

CONCRETE

Journal of the African Cement and Concrete Industry

trends

VOL 19 No 3 August 2016



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CONCRETE trends

Volume 19 No 3 August 2016

CONTENTS

Message from Gill Owens the editor	2
Industry News	3-6
Association News	7-11
News from Africa	12-15
Cover Story	16-17
Art & Architecture	18-22
Precast Concrete	24-31
Sustainability	32-36
Projects	38-50
Formwork	52-61
Cement	62-64
Readymix	66-73
Quarrying	74-77
Products & Services	78-85
Safety	86-87
THE LAST WORD	88

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Cape Town: 11-12 August 2016

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16 | COVER STORY

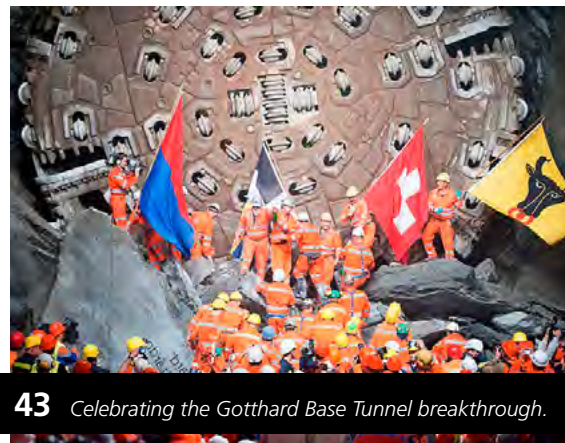
CONCRETE trends
Journal of the African Cement and Concrete Industry
Vol. 19 No 3 August 2016



Renico Plant Hire's
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trucks are robust,
reliable and safe.



21 Zaha Hadid's Messner Mountain Museum, Italy.



43 Celebrating the Gotthard Base Tunnel breakthrough.

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Building 'green' now quantified and coming into its own

"But it increases the project cost so much," is the long-standing complaint about going the 'Green Building' route. Well, as it turns out, not so much.

A new report, *Green Building in South Africa: Guide to Costs and Trends Report*, convincingly debunks that myth, and does so for the very first time with specific reference to South African costs.

Compiled by the Green Building Council South Africa (GBCSA), the Association of SA Quantity Surveyors (ASAQS) and the University of Pretoria (UP) and released in mid-July, the report reveals that the average cost premium of building green over and above the cost of conventional construction – or green cost premium – is a mere 5.0% and can be as low as 1.1%.

The study includes cost data on 54 Green Star SA office buildings certified through the GBCSA Office v1 tool up to the end of 2014 and shows for the first time that green buildings can be built for a negligible premium – between one and 10% – and that this premium is declining.

The study analysed the many factors affecting costs, and it comes as no surprise that the green cost premium goes up as the Green Star SA rating increases – from 4.5% for 4-Star rating to 10.9% for a 6-Star rated building. There are also substantial cost benefits for bigger buildings (9,3% for $\geq 5,000$ m² to 2.6% for buildings over 50,000 m²).

Manfred Braune, chief technical officer of the GBCSA says the study was undertaken to analyse the actual cost premium of building green in South Africa, and challenge the belief that green buildings cost much more than conventional building. "South Africa has seen exponential growth in certified green buildings, from the first Green Star SA building in 2009 to the 165th in June 2016. Despite this, there are many more buildings that could be going green but are not.

With the well-documented savings to be achieved in life cycle costs for including 'green features' in new or refurbished buildings, the question is why are more buildings not going green? Is our construction industry still under the mistaken impression that it would cost so much more, or are we just too lazy and content to 'do what we know and ignore the new'?

It is my belief that we are neither – that our industry can embrace the new, introduce innovation and, in fact, set new boundaries. There is evidence aplenty that we can – and hopefully we will rise to the challenge to do so in increasing numbers.

