first continuous concrete production plant was officially accredited by SARMA. This unit, owned by SSBR (joint venture Stefanutti Stocks and Basil Read), is currently working for Eskom at the Kusile Power Station project.

Shortly after the announcement was made that ProAll Reimer Mixers had been accepted and accredited by the Southern Africa Readymix Association (SARMA), a similar unit was purchased by 3Q Mahuma Concrete. Although the ProAll Reimer Mixers have been available in the market for some time, a thorough certification process had to be followed to ensure the trucks could produce concrete of a consistent standard to meet the association's strict requirements.

Reimer SA markets and supports a unique readymix system that allows dry cement, aggregates and other ingredients of concrete to be transported to site and mixed to specification. The system therefore is able to overcome the challenge of ensuring concrete is fresh when being transported over long distances and can metre-out small amounts at many different sites in a day without the risk of the concrete losing slump. With sophisticated metering systems aboard the ProAll Reimer Mixers, exact quantities of raw



*ProAll Reimer's dry readymix system has been certified by SARMA.*

materials are fed into the screw auger and can be batched to meet each individual customer's requirements. An immediate printout acts as certification of the mix for on-site record keeping purposes and is recorded for purposes of proof of delivery of supplier. The unmixed product remains fully usable.

"For our members the advantages of having a ProAll Reimer Mixer of this sort in their fleets are many and the accreditation of the system means that they can rest assured that it is able to produce the same consistent quality as their existing batching plants," said Johan van Wyk, general manager of SARMA.

"Certification follows a lengthy verification process to ensure that the ProAll Reimer Mixer units met set performance criteria. SARMA could then certify South Africa's first continuous concrete production plant," he explained.

Van Wyk concluded that the new system would provide members with a viable means of extending their reach into remote areas and allows them to measure out smaller quantities to clients who would usually have no other option but to settle for less reliable site mixing options. ■

**More information from Johan van Wyk,  
Tel: +27(0)11 791 3327 / [www.sarma.co.za](http://www.sarma.co.za)**

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# Liability cover for readymixers

**S**pecially tailored insurance policies for the readymix industry have been made available to members of the Southern Africa Readymix Association (SARMA) to cover major risks associated with the business.

This was announced at the recent Readymix Conference by SARMA and includes policies that cover liability in the event of concrete failure, as well as providing separate policies to insure plants and mixing trucks.

Expert brokers, Civil Sure, secured cover for the readymix industry with the country's leading insurance companies following intensive studies to understand the nature of the business and types of risks involved.

"With liability claims due to concrete failures being the biggest risk to any readymix operation, the introduction of liability cover for this eventuality will ease concerns of owners.

"Concrete failure can happen as a result of different reasons and this policy is a welcome addition to our members risk mitigation toolbox. Other risks such as vehicle damage or damage to a mixer's drum due to concrete hardening are other options that our members will welcome," says Johan van Wyk, general manager of SARMA. The strict standards and procedures applied to all SARMA members considerably eases the risk faced

by the insurers. As long as the insured has followed the correct procedure and maintains the documentation as required by SARMA guidelines, then claims may be submitted.

Dan Payton of Civil Sure says the company has been working with SARMA for some time to provide the right kind of cover for the industry.

The company's other specialist products are already proven and include innovations like Taxisure, Schoolsure and Civilsure, which address specific needs of those industries.

"It takes a small hole to sink a big ship. Liability on a large job may be all that is required to bankrupt a readymix company. Although this industry is comparatively small, we have identified a sufficient pool to achieve economies of scale and make the insurance considerably cheaper.

"Pooling the industry also makes it possible to design tailor-made solutions and offer very attractive and affordable policies," concludes Payton. ■

*Detailed information about the policies at [www.civilsure.co.za](http://www.civilsure.co.za)*

**More information from Johan van Wyk,  
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# Decking system speeds up construction of major malls

Contractors working on a slew of giant new shopping malls across Africa are opting to make use of an advanced new decking system that radically improves construction time while allowing easy and safe access to tradesmen working beneath deck supports.

The Kwik-Deck system, developed by Form-Scaff, is an evolution of the decades-old coffer system used to produce concrete slabs with a waffled soffit finish. The new system however takes less time to erect and can be stripped in just three to four days after pouring of concrete and, as a result, significantly reducing investment in additional falsework and also labour.

Having been designed from the outset to facilitate the use of either coffers or flat slabs, Kwik-Deck uses props to facilitate quick erection of the falsework. While this is not unique in the industry, the addition of quick-release beam supports is, and it allows the decking falsework to be removed after just three or four days (depending on curing requirements) while the props remain in position until the concrete slab has achieved sufficient design strength.

This is in contrast with other prop-based systems that require at least 21 days before coffers and falsework can be removed. Traditional stage-type systems, by comparison, also allow the removal of falsework within three to four days in most cases, but are comparatively labour intensive, take much longer to erect and limit thoroughfare underneath the deck. Breakdown and re-erection of staging is also time-consuming.

## Need for speed

“Contractors working on modern construction projects strive to achieve the fastest possible pour cycles and, in doing so, still have access to wet and dry trades underneath deck pouring areas where possible.

Until recently, prop-based systems provided a reasonable solution for easy erection and access underneath, but due to the 21-day period before stripping could take place they needed an enormous amount of falsework to be employed on each site.

“This was costly and time consuming. In addition, the reduced stability of props compared with traditional staging was a concern and the benefits were, in the opinion of some, not sufficient to outweigh the drawbacks.”

“That is why we developed a system that effectively draws on the best of both types.

“Our system is also designed to be seamlessly interchangeable with either system and for stability sake many of our contractors now choose to combine props with braced staging systems.

“For example, they can use our staging for perimeters or on a corner of the deck for initial stability and edge protection, then use props for the rest of the floor.

This interchangeability of our system is unique and is a major advantage for clients to simplify their falsework requirements on site. It will even work seamlessly with contractors’ own staging systems,” says Klaas Pouwels, Form-Scaff business development director.



Baywest Mall in Port Elizabeth. Just one of the many malls under construction using Form-Scaff's Kwik-Deck system with coffers.





West Hills Mall in Accra, Ghana. Coffers on the Kwik-Deck system supported on BS props.

### Showcase developments

Operations director, Darryl Voysey says these benefits have quickly been recognised and is the reason why contractors currently building the five biggest malls of their type in Africa are using Kwik-Deck to complete their projects.

WBHO and Group 5 (in a joint venture) have opted for the system on the giant Mall of Africa in Midrand, which is soon to be the largest mall in South Africa to be constructed in a single phase. WBHO is also using Kwik-Deck to construct the Westhills Mall in Ghana, while Murray and Roberts is using the system on a further three regional malls, namely Baywest Shopping Centre in Port Elizabeth, Dainfern Square in Fourways and Matlosana Mall in Klerksdorp.

"These are flagship developments and the contractors are using our Kwik-Deck coffer systems because of the speed of erecting, stripping, and re-erection, as well as the ability to grant access to tradesmen to complete work underneath the supports."

"Contractors also have access to a range of props for different roof heights, or to suit weight and strength requirements and can supplement requirements with their own staging equipment if needed. An additional benefit is that Form-Scaff has the unique ability to maintain sufficient stock-holdings to support the sheer scale of all these projects without delay. Our engineers, technical staff and crews are also readily available to assist with requirements on each of these sites, if and when there is a requirement," adds Voysey.

### Rich in benefits

Looking at some of the technical issues and advantages of the new system, Chris Erasmus Form-Scaff technical director, says the new Kwik-Deck system can be supported on any of the company's support-work systems. A Kwik-Deck drop-head

***"These are flagship developments and the contractors are using our Kwik-Deck coffer systems because of the speed of erecting, stripping, and re-erection, as well as the ability to grant access to tradesmen to complete work underneath the supports."***

is attached to the upper end of each prop which allows the coffers and Kwik-Deck Beams to be easily stripped for re-use. One of notable technical differences on the system is the change from the standard 900 X 900 mm grid to 925 X 900mm. This additional 25 mm is to accommodate the Kwik-Deck Beams required to hold the coffers in place and translates into beams in one direction being 25 mm wider and using slightly more concrete.

"We initially viewed this as a potential stumbling block, but our customers (contractors) on all of the projects where the new system is being used easily managed to convince their clients that the advantages of speed, space, transport and lower labour requirements of the new system far outweigh the need to resize drawings etc. In future architects and engineers wanting to use the system will simply take the new grid size into account and design accordingly. In addition, a slightly wider rib adds extra strength to the floor and may even increase the loading capacity of floors in certain circumstances," concludes Chris. ■

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## Relationship spanning over three decades is set in concrete



*Barend de Klerk says Benoni Bricks is still using machines bought in 1982 and 1984.*



*VB1 machines are designed to be sturdy, dependable, high-performance and produce quality units.*

**T**hanks to the quality and durability of machines supplied by Pan Mixers South Africa (PMSA) more than three decades ago, Benoni Bricks has been manufacturing quality bricks and pavers for over 30 years.

Benoni Bricks was established in 1982, and specialises in manufacturing 60-mm and 80-mm interlocking pavers for light and heavy industrial use, as well as domestic-use coloured bevel pavers. Their products are supplied to hardware stores, paving contractors and civil contractors.