For more information and to view the report, please visit www.gbcsa.org.za/knowledge/reports/

Gill Owens, Editor

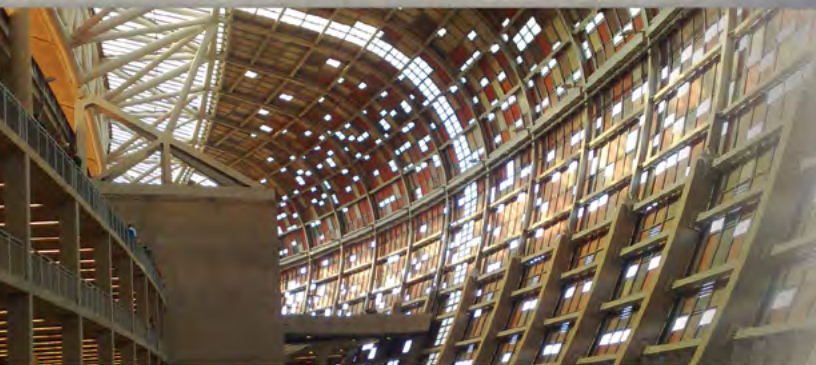


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Chryso Group acquires 20th subsidiary as S.A. operations celebrate 20th anniversary



Manila, the fast-growing capital of the Philippines, where the Chryso Group has now acquired new production facilities.



Norman Seymore, vice-president of the Chryso Group internationally and CEO of Chryso Southern Africa.

The Chryso Group has acquired its 20th subsidiary with the take-over of a major player in the Philippines construction industry.

Chryso Southern Africa, which includes a.b.e. Construction Chemicals, is this year celebrating 20 years of operations in South Africa.

Norman Seymore, vice-president of the Chryso Group internationally and CEO of Chryso Southern Africa, says the latest member of the Group is Philprime Global Corporation. Based near Manila, the company was established 47 years ago and has become a key player in the building sector in the country.

"Philprime offers a wide variety of products and services for the cement and concrete markets in the Philippines. The company has supplied products for luxury high-rise developments as well as for

strategic Filipino power generation plants. Philprime became a listed company in January 1990.

"Filipino customers will benefit from the expertise and product range of a respected local company, augmented by the Chryso Group's innovative technologies and large range of services, as well as techno-economic support, laboratory and site testing, and many other services Chryso offers."

Seymore says the Chryso Group expansion reflects its development strategy of investing in high-growth countries. The Philippines' construction sector is booming and the government plans to increase its infrastructure spend from around 3.1% of GDP last year to 5% in 2016.

The Philippines Construction Market Report expects the construction industry to grow by as much as 46% this year and industry analysts have predicted that around 1.5 million square metres of new offices will be built in the Philippines by the end of 2016.

The new acquisition follows acquisitions in Sri Lanka (2014) and Qatar in 2015, coupled with substantial growth in Africa, which includes establishing production facilities in Algeria late last year. "There is no doubt that Chryso is in the midst of an exciting growth phase worldwide and that Chryso Southern Africa is part of a global giant in the field of construction chemicals," Seymore observes. ■

More information from Norman Seymore, Tel: +27(0)11 395 9700 www.chryso.com



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World's most significant competition for sustainable design now open for entries

The 5th International LafargeHolcim Awards seeks leading projects of professionals as well as bold ideas from the Next Generation that present smart solutions for cities and the built environment.

The competition identifies the ideas with the highest potential to tackle today's challenges to increasing urbanisation and to improve quality of life. Projects and concepts from the fields of architecture, landscape architecture, urban design, planning, technology, and civil and materials engineering are eligible to be entered online at: www.lafargeholcim-awards.org

The competition's main category is open to architects, planners, engineers, students of related disciplines, project owners, builders and construction firms that showcase sustainable responses to technological, environmental, socioeconomic and cultural issues within contemporary building and construction. Projects must have reached an advanced stage of design, have a high probability of execution, and may not have started construction before July 4, 2016.

Participants up to the age of 30 years of age can also submit visionary concepts and bold ideas in the competition, irrespective of the probability of actual implementation of the project: the Next Generation category specifically seeks 'blue-sky' solutions by students and young professionals.

"The LafargeHolcim Awards have not only brought awareness, but have also raised the standard of how we deal with sustainability."

Alejandro Aravena, Partner Architect at Elemental, Chile. LafargeHolcim Foundation Board member since 2013. Pritzker Prize laureate 2016.