Benoni Bricks owner Barend de Klerk elaborates: "The professional relationship between Benoni Bricks and PMSA has grown from since the company purchased its first VB1 block making machine from PMSA in 1982."

De Klerk says Benoni Bricks is still using the two original VB1 machines purchased from PMSA in 1982 and 1984 respectively. "As advances in technology progress, PMSA representatives proactively contact us to upgrade the machine parts."

This value-added service has led to the machines exceeding output expectations. De Klerk explains: "The machines have consistently achieved 1,730 skid boards a day over the decades, as opposed to the theoretical output of 1,500. This equates to 600 m<sup>2</sup> per machine per day, which is exceptional."

PMSA sales and marketing manager Quintin Booysen states that the VB1 block making machines are designed to manufacture concrete bricks, blocks and paving. "These machines have been designed to heavy-duty standards, ensuring long life, high performance and high-quality products."

Booyesen says PMSA's philosophy is underpinned by a business ethos around Built to Last, based on three pillars: Customer relationships, Machinery, and Business entity, PMSA has successfully fulfilled all three with the Benoni Bricks. The 30-year-old machinery used at Benoni Bricks is still running strong, the relationship with the customer spans over three decades and PMSA has gone from strength to strength over that period..

The VB1 features remote electro-hydraulic controls for easy operation, as well as a powerful double-shaft directional vibrator with maintenance-free dynamic braking. It also has an automatic pallet feeder which feeds the pallets from the magazine to the moulding head. Once the moulds have been filled by the overhead bin, the pavers are vibrated to a high density and passed onto the take-off conveyer.

In the event of a technical challenge, De Klerk says a PMSA technician is always on hand within an hour. "The after sales and technical support offered by PMSA is second to none, and a product specialist has never left site without fully addressing all our needs."

De Klerk says: "It's very important that we get the economy to strengthen and expand. There are definitely growth opportunities for Benoni Bricks and PMSA will remain our supplier of choice," concludes De Klerk.

### About Pan Mixers SA

Pan Mixers SA is a leading manufacturer of a wide range of concrete block, brick and paving machinery, turbine and counter-current pan mixers and batching plants for the concrete, refractory and ceramic industries. Pan Mixers have been servicing the needs of local and overseas customers since 1976. ■

**More information from Quintin Booysen,  
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# Techmatik's ten-year landmark was action-packed

October 24, 2014 was an important date for the precast concrete manufacturers' market. The day marked the 10th anniversary of Techmatik, a Polish company producing high-quality concrete precasting equipment.

Guests who flocked to the company's factory in Radom, in the central part of Poland, included the cream of the concrete industry from more than 50 countries from all over the world. They were treated to the sight of the company's innovative machines in action – simultaneously. These included:

- HP 3000 Pro and SHP 5000 Pro C concrete block machines
- The Multi 200 egg-layer, producing concrete blocks with polystyrene inserts
- The latest-generation textured moulds with their heating systems
- And many more of Techmatik's innovations

Techmatik, the Polish company which was established in 2004, employs approximately 500 people. Its factory is located in the Radom sub-zone of the Tarnobrzeg Special Economic Zone. The company specialises in the production of high-performance machines, devices and moulds for the manufacture of construction products, which guarantee high performance, manufacturing repeatability and, as a result, consistent fabrication of precast products of the highest quality.

Every machine and device is automated and controlled by an integrated computer system. Techmatik is an unquestioned leader in the field of concrete product

manufacturing, with significant experience and a diverse machine pool. The company continues to keep ahead of its competition thanks to its ever-improving production processes, which make use of innovative solutions, and enable precise fulfilment of customer expectations.

The state-of-the-art machine pool guarantees that service is of the highest quality. Machines, devices and moulds manufactured by the company are adapted for high-performance work on steel production pallets, thus achieving the best possible dimensional accuracy for the manufactured products, durability through the highest possible compaction, and lower production costs because of decreased cement usage.

Techmatik constantly modernises its offering by regular introduction of new products. The machines undergo rigorous testing in the Radom R&D facility before being shipped to the customer. Techmatik's high-quality services and attractive pricing have resulted in their supplying equipment to the leading manufacturers of precast products in Poland and abroad. The company supplies its solution directly to many European and Asian countries, and thanks to the contract with the American Columbia Machines, Inc., the Columbia-Techmatik brand moulds are distributed to vibropressed product manufacturers throughout the world. ■

**More information from  
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www.techmatik.pl**



Techmatik has celebrated its 10th anniversary serving the precast concrete manufacturers.



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## Compaction indicator shows when the job is done

**T**he complexity of different soil types makes quality compaction a challenge.

Too little compaction and the soil may settle, causing structural failure. Too much compaction leads to unnecessary machine wear and downtime and can also cause some soils to 'crack' under increased pressure. The compaction indicator on the LG500 reversible plate measures the vibration patterns in the plate and shows how well the soil is compacted beneath the surface. The compaction indicator is mounted at the centre of the handle and the system communicates via a clear system of indicator lights. The three lights; yellow, green and red, signal the different stages of compaction. When the red light flashes, the particular soil type has reached maximum compaction and it is time to stop.

By combining compaction indicator-technology and operator's knowledge, the risk of over- or under-compacting is much reduced. The combination will save the operator's time and increase uptime for the reversible plates. This is thanks to less



*The new compaction indicator on the Atlas Copco LG500 reversible plate saves time and money by reducing over-compaction and machine wear.*

servicing necessitated by machine wear. To get an even safer compaction experience, the Atlas Copco's CompBase provides detailed compaction data and capacity information based on full-scale tests. The machine and method selection is based on the material to be compacted and provides information on the expected depth effect and degree of compaction after any given number of passes.

Atlas Copco Construction Tools is a division within Atlas Copco's Construction Technique business area. It develops, manufactures and markets hydraulic, pneumatic, and petrol-driven equipment for demolition, recycling, compaction, rock drilling and concrete applications. Products are marketed

and sold under several brands through a worldwide sales and service organisation. The division is headquartered in Essen, Germany, and has production units in Europe, Africa and Asia. ■

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## Study findings on Eirich hold true 10 years on – Birkenmayer

**T**he findings of a decade-old independent study on the effectiveness of Eirich mixers are still relevant, according to industrial process solutions company Birkenmayer South Africa, which manufactures and distributes the mixers locally. The Weimar Institute for Finished Part Technology and Finished Construction's report stated: "The Eirich mixer is outstanding for its very short mixing times. Subject to the same mixing drum contents and conditions a comparable mixed product is achieved with the Eirich intensive mixer faster than...mixer 'X' and... brings economical advantages. The high uniform consistency of concrete prepared with the Eirich mixer was obvious."

Ten years on, Eirich's R&D has introduced fresh innovations. However, regardless of technological advancements, the study findings still hold true for all Eirich mixers.

Louis Eksteen, Birkenmayer business development manager, says: "With each mix being exactly like the next, there is less

waste through surface faults. Investing in Eirich mixing technology pays for itself very quickly because of improved mixing efficiency and reduced wastage."

Eksteen says the difference lies in Eirich's unique mixing principle: Rotating mixing pan and transportation of the mixed material; and the variable slow-to-fast running mixing tools for mixing. Separating transportation of the mixed product and the actual mixing operation makes it possible to vary the speed of the mixing tool (and, thus, the energy introduced into the mixing operation) over a very wide range.

"The low number of tools required, their constructive design and the use of special materials ensure low expenditure for service and maintenance; primary wear parts can also be easily replaced," Eksteen explains.

In recent years, Eirich has developed a range of new mixer models capable of handling mixes from 250 litres all the way to 7,000 litres. An Eirich speciality is the preparation of ultra-high strength heavy-duty concrete in the Eirich vacuum mixer. "Air inclusions, which have a detrimental effect on concrete strength, can be largely avoided," Eksteen points out.

"The bottom line is that, to date, no other mixer has the technology or broad-spectrum capabilities of an Eirich mixer, with a return on investment to match! The quality of any concrete product starts with the mixing process – and there is no known type of concrete in the market which cannot be efficiently processed in an Eirich mixer. ■

**More information from Louis Eksteen,  
Tel: +27(0)11 970 3880 / [www.birkenmayer.co.za](http://www.birkenmayer.co.za)**



# Chicago Pneumatic does the job reliably, efficiently, affordably

**C**hicago Pneumatic is a brand that is synonymous with high performance, reliability, efficiency, ease of operation and cost effectiveness, qualities epitomised by their full range of quality concrete equipment.

Pokers, bull floats, hand-held screeds, screed rail systems, power trowels and floor saws – Chicago Pneumatic does not overload any of its concrete equipment with rarely-used extra features. “Instead the equipment is all about getting the day-to-day work done reliably, efficiently and affordably. Chicago Pneumatic’s solutions cover virtually every step of the job, from soil, clay, silt, sand, gravel and asphalt compaction to concrete placing and finishing and finally, to repair and maintenance,” says Eben van der Vyver.

With features that include robust design, effective shock absorbing and easy-to-access service points, the Chicago Pneumatic product line-up delivers reliable performance, user-friendly operation and low maintenance – adding up to long-term productivity. The end user benefits from low cost of ownership and a rapid return on equipment investment.