The 5th International LafargeHolcim Awards competition closes for submissions on March 21, 2017. ■

More information at www.lafargeholcim-awards.org

SA Mint's new collectable coin showcases a local harbour innovation



The South African Mint recently launched a sterling-silver R2 Crown and 2½c Tickey as part of its South African Inventions collectable coin series.

The coins featured a series of dolosse – concrete blocks in complex geometric shapes that weigh up to 20 tons and are used to protect harbour walls from the erosive force of the ocean during storms.

"The two coins come with a remarkable history and heritage. Under the new theme of South African Inventions, the R2 Crown and 2½c Tickey will offer coin collectors a lifetime of appreciation," said South African Mint product developer Richard Stone.

He explained that the reverse side of the R2 Crown depicted people standing on a harbour wall, protected by

a number of dolosse. It also showed a single dolos with the denomination '2½c'.

"Its obverse side features South Africa's coat of arms, the year 2016 and the words 'South Africa' in all nine South African official languages, as well as a protea," he said.

The set, packaged with a miniature sterling silver dolos, is a source of pride in South African innovation, as the dolos "put South Africa on the map when it comes to harbour protection across the globe."

"The dolos was developed by East London harbour engineer Eric Mowbray Merrifield and draughtsman Aubrey Kruger, whose images are both included on the coin," he said.

Stone pointed out that the coin was the very first to be manufactured by the South African Mint to contain shadows. "We used the latest laser technology to achieve this; it helps create subtle nuancing that has never been done [by the South African Mint] before," he said, adding that the process of including shadows on the coin was extremely labour intensive.

He said the coins took six months to manufacture and were an enormous source of engineering pride, showcased by the South African Mint for the first time.

"The coin is a great investment in craftsmanship and artistic integrity that will only appreciate in value," he stated. ■

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moladi technology to fast-track construction of court buildings in Tanzania

While the Tanzanian public awaits the much talked-about and the long-awaited special courts to try corruption and economic sabotage suspects, the chief justice has assured the public that the government is, however, working to build more courts across the country to improve service delivery.

Figures from the High Court of Tanzania show there were 3,963 wards and 139 districts across the country in addition to 960 and 27 court buildings for primary and district courts respectively.

This means there is a deficit of 3,115 courts across the country. "Court buildings are in a bad condition. We have been forced to close many buildings that were previously being used as courts since they don't meet the requirements," the chief justice told reporters.

Othman added that the government has allocated 24 billion/- to improve the courts' infrastructure. "The judiciary is also working with Ardhi University and National Construction Council in a pilot project using moladi technology to fast-track construction of court buildings".

He said the pilot project is now being carried out at Kibaha, Kigamboni, Kawe, Kinyerezi, Mkuranga and Bagamoyo to examine how effective and cost-effective the technology can be for eliminating the backlog of court buildings.

While conventional construction methods take more than 180 days (minimum), moladi technology is projected to take less than 76 days for a structure with a 1,168-m² floor area. The Judiciary's civil engineer explained that when the technology is applied, it has the potential to cut down costs by 50%.

moladi is a unique housing solution that combines a reusable, patented, recyclable, lightweight plastic injection moulded formwork system with a SABS-approved lightweight aerated mortar mix which produces a cast-in-situ, steel-reinforced monolithic structure.

The moladi formwork components are fully interlocking and are assembled into easy to handle panels which are configured into a full-scale mould of the desired structure. The formwork panels are joined to form the external and internal wall cavities and all the steel reinforcing, window and door



moladi CEO, Henni Botes.

block-outs, conduits, pipes and other fittings are positioned within the wall cavity to be cast in place when filled with the moladi mortar mix.

The wall cavities are filled simultaneously with an SABS approved mortar mix which contains, cement, water, river sand, and moladiADMIX. The special mortar mixture produces a fast curing aerated mortar which flows easily and results in a wall that is waterproof and possesses good thermal and sound insulating properties.

After the wall cavities have been filled with the mortar, the mortar is left to set overnight and the formwork panels are removed the following morning to be re-erected on the next foundation. The wall has a smooth and flat finish that does not require any plastering, beam filling or chasing.

All moladi structures have steel reinforced internal and external walls. The reinforcing design is specified by an independent structural engineer, who independently certifies the structure after construction is completed and the final inspections are carried out. The result is a fast track cost effective and transferable construction technology that is amortized over 50 re-uses, which reduces the cost of construction and transportation significantly. This also facilitates the possibility for many in situ moladi structures to be built in just one day.

Because the moladi system follows an optimised and sequential process, it is possible to use unskilled labourers.

Local unskilled labourers get training from a moladi foreman on the client's first unit and all the procedures and phases of the construction process are followed through and explained thoroughly.

The client is supplied with a working document and assembly instructions, which are compiled specifically for the client's project. After training has been completed, the team of unskilled labourers are awarded certificates for the completion of the training programme and are graded accordingly by a moladi foreman.

**More information from Tel: +27(0)41 379 2600
www.moladi.com**

ASAQS president warns of formidable challenges lying ahead

The quantity surveying profession is facing formidable challenges in future, Dr Stephan Ramabodu, the new president of the Association of SA Quantity Surveyors (ASAQS), has warned.

Speaking at the recent 2016 ASAQS annual congress held in Midrand, Dr Ramabodu said excessive fee discounting coupled with a drop in service standards from unscrupulous QSs were undermining the profession and made a career in quantity surveying less attractive to young South Africans. "Quantity surveyors need to appreciate the crucial nature of the service we offer to clients and realise that we play a vital role in South Africa's economic growth through value-engineering and cost control. Quantity surveying is a profession of integrity and we have to entrench that philosophy for future generations of South Africans."

He said although ASAQS strongly believed in the concept of a free market and positively embraced competition and change, there were nevertheless important unwritten rules to observe to ensure fair play. Excessive discounting of professional fees would encourage the tendency to award quantity surveying contracts based on price and not performance, which could further undermine the status of the profession and the service it delivered.



Dr Stephan Ramabodu, president of ASAQS, says the QS profession is facing formidable challenges in the future.

To encourage more young people to enter the profession, Dr Ramabodu challenged quantity surveyors to mentor newcomers to the profession and assist with vocational training wherever possible. He said ASAQS was planning to create Student Chapters to involve more students in its operations and called on academic institutions in the built environment to assist in this mission.

"The University of the Witwatersrand has already embraced this great initiative and we need other universities to follow suit to create a legacy for the QS profession. ASAQS now has over 2,700 student members. It is essential that we convert these student members into full ASAQS members after completion of their studies to strengthen the united front ASAQS can present to the challenges we all face.

"Our journey is not complete until there is stronger representation of both male and female members at Chapter or Board levels. ASAQS is the livewire of the QS profession, so it is also essential that more black quantity surveyors participate in the structure of our association. This is your profession and you must be proud to be involved in driving it as well," he concluded. ■

**More information from Larry Feinberg,
Tel: +27(0)11 315 4140 / www.asaqs.co.za**

BIBC INCREASES COMPLIANCE FORCE BY 80%

The **Building Industry Bargaining Council** (Cape of Good Hope) (BIBC) has put drastic measures in place to increase compliance to its Collective Agreement, by increasing its Compliance enforcement permanent workforce by more than 80%. The primary focus of this enforcement team is to ensure that all contractors in the building industry adhere to conditions laid down in the Collective Agreement as provided for in the Labour Relations Act. These conditions are legislated to become applicable to all contractors (including sub-contractors i.e. painters, plumbers, etc.) in the Building Industry. Please refer to the relevant Government Gazette available on our website under "Collective Agreement".

The Compliance Department will further be supported by nearly thirty interns from a local college to assist with the administrative and enforcement duties. The Council aims to create a level playing field in the industry whereby all contractors compete with the same labour costs and conditions, and this strategy will significantly increase their visibility in the industry and speed up the enforcement process.



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IS YOUR CONTRACTOR COMPLIANT?

When choosing a contractor you have a civil obligation to check that the contractor is compliant with the minimum employment conditions as prescribed and administered by the BIBC.