Highlighting the importance of a good service ethic, Van der Vyver says that the quality of a product is only as good as the supporting service. “We aim to keep customer downtime to the minimum by being able to deliver all-round service

excellence, from rapid product and parts supply to providing speedy servicing, maintenance and repair.”

“For this we need a wide regional footprint to bring our products as close to our customers as possible and we are building a solid countrywide network of handpicked dealers to effectively supply the extensive Chicago Pneumatic concrete range to the South as well as southern African markets.”

“We depend on our authorised dealers to assist customers in choosing the correct equipment for their needs. The dealers are also responsible for the servicing, repair and maintenance of the equipment. We therefore provide regular product training to equip dealers with extensive knowledge of the latest technology and product offerings so that they can add value to the supply chain,” ends Van der Vyver.

Since the introduction of the Chicago Pneumatic brand to the world market in 1901, the equipment continues to successfully meet diverse applications all around the world. In South Africa, particularly in the mining sector, Chicago Pneumatic industrial and pneumatic hand tools have operated for over 100 years. ■

**More information from Eben van der Vyver,  
Tel: +27(0)11 821 9000  
www.cp.com**



*Chicago Pneumatic's equipment only has those features needed to get the job done in the most efficient way.*



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# Master Builders Solutions® launched in South Africa

**B**ASF launched the Master Builders Solutions® brand in South Africa at the Totally Concrete Expo held in May 2014. The brand strengthens BASF's industry orientation: It stands for BASF's commitment to provide the whole construction industry with tailored products and solutions. Master Builders Solutions® has already been introduced in the Asia Pacific region, including Russia, Turkey, the Gulf Cooperation Council and Kazakhstan. It was rolled out worldwide by the end of the second quarter 2014.

Master Builders Solutions® draws on a number of successful specialty brands such as Master Builders®, Glenium® and Ucrete®. It is based on over a century of innovations for the construction industry. "In Master Builders Solutions, we concentrate our ability to collaborate across technologies and functions on a global scale. That way, we create solutions geared to meet the individual construction challenges of our customers," said Dr. Tilman Krauch, president of BASF's Construction Chemicals division.

The range of products and services marketed under the brand features a global naming system, helping BASF to support customers and partners with high-quality and consistent products and services.

The portfolio of products and services marketed under the brand embraces chemical solutions for new construction, maintenance, repair and renovation of buildings as well as infrastructure: concrete admixtures, cement additives, solutions for mining and tunnelling, waterproofing, sealants, concrete repair and protection, performance grouts, high-performance flooring products and tiling solutions.

The launch of Master Builders Solutions® in Russia, Turkey, the Gulf Cooperation Council countries such as Saudi Arabia and the United Arab Emirates, Kazakhstan and South Africa will support BASF in further strengthening its position in these emerging markets. Azerbaijan and Jordan also followed in May

2014. "The introduction of the brand underlines that we are more than a supplier of individual chemical products. BASF combines its products and services under one brand to be the solution provider of choice for the whole construction industry. The new brand also highlights our position as a truly global player in the construction chemicals industry," said Dick Purchase, head of BASF Construction Chemicals division in the ORA region (Orient, Russia and Central Asia, Africa).

With its comprehensive portfolio marketed under the Master Builders Solutions® brand, BASF is offering state-of-the-art construction chemical solutions to support its local partners. "Important projects such as the 347-million cubic metre De Hoop Dam in Sekhukhune, Limpopo province, which would supply potable water to people in the province while also serving the mining industry along the South African platinum belt, are strengthening the province's social and economic performance. "We are proud to be part of this progress by offering solutions which are based on our global know-how and provided by our local experts," said Morgan Govender, MD, BASF Construction Chemicals South Africa.

## About BASF's Construction Chemicals division

BASF's Construction Chemicals division offers 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, 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 construction challenges from conception through to completion of a project, know-how across areas of expertise and regions are combined and the experience gained in countless construction projects worldwide is drawn on. Global BASF technologies, as well as in-depth knowledge of local building needs are leveraged to develop innovations that help make customers more successful and drive sustainable construction.

The division operates production sites and sales centres in more than 50 countries and achieved sales of ±€2.1 billion in 2013.

## About BASF, South Africa

BASF has been doing business in South Africa for over 45 years. Headquartered in Midrand, Johannesburg, the BASF Group in South Africa consists of eight companies with locations in Johannesburg, Port Elizabeth and Cape Town. The local group's employee complement is around 1,000 people. ■

**More local information at:**  
[www.basf.co.za](http://www.basf.co.za)



At the launch, from left: Morgan Govender, MD Construction Chemicals, BASF South Africa; David Bowerman, Regional Business Segment Manager, Admixture Systems and Cement Additives, Construction Chemicals Division, ORA; Tim Thomas, Regional Business Segment Manager, Construction Solutions, Construction Chemicals Division, ORA: Middle East, West Asia, CIS & Africa; Joan Maria Garcia Girona, Head of Business Centre South Africa & Sub-Sahara, BASF.

# a.b.e. expands its popular Polyurea coatings range



*Polyurea coatings are now used as insulation layers attached to special prefabricated Lamdaboards.*

a.b.e. Construction Chemicals has expanded its range of VIP Polyurea coatings to include systems for specific waterproofing applications, as well as a new concept featuring polyurea coatings factory-applied to insulation boards.

Noel Abendroth, manager: Polyurea Performance Coatings for a.b.e. Construction Chemicals – part of the Chryso Southern Africa Group – says there has been increasing local demand for VIP Polyurea coatings since a.b.e. last year secured an exclusive agreement with Voelkel Industrie Produkte (VIP) of Germany for the local distribution of the VIP range of protective coatings and joint fillers.

a.b.e. had since then also secured several high-profile contracts for the VIP Polyurea coating range based on its 'revolutionary' benefits which include durability, superior protection, ease of application, rapid curing and turnaround times.

The two new versions of VIP Polyurea coatings now available from a.b.e. are:

- VIP Polyurea cold spray-applied, high and low pressure systems for specific waterproofing applications, offering elongation (flexibility) ranging from VIP Polyurea cold spray-applied, high and low pressure systems for specific waterproofing applications, offering elongation (flexibility) capacity ranging from 240% to 650%.

Abendroth explains: "The more flexible product accommodates high movement of the particles of the membrane, and would therefore be softer and able to offer maximum impact resistance. However, if abrasion resistance is needed, a harder product, with lower elongation capacity, can be better. That's why a.b.e. selects

individually-designed specifications per project, taking all the criteria into account."

- The use of Polyurea coatings as insulation layers attached to special prefabricated, lightweight boards produced for a.b.e. by Rigifoam. The new, unique version of Rigifoam's popular Lamdaboards was developed by a.b.e. and Rigifoam especially for the South African market and local conditions.

Abendroth also says that the Polyurea Lamdaboards are ideal for the roofing market and can be applied over existing roofing or as separate, independent roofing components. The thickness of the Lamdaboards' insulation can be determined by specification and the product will be available in a standard size of 2 m by 1 m, but the dimensions can also be tailor-made if required.

Polyurea Lamdaboards can be used over purlin, as vertical cladding, under screeds, as cavity or curtain walls, ceilings, and as ducting. The boards are moisture- and water-repellent, resist chemicals including solvents used in construction adhesives, offer exceptional dimensional stability, and have high compressive strength, as well as resistance to impact, punctures, and even corrosion.

They also reduce operational heating and cooling costs and consequently provide substantial energy cost-savings.

Both a.b.e.'s Polyurea Lamdaboards and the new cold spray-applied waterproofing system are now available nationally. ■

**More information from  
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# Chryso Southern Africa's products travel 2,300 km to St Helena Airport Project

**P**roducts from Chryso Southern Africa travelled 2,300 km over the South Atlantic Ocean to St Helena, one of the most remote islands in the world, to be used at the Basil Read St Helena Airport Project (BRSHAP). All of the materials used in the production of the concrete required, apart from the crushed aggregate, were sourced off the island. Dune sand was obtained from Walvis Bay, while the cement came from Ohorongo Cement in Namibia, the fly ash from Ash Resource's Lethabo plant in Vereeniging and admixtures from Chryso's plant in Cape Town.

"It was extremely important to keep quantities of materials to a minimum as there was limited space on the Basil Read cargo ship NP Glory 4," Brenton Brouard, Chryso Southern Africa, technical manager, explains. "When designing different concrete mix designs, for example, we could not use vast quantities of dune sand because that still had to be transported to the island."

Concrete was specified for the airport runway, terminal building, air traffic control building, fire department building and permanent wharf. Chryso® Plast Omega 101 was used in all of the general concrete as well as the concrete for the runway and the precast concrete used to construct the 700 precast Core-loc armour units and hollow blocks for the wharf. The 100-m-long, 10-m-high and 13-m-wide wharf has a rock breakwater that had to be protected from any possible damage caused by ships.

"When formulating the concrete mix design for the precast units, it was important to achieve a mix with optimised properties. The concrete had to fill complex mould shapes with limited bleed and settlement. Excessive bleed water would lead to unsightly voids in certain element sections, as well as increasing the risk of both plastic settlement and shrinkage cracking," Brouard says.