Before you hire a contractor please:

- Contact the BIBC at 021 950 7400 and ask whether the contractor is compliant; or visit www.bibc.co.za – click on "Looking for a contractor?" on the home page and enter the name or part of the employer's name under the heading "Employer name search" to check if the builder is compliant.
- The website also lists compliant employers by trade – simply choose a trade from the drop down list under the heading "Employer Category Search".
- Check work done at the builders' previous sites and obtain references from previous clients.

CONTRACTORS IN THE BUILDING INDUSTRY TAKE NOTE

If you are active in the building industry:

- Your company must be registered with the BIBC.
- All employees working for you must be registered with the BIBC.
- Your company must at all times remain compliant in order to obtain a compliance certificate which will be requested by main contractors.
- You are required by law to pay your employees a minimum wage and provide certain minimum social benefits for them as administered and enforced by the BIBC.
- If you do not comply, you will be liable for penalties in addition to the benefits payable.
- If an employee passes away whilst in your employment and you are not up to date with the employee's retirement contributions, you will be liable to pay the death benefit of four times the employee's annual salary as well as the funeral benefit.

For details on how to become compliant with the BIBC's Collective Agreement, contact 021 950 7400 or visit www.bibc.co.za

**THE BUILDING INDUSTRY
BARGAINING COUNCIL
CAPE OF GOOD HOPE**

Non-Destructive Testing Institute celebrates milestones

The South African Institute for Non-Destructive Testing (SAINT) is making significant progress in becoming the cornerstone body for Non-Destructive Testing (NDT) professionals and practitioners in Southern Africa. This was the core message from SAINT President Keith Cain at the launch of the Institute's 2016/2017 Yearbook.

SAINT, originally founded in 1968, hosted the hugely successful 18th NDT World Conference in Durban in 2012, where it gained local and international recognition and began its renewed momentum after decades of inertia.

Cain highlighted the Institute's subsequent achievements:

- SAINT established a professional body for the NDT industry earlier this year, aligned with South Africa's National Qualification Framework (NQF) Act and the South African Authority of Qualifications (SAQA).
- This successful quality-development partnership with SAQA and the merSETA has led to the establishment of professional designations for the NDT industry.
- SAINT is actively providing the industry with current, relevant information and promoting co-operation between its members and various role-players and stakeholders via its new industry standing committees.
- SAINT has expanded and improved its collaboration with technical schools on NDT training to ISO 9712 examination and certification standards, and aims to harmonise a national system under the professional designation scheme outlined in the Yearbook.
- SAINT enables international collaboration in the global NDT industry. In June this year a South African contingent of 10 SAINT members represented the South African NDT industry at the 19th World Conference in Munich.



Keith Cain, President of SAINT, together with Bev Lawrence (CVR Publications) and Jeannie Campbell (CVR Publications).

"The SAINT 2016/2017 Yearbook represents the great strides being made by SAINT," said Cain at the launch. "It is the most informative, detailed and concise NDT guide ever produced by SAINT. It is the 'go to' manual for technicians and operators."

"The SAINT Yearbook also provides current information on the International Committee of NDT (ICNDT), along with guidelines for the International Standardisation of NDT Qualification and certification," Cain explained.

The 2016 SAINT Yearbook, published by CVR Publications, is expected to play a large role in raising public and industry awareness of the South African NDT industry.

Cain says SAINT's digital footprint is a success: "We've seen an impressive 200% increase in engagement with SAINT from new content constantly being added to our online presence." SAINT aims to actively produce quality NDT personnel for both the national and global NDT market. ■

More information on the yearbook and SAINT at
www.saint.org.za / www.facebook.com/SAInstituteNDT

Honorary Membership for Terry Ashmore

Terry Ashmore, who has served as chairperson of the SA Paint Manufacturing Association (SAPMA) for the past seven years, has been awarded Honorary Professional Membership of SAPMA.



Terry Ashmore (left), chairperson of SAPMA, receives the association's Honorary Membership certificate from Aggie Argyrou, vice-chairperson of SAPMA.

Deryck Spence, executive director of SAPMA, says the honour was bestowed on Ashmore because of the major role the veteran of the South African coatings industry has played in the growth and improvement of the expertise of SAPMA and its members.