Therefore 12-mm Chryso® Fibre Plus polypropylene micro fibres were used to increase the cohesiveness of the mix, while

Chryso® Plast Omega 101 assisted in creating an optimised slump. Chryso® Dem Oleo SM was used on all of the moulds to ensure an easy release once the concrete had set, without causing damage to the moulds or concrete.

Concrete also had to be transported over long distances on the island, affecting the slump retention and workability. Chryso® Tard CE retarder was used to retard the concrete setting time. When necessary, Chryso® Rescue Pack slump revival admixture was added to the concrete in a readymix truck immediately before discharge.

"This increases workability and makes it easier to pump or discharge concrete from trucks that may have travelled long distances or been stationary on site for extended periods," Brouard says. Chryso's biodegradable, environmental-friendly cleaning agents Barracuda, Fusion and Truck Wash were used to clean and line the readymix trucks to ensure they remained in good condition.

In order to reduce the need for future maintenance, it was decided to build the runway with concrete instead of asphalt. Manufactured from 27,000 m<sup>3</sup> of concrete, the runway is 1,950 m in length, 45 m wide and has a maximum thickness of 350 mm in parts, with reduced thickness to the 'off-keel' sections. The runway is mostly unreinforced.

Commenting on the complexity and size of the project, Jimmy Johnston, project director, BRSHAP, says: "The long logistical chain made planning vital, and BRSHAP needed reliable suppliers such as Chryso that can provide the correct product at the required amount on an agreed date and time." ■

**More information from Kirsten Kelly,  
Tel: +27(0)11 395 9700 /www.chryso.com**



Over 700 units of precast Core-loc armour units (7 tonnes per unit) and hollow blocks (27 tonnes per unit before being filled with stone) were placed by crawler cranes via GPS around the wharf from the surface bed to just above sea level.



# Waterproofing solutions that work

The demand for effective waterproofing solutions has become a pivotal aspect of the property group maintenance strategy.

Sanika offer a diverse array of waterproofing solutions to rectify even the most difficult waterproofing dilemmas. With over 25 years experience in the waterproofing industry, Sanika have secured themselves as primary waterproofing vendors for the likes of Impala platinum, NMSCOM, Liberty Property Group, Growth Point Properties, Tiger Brands, Johnson Matthey, TFMC and many more for all their waterproofing solutions.

Sanika offer waterproofing solutions including acrylic, torch on, insulated boarded systems, concrete waterproofing, concrete repair and maintenance solutions.

Since securing the rights to be the exclusive distributors and applicators of Kryton Crystalline Waterproofing Products in Southern Africa, Sanika have completed over 5,000 m<sup>2</sup> of concrete repair.

Completed projects include: waterproofing and repair of concrete basement parking areas for various Growth Point and Liberty Properties buildings; concrete reservoir maintenance and repairs for Anglo American, Impala Platinum and various municipalities; subterranean and basement waterproofing for Tiger Brands and the private sector.

Kryton's Concrete Crack Repair & Maintenance products, applied by Sanika, offer a permanent solution for waterproofing and repairing tie holes, pipe penetrations, cracks and defective concrete. By utilising the Kryton admixtures when pouring



*Anglo American conventional thickener waterproofed from the exterior using Kryton Krytol Waterproofing methods.*

new concrete you can render your concrete structures 100% waterproof for the lifetime of the concrete.

By incorporating the world renowned Kryton products to the already extensive range of high quality waterproofing solutions that Sanika offer, we are confident that we can assist our local market with waterproofing solutions that actually work! ■

**More information from Sandor Dowling,  
cell: +27(0)82 922 5586 / info@sanika.co.za**



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# Sika CarboDur Rods strengthen Hyundai Gateway

**G**ateway Theatre of Shopping is situated in Umhlanga on the KwaZulu-Natal coast just north of Durban. It has been described as both the largest shopping centre in South Africa and the largest in the southern hemisphere and it was here at a motoring showroom that Sika CarboDur BC Rods were used for the first time in South Africa. Sika's Warren McDaniel advised on the product requirements.

Due to an expansion project at Hyundai Gateway, the building requirements had changed; additional structural strengthening on the existing slabs had become a necessity. Sutherland Consulting Engineers had no hesitation in specifying internationally approved Sika CarboDur Plates together with Sika CarboDur BC Rods.

Designed for strengthening concrete, timber and masonry, Sika CarboDur Plates are pultruded carbon fibre reinforced polymer (CFRP) laminates that are bonded onto the structure as external reinforcement. Manufactured in rolls of 100 m, the product can be cut to varying lengths so that no joins are



*Sika CarboDur plates are installed onto the ceiling to strengthen the concrete slabs.*



*Hyundai Gateway showroom.*

required. These laminates require minimal preparation while numerous sizes of high-strength plates are available with three different moduli of elasticity: Standard, Medium and High.

Sika CarboDur BC Rods, also pultruded carbon-fibre-reinforced polymer (CFRP) laminates, with a circular cross section, are used as part of a Sika CarboDur system. They are bonded into slots as near-surface mounted reinforcement for concrete, timber and masonry. The rods are especially useful when a slab has poor surface quality, as the need for high surface tensile strength is negated by embedding the rods into the concrete. Sika CarboDur BC Rods are used to improve, increase or repair the performance and resistance of structures for flexural strengthening for positive and negative moments, flexural strengthening of columns under axial load, shear strengthening of beams and strengthening of masonry walls. Due to their confinement and bond, Sika CarboDur BC Rods are completely anchored with short anchorage lengths.

Warren McDaniel explains: "For this project, 164 m of Sika CarboDur Plates S512 (50 mm x 1.2 mm) and 75 m of Sika CarboDur Plates S1012 (100 mm x 1.2 mm) were bonded to the soffit of the slab while the Sika CarboDur BC Rods (35 x 3 m) were bonded into the surface of the slab. The bonding agent used for both products was Sikadur-30, a thixotropic, structural two-part adhesive based on a combination of epoxy resins and special filler, and designed to be used at temperatures between 8°C and 35°C." Freyssinet Mndeni was contracted for the application of these Sika products.

Both Sika CarboDur Plates and Sika CarboDur BC Rods are used in a wide variety of applications, e.g. for increased load-bearing capacity, for repairs to structural damage, for service improvements or to rectify design or construction defects. These lightweight, non-corroding, products are highly durable with outstanding fatigue resistance and are very easy to install. Sika CarboDur BC Rods provide resistance to possible catastrophic events such as explosions and earthquakes.

Sika South Africa is confident that this project is the first of many more that will necessitate the application of Sika CarboDur BC Rods.

## About Sika AG

Sika AG, is a globally active specialty chemicals company, whose South African Head Office is based in Durban, along with branches in all major SA cities.

Sika AG, located in Baar, Switzerland, supplies the building and construction industry as well as manufacturing industries (automotive, bus, truck, rail, solar and wind power plants, facades).

Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing and protecting load-bearing structures. Sika's product lines feature high-quality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

Worldwide, local presence in 80 countries and some 15,200 employees link customers directly to Sika and guarantee the success of all partners. ■

**More information on Sika products and systems at [www.sika.co.za](http://www.sika.co.za)**

# Carnival City ponds restored to original glory

The Sun International casino and entertainment centre, Carnival City, in Gauteng, had problems with its large landscape feature ponds. In the absence of a successful solution, the ponds had been left empty for two years. Totalling 10,000 m<sup>2</sup> in extent, the water features have fountains, a 200 m-long by 7 m-high waterfall that cascades into a moat, planter boxes and tiled bund walls.

The original sealing system – a three-layer plastic product from America – failed due to the expansion and contraction of the pond structures not being taken into account. The ponds were leaking over 200,000 litres of water a week.

Mapei South Africa proposed a solution based on the use of its elastic cementitious mortar, Mapelastic Foundation. The proposal was accepted and the specialist waterproofing company, Stonehaven Projects, was appointed the main contractor to remove the existing waterproofing and install a new lining.

“It was a challenging project, which involved carefully removing all of the existing membranes and fibreglass,” says Kobus Uys, Director of Stonehaven Projects. “This revealed structural problems and poorly constructed expansion joints, but my team was thoroughly trained by Mapei South Africa and we had their excellent backup service whenever we needed it. The membranes had been installed with adhesive that had to be removed using high pressure water jets. We repaired substrate defects with Mapei’s Mapecem Pronto, a pre-blended, quick-setting mortar.”

Mapei’s Triblock P Priming System was spread onto the clean repaired surface and, while still wet, 0,5 Mapequartz was broadcast over the surface and allowed to dry overnight. Attention to the preparation of difficult areas is the secret to waterproofing success and the Mapeband SA joint preparation system was applied to corners and joins. This is a self-adhesive butyl rubber tape with alkali-resistant non-woven fabric bonded on the outer surface.

Two coats of the renowned Mapelastic Foundation mortar were then applied to the entire wall and floor surfaces. The large waterfall feature and surrounding moat were encapsulated in Mapei’s Elastocolor Waterproof Blue acrylic resin-based paint. Elastocolor paint is a highly protective, elastic product offering a crack-bridging capability and high resistance to water, chemicals and extreme weather conditions.

“Mapei waterproofing products are definitely the best!” adds Uys. “Once you have used them, you will not go back to the old conventional materials. We use many of the Mapei systems on our housing projects and know that when a strict application process is followed, a top-class result is assured. In the case of the Carnival City ponds, the outcome was that we could give Sun International a five-year guarantee.” ■

**More information from  
Candice Santana,  
Tel: +27(0)11 552 8476  
www.mapei.co.za**



The waterfall and ponds at the Carnival City Casino and Entertainment Centre prior to Mapei Waterproofing solution.

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# Builders Trade Depot now in Rossburgh!

The first Builders Trade Depot store, with the new yellow Builders branding has opened in Rossburgh. The store is centrally located in Durban on the corner of Solomon Mahlangu (Edwin Swales) and Chalmers Road and is close to major highways and the busy port area. The site previously traded as a Makro for more than forty years and is a well-known landmark in the area.

*Economic impact – creating new jobs:* 20 jobs were created in the community.

*The new store comprises:* A 4,200-m<sup>2</sup> trading floor; a 7,850-m<sup>2</sup> yard; a 1,600-m<sup>2</sup> truss and moulding manufacture area; and parking bays for 215 vehicles.

The Rossburgh store is significantly larger than any other Builders Trade Depot store in Kwazulu-Natal and was designed to enhance easy access and exit for customers as well as efficient movement and handling of stock and orders.

## Customer Focus

Builders Trade Depot offers services that speak directly to the building contractor, homeowner builder and serious DIY'er. It has been designed to offer maximum efficiency with a service offering that provides convenience and a project complete solution to the contractor.

In addition to customers being able to leave the store while having their orders processed, collection cages have been put in place so that call-in orders can be picked and isolated ahead of the scheduled collection time, saving customer's time and effort.

The contractor customers have a dedicated department and service counter that can assist them with their bill of quantities for projects and an experienced Key Account Manager is allocated to attend to their specific individual needs with regards to tender pricing, specifications and the supply of building and civil material.

The store also offers a customer area that is equipped with facilities for the contractor to sit and work on their business outside of their office. This space can be used in times when the



The spacious new Rossburgh store.

contractor needs to get something done in the event that they are away from the office, to meet with their stakeholders or to interact with industry staff while their orders are being processed.

## Product Range

Rossburgh is the first store to roll out the new Builders Trade Depot product range. This range comprises of a solid and complete offering focusing on phases 1-4 of the building process, which include foundations, superstructure, roofs and carpentry items. The store also offers a targeted range for the DIY enthusiast and home owner.

## Value-Added Services:

Services include:

- Building cost estimation
- Precision roof trusses design and manufacturing
- On-site measurements of roofs and additions
- Wooden doors manufactured to size in bulk order quantities
- Supervised installations of kitchen cupboards
- Cutting and edging of boards
- Cornices specifically designed in width and cut to size
- Manufacture of timber moldings and door frames in a purpose-designed moulding plant
- Deliveries as well as the option to either open a 30-day account, cash or deposit account

**Ordering of bulk aggregates is made easy with the new self-service cards in store:** The customer selects the product card of the item they want to purchase, takes the card to the cashier to pay and choose whether to collect or have it delivered.

**The Builders Money Centre:** The product portfolio includes: The Builders Card, Trade Card as well as Home Improvement Loans.

**Plascon Paint Centre:** The dedicated Plascon counter in the Rossburgh store, soon in all Builders Trade Depot stores, enables contractors to purchase directly from Plascon on their Plascon account and take the goods from Builders' Trade Depot's stock holding. The contractor is thus able to satisfy more of his building requirements from one central point, optimising efficiency.

**The Management Team:** The branch is managed by Andrew Savides, who has a qualification in construction and wide-ranging construction and building materials experience. Savides has been in the merchant side of the industry for 15 years – five of which have been with Builders.

With his competent team of Key Account Managers, you can be assured of a dedicated and trusted team in your corner to assist with all your building requirements.

## Trading hours:

Monday to Friday: 07:00 to 17:00  
Saturday : 08:00 to 14:00

**Builders Trade Depot Rossburgh contact number,  
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**[www.mypressoffice.co.za/BuildersWarehouse/default.html](http://www.mypressoffice.co.za/BuildersWarehouse/default.html)**

# Diamond grinding heads suitable for all materials

The South African division of Bosch Power Tools – a world leader in portable electric power tools and accessories – offers a wide range of diamond grinding heads that are ideal for all concrete grinding applications.

Bosch Power Tool SA Accessories senior brand manager Campbell Mhodi notes that the Bosch diamond grinding heads are ideal for use in concrete. “The best quality diamonds are used for the grinding heads, guaranteeing a high grinding performance and an excellent grinding head lifetime.”

There are several different grinding heads available, suitable for a variety of applications. Mhodi highlights that all of the diamond grinding heads offer vibration-free work thanks to the dynamic counter-balancing, which also protects the tool.

The Best for Concrete, Expert for Concrete and Standard for Concrete diamond grinding heads are suitable for use with concrete, basalt, bricks limestone and pavement slabs. Mhodi explains: “The various concrete diamond grinding heads are ideal for quick grinding down of thick concrete layers.”

The diamond grinding heads Best for Abrasive and Expert for Abrasive can grind a variety of materials, including concrete, asphalt, plaster and mortar. These grinding heads have two rows of segments for even grinding. The abrasive grinding heads are suitable for large-area removal of a variety of abrasive materials, however, they are not suitable for grinding hard materials.

The Bosch diamond grinding head Best for Protective Coating can be used when grinding thermo-plastic protective coatings,



slag stone, sandstone, pumice stone, and a variety of other stone and concrete materials, but are not suitable for large material removal of concrete.

This grinding head has been designed with wide segment spaces to ensure a low working temperature, thereby preventing the protective coating from rubbing off during grinding. According to Mhodi, the diamond grinding head Best for Universal Turbo is the most versatile of the Bosch diamond grinding heads. “This grinding head allows for fine grinding results for finishing work in natural stone and building materials,” he concludes. ■

**More information from Campbell Mhodi,  
Tel: +27(0)11 651 9600 / [www.bosch.co.za](http://www.bosch.co.za)**

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# Diba is committed to serving Africa

**D**iba Built Environment Solutions cc (DIBA) is a 100% Black female owned company, established in 2005. DIBA provides a total construction solution, including building according to customer requirements, developing Occupational Health and Safety standards, as well as ensuring compliance with the set specifications.

Director of Diba Built Environment Solutions, Nandipha Nqokoto, says: "As part of our commitment to environmental sustainability we render our service in a way that ensures optimal usage of natural resources, and minimises the built structure's impact on the environment."

DIBA is registered with the Health Professions Council of South Africa (HPCSA), National Home Builder Registration Council (NHBRC), Construction Industry Development Board (CIDB), Gauteng Master Builders Association (GMBSA) as well as the Institute of Safety Management (IOSM).

Nqokoto continues: "Our vision is to become world leaders in the Built Environment and we are committed to practicing in a manner that is green and sustainable, as is constitutionally required of all South Africans.

"Our mission is to give our customers peace of mind by offering them unparalleled customer service and ensuring compliance with the highest standards of safety as we construct healthy and environmentally friendly buildings."

Nandipha Nqokoto, DIBA's director, is a vibrant, driven woman who guarantees her clients enjoy peace of mind in every project she undertakes. She is a qualified Independent Environmental Health Practitioner who holds a B Tech in Environmental Health and in 2004, she obtained her B-Degree in Occupational Health.



Director of Diba Built Environment Solutions, Nandipha Nqokoto.

Over a period of 10 years Nqokoto has accumulated a wealth of experience, working for municipalities, provincial government and the private sector. Her broad understanding of the impact of buildings on the environment enables her to provide expert advice on the construction of green buildings.

She understands that for Diba Built Environment Solution to be a world leader, it must have broad technical knowledge. To achieve this, she regularly upgrades and adds to her qualifications.

In 2011, Khuthaza recognised her dedication, hard work and success by nominating her 'The Ambassador for Leadership'. Later that same year Khuthaza also awarded her the 'Business Woman of Year'.

Nqokoto believes in providing opportunities and experience for women who are new entrants to the construction industry. She understands the barriers to entry in this male-dominated sector and actively promotes equal opportunities for women in construction. As a result, she often invites new entrants on projects so that they can gain valuable practical experience on site. "For every project DIBA is involved in, we ensure that safety is never compromised. Instead of taking Occupation Health and Safety standards off-the-shelf, DIBA customises the standards to the specific requirements of each project. With DIBA at the helm, your projects are in safe, green hands," is Nandipha Nqokoto's assurance to clients.

## Focus on Africa

On moving into Africa, she comments: "It is a fact the world has become smaller and continues to drive Africa to be of an interdependent nature. This means that, as a continent, we are required to ensure a high level of self-sufficiency in terms of adequate and suitable infrastructure."

"The current investment in the industry, particularly in Southern, East and West Africa is a direct response to this. According to Deloitte's Africa African Construction Trends Report, 2013: "the three regions mentioned constitute 88% of the continent's construction sector contribution to the economy of the continent."

## Expansion

Nqokoto explains that DIBA is definitely looking to expand into East and West Africa in the near future. "We have a burning desire to contribute to ensuring that this exciting physical infrastructural development is not achieved at the expense of sustainability (in terms of construction safety as well as environmental preservation and conservation) through the application of sound technical methodologies. Our recent Enterprise Development partnership with Aurecon, one of the leading multidisciplinary contributors in the construction industry worldwide, will enable us to move towards realising this objective," she states.

"Diba BES's existence is acknowledgment that these two disciplines (safety and environmental awareness) are always coupled together to ensure and to recognise our financial, legal and moral obligation to our clients and the continent at large. We have achieved this over the past nine years through our range of construction, health and safety management services," Nqokoto concludes. ■

**More information from Nandipha Nqokoto,  
Tel: +27(0)12 67 656 1206 / [www.diba.co.za](http://www.diba.co.za)**

# Transforming the steel industry

**D**uvha Liswa is a steel and chemical company that supplies carbon steel, stainless steel and aluminium to the chemical, construction, mining, petro-chemical and power generation industries. It was established in 2009 by a husband and wife team, Pinkie and Freddy Mathaba, upon realising there was a gap in the steel industry which was dominated by White males.

"We believed there was an opportunity for our company to play a part and maximise the opportunities," says Pinkie. "We also wanted to establish a reputable company that would express its expertise and experience in the business world."

The forming of Duvha Liswa also came about as a result of the two realising that together they had combined extensive business experience and industry knowledge. Freddy previously worked as a general manager at Group Five Steel and Pinkie brought 16



*Duvha Liswa's chief executive, Pinkie Mathaba.*

years' experience of working for various companies. She started as a lab technician at an explosives company and rose through the ranks to become the company's business manager, overseeing the exports division. "This experience, combined with that of my colleagues, has been valuable in how we run our company, and has enabled us to recognise problems and deal with them in time," Pinkie adds.

Duvha Liswa also supplies the mining sector and manufacturing plants. Their factory in Witbank, Gauteng produces fabricated steel such as casting items, staircases, handrails and also steel structures manufactured to the client's specification.

To stay on top of the game, Duvha Liswa keeps up with trends by conducting periodic market research. This helps the company create products and services that are relevant to the market and offer a solution. Furthermore, through market research the company realised that steel is an important component of all construction projects and servicing that market provided a chance of building a sustainable business that would survive for many years. This, together with the opportunities presented to small enterprises by Government procurement policies, played an integral part in establishing Duvha Liswa. The company's client list includes among others, Group Five, Murray & Roberts, Medupi and Kusile Power Station projects, the Gauteng Department of Education, the Department of Correctional Services, Civcon and Foskor.

At the helm of Duvha Liswa as chief executive, Pinkie Mathaba models herself after renowned South African businesswoman Dr Anna Mokgokong, for succeeding in building a company that prides itself in being a sound and successful entity in the past five years. ■

**More information from Tel:+27(0)11 392 9860  
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Rocla is a subsidiary of ISG, a leading supplier of innovative infrastructure products to the construction and mining markets in Southern Africa.

# Mabisto Hlongwane – a South African who inspires

**M**abisto Hlongwane was born and raised in Malamulele, Limpopo. At 10 years old he was sent to live with relatives in Hammanskraal, Pretoria. Though both families were excruciatingly poor, migrating brought him closer to a world of opportunity.

Moving to Alexandra, he attended school, but failed dismally – having succumbed to negative influences. His life changed when Stephans, a carpenter at Group Five living in Alexandra, became his mentor. Stephans saw a troubled boy and took Mabisto under his wing.

He started as a general labourer at Group Five under Stephans – working in this capacity for four years before becoming a concrete hand. For the next 20 years, he worked in a number of divisions at Group Five.

After a spell in Namibia in 1998 doing shuttering and setting out, Mabisto returned to South Africa, continuing this work from 1999 to 2004.

In 2004 Group Five sent him to Algeria to build houses for the military base. While in Algeria he learned French through Group Five's provision of on-the-job schooling. Mabisto mastered French to the extent that he could communicate well with the Algerian labourers.

When Mabisto was instructed to work on Growing Up Africa's Devland Soweto Community Education Campus, he never knew it would change his life.

Studying the design he realised that this project was different from anything he had ever done before, fitting between for-profit projects and not-for-profit projects.

He knew his life had changed that first day, but it wasn't until Group Five completed their part of the foundation work and he was about to move to another Group Five project, that he realised he had to do more.

Recognising his part in uplifting lives, whole communities, empowering and training, Mabisto had never believed he could make such a significant difference to so many lives, as just one individual.

He says going to work each day on the Devland Project was different. It was important for him to work with local unskilled



Mabisto Hlongwane and Deborah Terhune, founder of Growing Up Africa.

## Mabisto attributes the quality of his life and career to:

**Stephans** – being thankful every day that Stephans came into his life and with a strong hand, led him to a better life.

**Group Five** – for the stability and job opportunities.

**Learning the best lesson ever** – concentrate and focus on improving his and his family's lives.

labour – giving back so much of what he has learned over his 20-year career. He found this immensely rewarding, but the project made him grow too.

Training 22 labourers on the job, imparting his knowledge, project managing, working with the Growing Up Africa professional team, interfacing with engineers and architects on site, attending site meetings with the professional team and building a complex design, has shown him that “there is more.... there is always more to learn.”

He says, the foundation work was challenging as well as inspiring. The design challenged him, but it also extended him as it was more complex than the foundation work he had done previously on any job.

He also learned a great deal from working on a social responsibility project with a non-profit client, handling challenges with scheduling, performance, communication, and community liaison around unforeseen issues.

Building lives and building the Devland campus inspired Mabisto. He believes these projects will change how people interact with one another, bringing a sense of solidarity amongst so many different African groups. It will teach communities how they can build and improve their infrastructure and facilities they desperately need themselves, long after Growing Up Africa has left for another project.

He emphasises that education is the key and is happy to be part of building an education campus, one that will stress the importance of education in every community and village across the whole of South Africa.

This project took his skills to another level of awareness, a level he could never have anticipated.

There is a happy ending to Mabisto's story. He is grateful for the opportunities Group Five has afforded him, but knows that furthering his career has been hampered by his lack of education. While he is adept at spoken communication, he cannot communicate through the written word. He will approach Group Five HR for assistance to complete his matric, enabling him to seek other opportunities within the company.

Mabisto is adamant that he will continue with social responsibility projects, even after retirement, offering his services as a volunteer on Growing Up Africa's professional team. He has earned the place of founding member of the Growing Up Africa professional volunteer registry. ■

**More information on Growing Up Africa from Deborah Terhune, email: [deborah.terhune@gmail.com](mailto:deborah.terhune@gmail.com) [www.growingupafrica.co.za](http://www.growingupafrica.co.za)**



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# CAUTIONARY NOTICE

## MISREPRESENTATION BY MR PAUL HARTMAN, A PREVIOUS EMPLOYEE OF A.SHAK PERTAINING TO RELEASE AGENTS

A.SHAK (Pty) Ltd was established in 1958 as a manufacturer of Release Agents to the Construction and Pre-cast Industry.

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It has come to our attention that a former employee, (Mr Paul Hartman, ID 6812235255082) who now has a company called "Shutter Release (Pty) Ltd" and who is currently in the employment of a leading Construction Chemicals Company as a "Technical Advisor" is claiming that he was a Shareholder and Director of A.SHAK and that he formulated our Release Agents and therefore these formulations are his property.

### **THE TRUTH IS:**

Mr Paul Hartman never was nor could he ever have been a Shareholder or Director of A.SHAK because he was Sequestered by a court of law for a business he previously owned that was unrelated to our Industry.

Mr Paul Hartman was employed by our former Western Cape agent, Solo Oils (Pty) Ltd, from 2007 until 2011 at which time A.SHAK opened a branch in Cape Town and as a result the agency fell away.

Mr Paul Hartman was then permanently employed by A.Shak as Branch Manager until he resigned as a permanent employee in June 2013 and worked as a freelance representative until January 2014.

Mr Paul Hartman is currently manufacturing release agents for the company he works for which he claims are the same as ours and he further claims that the formulations are his - which is certainly not true.

### **INTELLECTUAL PROPERTY:**

In the interest of protecting our intellectual property and to safeguard the integrity of our company as well as to protect you, our valued customers, we invite members of the industry that may have been confused by Mr Hartman's claims, to contact us for clarity.

Contact Cindy Engels Tel: 011 822 2320  
Email: cindy@ashak.co.za

# Industry generosity makes Soweto Community Education Campus grow

By David D' Oliveira



Architect's rendition of the Devland Community Education Campus.

The Devland Community Education Campus, in Soweto is growing thanks to the collaboration of the building industry with the South Africa- and US-based non-profit organisation, Growing Up Africa (GUA).

The building is primarily funded through pro bono professional services and in-kind sponsorships from national and international construction companies and suppliers to the building and construction industries.

"As part of its commitment to corporate social responsibility and investment, the South African division of global engineering consultancy SMEC has provided its professional services, as lead civil and structural design engineers, on a pro bono basis," explains SMEC structural engineer Effort Mokoena.

He says SMEC started offering its services in September 2012 during the concept stages of the project and has been actively advising the architects on the civil and structural design requirements of the education facility building.

Bulk earthworks on site started in late September 2013 and were completed in January this year. "We are currently constructing the superstructure, which includes construction of the foundations and raising the support columns for the concrete roof," states Mokoena.

"GUA completed the site establishment work, which started in October 2013. Engineering and infrastructural company Group Five provided the foundation work and construction



The Devland community clearing the site.

and engineering group, Basil Read, is contracted to do the bulk earthworks at the site. Construction company ProBuild were contracted as the site surveyors and the company also set out the building location," says Mokoena.

The multipurpose education campus covers about 2,000 m<sup>2</sup> and will include a main auditorium, classrooms, a lecture hall, a management office, ablution areas and a cafeteria with a kitchen and dining area.

He notes that a major cement producer and supplier company indicated from the project's start that it wanted to be involved and is sponsoring substantial amounts of concrete. SARMA and a number of readymix companies are also contributing.

The roof will be concrete. "On a commercial project, the roof would be either concrete or steel, depending on the architect's vision. However, we had to consider which materials would be sponsored before we could complete the design."

"We intended to deliver the project at the end of this year, as the construction phase of the project should have taken eight to ten months. However, as the project relies entirely on in-kind sponsorships for construction of the building and all materials needed, we expect to complete the project next year."

Mokoena adds that, because the building has a concrete frame and roof, the main materials needed have been reinforcing steel, formwork, scaffolding and concrete. "We needed 1,661 m<sup>3</sup> to complete the project."

Updating progress, Deborah Terhune of GUA said: "Currently we are completing the foundation to 3-m column height with a projected completion of the columns and slab by the builders' holiday in December. At that stage we will be 50% complete and are looking at a huge celebration in July 2015 that will also honour Mandela's legacy of education for all."

Mokoena notes that the project is receiving in-kind sponsorship from a very wide range of companies, including cement companies Lafarge, IDM Safika as well as insulation specialists Rifoam.

The building has a 6-m-high, double-glazed glass façade, which is being sponsored by glass and aluminium fitters Govender's Glass & Aluminium. Double-glazed glass will improve temperature control and reduce the energy consumption of the building.

To further improve temperature control, the perimeter of the building will have an ecowall, which will comprise over 140,000 sand-filled bags stacked as infill. Green building solutions

provider African Olive Concepts, which has been involved in the project since 2012, designed the wall.

Several architectural firms also provided their services free of charge, such as New York-based William Reue Architects, for concept architecture; lead architects Boogertman & Partners; and project architect Mark Laburn Architects.

Electrical works are being sponsored by Spoomaker & Partners, while fire-protection services are being sponsored by Pontins. Norval Wentzel Steinberg are providing all quantity surveying services the project is managed by Metrum Project Management.

South African steel company Aveng Steel will supply 99 t of structural steel elements and steel reinforcement. Waco Africa's divisions - Formscaff, Sanitech, SGB-Cape and Abacus Space Solutions - are supplying formwork, scaffolding, ablutions and site containers respectively.

The daily construction materials and consumables are being supplied by retailer Builders, brick manufacturer Heidelberg Clay Bricks & Sand and materials suppliers Gomes Sand and Drift Super Sand.

The construction plant is being sponsored by Group Five Construction, Barrow Construction, EW Tools, Barloworld Equipment Africa and Active Hire.

Sanitary and piping systems solutions provider Geberit and drainage solutions manufacturer Saint-Gobain Pipelines are providing the wet services materials. Waterproofing products manufacturer Penetron is providing the waterproofing materials. Finishes will be sponsored by Assa Abloy, Hufcor and Saint-Gobain Gyproc. "In addition, there is an enormous number of companies whose generosity is providing us with services and



*Constructing the foundations and raising support columns for the concrete roof.*

materials of all kinds. Space does not permit mentioning them all, but I owe them so much and my thanks go out to them all," concludes Deborah Terhune, founder of Growing Up Africa. ■

**More information at [www.growingupafrica.co.za](http://www.growingupafrica.co.za)**

*The article first appeared in Engineering News, 1 August 2014 and has been updated with comments from GUA's Deborah Terhune.*



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## PPC partners with provincial government in landmark road upgrade



North West Premier, Supra Mahumapelo and executive for special projects, Yogesh Narsing

In order to stimulate the local economy and empower the lives of communities, PPC Ltd has entered into a landmark partnership with the North West and Limpopo provinces as well as the Roads Agency Limpopo (RAL) in the proposed upgrade of an 82-km secondary road stretching from Koedoeskop to Dwaalboom.

This joint venture between PPC, the Limpopo and the North West provincial governments, and RAL is set to dramatically improve social and economic conditions in the local community. This road is the only point of access that community members have to get to work, to the shops, and to send their children to school.

The project will include clearing and grubbing, construction of traffic deviations, removal or cleaning of existing culverts and fencing, as well as basic earthworks, layer works, surfacing, road markings and signs.

PPC, in collaboration with the governing parties in the North West and Limpopo provinces will be contributing a substantial amount to the project with the ultimate aim of improving the quality of life of the surrounding communities. RAL will be contributing the total percentage of the remaining amount required to complete the project.

On October 1, 2014, all parties convened for the official signing of the project at the Department of Public Works in Pretoria. The Premiers of Limpopo and the North West province were in attendance together with MECs for Public Works and Roads and Infrastructure for both provinces and representatives from PPC and the Roads Agency Limpopo.

Limpopo Premier Chupu Stanley Mathabatha said at the signing ceremony, "We may have provinces but we are one and we need to cooperate with each other. This road links Limpopo with the North West province and fortunately PPC came in to help us take this country forward.

"Sections of this road are still largely made of gravel, which are riddled with potholes and dongas. During the rainy seasons, it becomes impossible to traverse, leaving many community members unable to get to work on time and maintain gainful employment."

Training and Development Officer at PPC's Dwaalboom plant, Asaph Ngoepe says, "This road is going to have a huge economic and social impact. Sure it will also help the employees at our Dwaalboom plant, but also the thousands of others who need to travel this road on a daily basis to get to work, see relatives, or take their children to school."

Ward Councillor TJ Moeng for the Mogalaneng community comments: "The community is over the moon about this project." He says that the road has been a long time coming. "For us, this road is so important because the buses and taxis travel on it to the mines and plants, and people use it to go to the shops and schools. Without this road there would be no life. Now we can unlock the economic potential of our community. This is good for everyone." ■

**More information from**  
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**[www.ppc.co.za](http://www.ppc.co.za)**



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# Cargo Carriers – innovation meets B-BBEE

*Adding value through enterprise development in the transport and logistics industry*

**B**-BBEE is a controversial subject. Almost no-one is neutral on the subject. In a refreshing example Cargo Carriers and Lafarge have concluded a deal which supports the real spirit of the concept. And innovative thinking is at the heart of the solution. In a logistics industry where optimisation, high levels of SHEQ and critical mass are often required to manage productivity up and costs and risk down, these two organisations have found a way to achieve this.

Since 2003, Cargo Carriers have introduced owner drivers to contracts where opportunities presented themselves to create enterprises that could flourish under their guidance. Cargo Carriers source the business opportunity, provide the benefits of the management systems used in their own business, and allow these businesses to flourish with mentorship and training until they are self-sufficient.

Thus the Lafarge owner drivers are not subject to the same risks and failure rates as stand-alone new businesses. The most recent of these Owner Driver Schemes started discussions in 2012, when Lafarge saw an opportunity to develop an empowered enterprise to provide a transport service to supply increased volumes of Lafarge bagged cement products in the Free State, Northern Cape, and North West Province. As an existing Cargo Carriers customer, they approached the company for assistance with an Enterprise Development initiative.

"This is a slightly different version of our owner driver scheme because, till this contract with Lafarge, owner drivers were contracted directly to Cargo Carriers with a service agreement – we assisted them with everything, allowing us to claim for preferential procurement and enterprise development. In this instance the owner drivers are contracted directly to Lafarge and Lafarge benefits from the B-BBEE benefits of the scheme," says John Sprenger, Cargo Carriers, owner driver manager.

Cargo Carriers appointed the owner drivers from within their own company to ensure that the drivers had the right and appropriate qualifications.

The drivers also underwent intensive training covering contractual issues, operating parameters, accounting matters, budgeting principles, business management and communication. One of the key conditions for participating in the scheme is the requirement to comply at all times with Lafarge South Africa's rigorous safety standards for driving as well as vehicle maintenance and upkeep.

To further increase their B-BBEE rating, the owner drivers appointed black female partners. Because of this structuring, Lafarge can claim at three different B-BBEE levels – the overall level, the EME/QSE level, and the black female shareholding level. This cooperation between Lafarge, Cargo Carriers and the owner drivers team has no losers.

"We believe our Owner Driver Scheme is a win-win initiative. It is about a continuing partnership; where the drivers are empowered to determine their own success and future, while also leading to increased productivity and enhanced service levels," says Tim Nelson, Lafarge Cement's supply chain manager.

With the Owner Driver Scheme and its evolution to suit the specific needs of Lafarge, Cargo Carriers proves that providing innovative supply chain solutions can go beyond performance and safety, to deliver value to their customers in other areas such as B-BBEE solutions within the transport and logistics industry. When innovation meets B-BBEE, the results are truly transformative. ■

**More information from Elmarie Ollewagen,  
Tel: +27(0)11 485 8768 / [www.cargocarriers.co.za](http://www.cargocarriers.co.za)**



*Lafarge owner drivers from left: Ezekiel Lechoenyo, t/a Skybo Investment; Mokotedi Dithake, t/a Modibana Trading Enterprise; Keliby Rapoo, t/a Kelyflo Trans; Khudu Mere, t/a Lebo Mere Trading Enterprise.*



*Participants in the scheme must comply at all times with Lafarge SA's stringent safety requirements for driving and vehicle maintenance.*

## Unique video-based, interactive safety training

Johannesburg-based KBC Health and Safety has developed a first-of-its-kind video-based safety training that interactively explains basic health and safety principles in the workplace, while covering OHSAS 18001 standards.

KBC innovation manager, Natalie Pitout, explains that a video-led presentation is more inviting and easily understandable for trainees, when compared to the standard slide-based presentation. "The video is more visually appealing, and provides a more hands-on approach to safety training. What's more, it can be paused at any time to encourage regular interaction and participation," she explains.

In order to make the training as engaging and user-friendly as possible, the fully-narrated training video focuses on a day in the life of the protagonist 'Joe', and KBC trainers use a spaza shop analogy to introduce the 12 OHSAS 18001 standards to the learners in basic language, as many people in this target audience do not have matric.

"At the end of the one-day course, learners will be able to describe OHSAS 18001 standards, explain employer and employee duties with regard to occupational safety and health in the workplace, and explain the general safety rules in the workplace. What's more, they will understand the use and application of personal protective equipment in the workplace, the importance of good housekeeping, as well as



*KBC innovation manager, Natalie Pitout.*

the application of emergency procedures in the workplace," says Pitout.

The KBC basic safety training course also features an organisational model for continuous improvement, which is made up of four sections, namely; plan, do, check and act. Pitout adds: "The 12 OHSAS 18001 standards are introduced to the learners, and explained in more detail by demonstrating how they all fit in to running the spaza shop."

The new basic safety training course was launched by KBC in May 2014, and Pitout says that the company has received an overwhelmingly positive response from customers. "Mining companies form the bulk of our client base, and they have displayed

their satisfaction in the new layout of the training programme, which serves as a value-added offering in a constantly changing working environment."

Pitout is confident of future success. "Given the success of the programme in the mining sector, I believe that there is a strong possibility for growth in this market. The construction industry also holds enormous potential, and we are placing a strong focus on penetrating this burgeoning market through the development of tailor-made solutions to suit each specific client," she concludes. ■

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# Atlas Copco South Africa hosts Dealer Driver's License Training

Global Engineering Group, Atlas Copco, believes that excellent after-sales service support from a team of experts is essential to ensuring the correct product specification to meet a particular application. "Good service support amplifies the value of a quality product and this forms the fabric of our turnkey product and service solutions which is fundamental to sustainable productivity," according to Atlas Copco Business Line Manager Construction Tools Division, Neville Stewart.

"The common denominator," says Stewart, "is training – in-house, customers and dealers. It is far easier to make recommendations when you know a product inside out and imparting product and service knowledge to customers will ensure that they use the product with confidence."

Regular training intervals are essential to ensuring accurate and updated product knowledge and to remain in step with current customer needs and applications. Two additional drivers for on-going training is the constant development of new products and the appointment of new sales people.

Fully fledged training on Atlas Copco's product portfolio takes place every two to three years. The training is based on a similar concept to the bi-annual training offered at the

company's Academy in Sweden. The course duration is normally four days with a test on the fifth day; certificates are issued to all successful participants.

The theoretical part of the course takes place at the Atlas Copco Academy and practicals are done in the yard at the company's Johannesburg headquarters. Stewart explains that the training is led by the respective product managers from the division and the theory and hands-on practicals are equally split with each product line.

According to Stewart, all Atlas Copco dealers who have signed agreements automatically qualify to receive this training and the recent course was attended by 25 people who represented nine dealers, including recently appointed Atlas Copco Construction Technique dealer, Dynamic Air based in the Free State.

Dynamic Air was established in 1999, primarily as a rental house delivering air and power solutions with only some equipment in the mix. "This changed after we became a distributor for Construction Technique in 2013," explains Raymond Herholdt, Purchasing Manager at Dynamic Air. "We have since spent a lot of time on marketing the equipment and maintenance/repairs thereof. Our customers represent mainly the refinery, sandblasting, refractory and industrial cleaning industries and our biggest customer demand is rented air power, mainly for manufacturing processes. So our dealing with Atlas Copco was inevitable."

"One of the reasons for staying with Atlas Copco since we first purchased an Atlas Copco compressor in 2000 is the age-old way of thinking – you get what you pay for. Atlas Copco provides world-class support, whether sales or technical and the company's ability to deliver imported parts/spares within 10 days is key to keeping customers happy. Some of our Atlas Copco compressors have been operating in abusive conditions, accumulating close to 12,000 problem-free hours; we have not sold/written off a single compressor to date. We also rebuild our old units in-house, from the engine up, and can continue doing so, secure in the knowledge that broken parts can always be obtained from Atlas Copco."

Herholdt says he gained irrefutable value from the training. "Apart from working with the Productivity Solutions, it is absolutely fantastic to have the Product Line Managers doing a presentation, sharing their expertise and being able to answer all our technical questions."

Herholdt agrees with Stewart that product training is essential for effective sales. "Although I was joined by only one of our newly appointed sales representatives, I believe that, numbers permitting, it is crucial for the entire sales team to attend these courses so as not to miss out on technical aspects and selling points."

Commenting on the practical training, Herholdt says that you can only learn so much from the Construction Tool Facts Book and brochures. "Actually seeing and operating the units massively improves the sales pitch – there are small benefits not indicated in the literature which make for a very impressive demonstration. Furthermore, once you see how all the equipment complements each other, it opens your mind to look for opportunities that would otherwise have been missed when, for instance, just driving to and from work every day," ends Herholdt. ■



*Atlas Copco highlights the importance of regular training intervals - essential for keeping in step with accurate and updated product knowledge to meet customer needs.*

**More information from Kathryn Coetzer,  
Tel: +27(0)11 821 9019 / [www.atlascopco.com](http://www.atlascopco.com)**



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# Never a dull moment for Britain's concrete cows

*Milton Keynes' six ruminants are definitely not sacred, writes Jan de Beer*

For 36 years, the British town of Milton Keynes, has been home to a small herd of concrete cows which just cannot stop making news.

Milton Keynes is a fast-growing wanna-be city in the UK's Buckinghamshire, situated somewhere between Oxford and Northampton. The town's famous concrete cows – three cows and three calves – were bequeathed to it by Canadian sculptor, Liz Leyh, at the end of her three-year stay in the town as 'artist-in-residence'. Artist-in-residence programmes allow artists to stay and work elsewhere 'for art's sake' and Liz, as a 'leaving present' created the six cows in the local museum using scrap materials, with fibre-glass reinforced concrete as skin. The herd was painted black and white in the style of Friesians, and placed in a small grassed area – the kind of place where you might expect to see cows. There are paths close by for walking and cycling, and a river bank for picnicking, so the cows have over the years become beloved, quirky residents of MK. (As this is South Africa, I suppose it best to avoid confusion and not abbreviate the name of the town again...).

Anyway, in the 36 years since they were left to graze in Milton Keynes' tranquil Bancroft Park, the cows have had to endure the most adventurous lives thanks mainly to good old vandalism: deeds that, although illegal, were at times oddly creative. Various gangs of inspired vandals have, for example, painted the cows pink, transformed them into zebras, painted pyjamas on them, covered them with graffiti at the time of Mad Cow Disease, and even beheaded one of them (it was repaired afterwards). Frisky university students placed them in 'compromising positions' - which must have resulted in family picnics at the river producing some awkward questions from junior for a while.

Bizarrely, one of the concrete cows was once also kidnapped and held to ransom – this called for real determination if you consider that the concrete sculptures weigh about 1,5 tons each. Then, two years ago – in the spirit of Halloween – vandals created a really scary dairy by giving the herd a skeletal look.

So the concrete cows, through no choice of their own, are now UK celebrities. Some locals are delighted that it brought fame to Milton Keynes: one business, I read, is doing a roaring trade selling mini hand-painted concrete versions. Other residents are embarrassed ("bugged", one lady called it) when people say to them: "Oh, you are from Milton Keynes. You have concrete cows there, don't you?" – as if that was the only attraction in a town that aspires to become a city. Back in Canada, Liz Leyh herself does not mind the regular revamping of her concrete creations at all and thinks it's all rather fun. The local council, which has to fork out about R40,000 to repair the aftermath left by each paint posse, remains less amused.

But the Mayor was probably as happy as a cow chewing the cud when his cows helped put Milton Keynes on a highly-respected, global cultural map this year. Even London's Daily Telegraph wrote about it when in June, two of the cows were invited to a VIP vacation in Italy. As part of Britain's contribution to the 2014 Venice Architectural Biennale, they were stationed on the steps leading to the British Pavilion in Italy's most romantic of cities. Watching the gondolas glide past, the contented cattle welcomed visitors to "A Clockwork Jerusalem", an exhibition illustrating Milton Keynes' development as part of the history of Britain's post-war towns.

Bet those two cows had a lot to tell an envious herd when they got back to Bancroft Park. ■



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