The SAPMA executive committee will this year again be led by the now familiar trio of stalwarts comprising Terry Ashmore (chairperson), Sanjeev Bhatt and Aggie Argyrou (vice-chairpersons), following the election of the Exco at the recent SAPMA AGM at Zwartkop, Pretoria.

The other principal members of the SAPMA Exco are Magan Soonbramoney (Promac Paints), Guy Lawson (Mylaw Chemicals), Qaiser Chaudry (Medal Paints), Salvan Govender (Medal Paints), Jag Kalyan (Ferro Coating Resins), Shaun Benn (ICI Dulux), Dr Siphilisiwe Ndlovu (Kansai Plascon), Tertia Kahts (Acti-Chem), Lynn de Beer (Nampak Divfood), Etienne Pretorius (Prominent Paints), Debajit Shome (Union Colours), Danny Grady (OCCA), Nick Shave (Shaves Industrials), Reg Hoddinott (SAPMA), Deryck Spence (SAPMA), and Paula Faleschini (BASF Coatings). ■

More information from Deryck Spence,
Tel: +27(0)11 615 1195 / www.sapma.org.za



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Who's who in concrete in South Africa

Quality concrete does not happen by accident. Rather it is a combination of technical skills, quality materials, ratios and equipment that combine to produce a material that can easily be utilised to build a structure that may last for hundreds of years.

Yet each element in the manufacture of concrete is closely interwoven in a complex chain. The weakest link determines the ultimate strength and suitability of the concrete for the job at hand which is why industry bodies that strive to uplift each segment of the industry are of the utmost importance.

In the concrete industry there are various organisations that play a part in formalising and uplifting construction industry skills so that end users can enjoy the benefits of better quality concrete for their projects.

Raw materials

Starting at the very beginning of the concrete chain are the producers of materials that make up concrete. The Aggregate and Sand Producers Association of Southern Africa (ASPASA) is an industry association that represents the interests of quarrying operations. It plays a pivotal role in ensuring aggregates are obtained from high-quality sources and that the products comply with national requirements. It works with construction role players and Government to ensure that standards are upheld and that supplies are sustainable. The Institute of Quarrying SA (IQSA) represents individual members of the quarrying industry. (www.aspasa.co.za; www.iqsa.co.za)



Likewise, the Association of Cementitious Material Producers (ACMP) acts as an umbrella body for South African clinker and cementitious material producer companies, guiding and representing these companies' interests in all fields. The association's member companies produce the grey powder (cement) that acts as the glue to bond the sand and aggregates together and essentially makes up the key elements of concrete. (www.acmp.co.za)



Manufacturing concrete

On the concrete manufacturing side of the industry bodies such as the Southern Africa Readymix Association (SARMA), Concrete Manufacturers Association (CMA) and the Concrete Society further the cause of manufactured concrete in its many forms.

SARMA represents manufacturers of readymix cement which is the most widely used type of concrete on large construction sites. SARMA is a representative association of ready-mix companies and is responsible for the promotion and establishment of ready-mix as a preferred construction material. Its purpose is to set standard and guidelines with regard to environmental, safety and quality issues.

The CMA furthers the aims of precast concrete product manufacturers with a prime focus ensuring that its members' products are applied correctly. It also initiates standards in close cooperation with standards authorities and collaborates with its members in developing new products and services required for the construction industry. (www.sarma.co.za; www.cma.org.za)



Value chain

At the end of the chain is the Concrete Society of Southern Africa which represents individuals and companies. Its aim is to promote excellence and innovation in the use of concrete, and to provide a forum for networking and for the sharing of knowledge and information on concrete. It also provides a platform for training and the continued professional development of concrete professionals. (www.concretesociety.co.za).



Technical assistance and training

The Concrete Institute (TCI) is a non-profit organisation that provides a comprehensive range of technical services in concrete to the construction industry through education, information and technical advisory services. It seeks to promote and protect the good name of cement and concrete.

The TCI's School of Concrete Technology offers a wide range of courses and the TCI Information houses of over 120 000 books and journals on cement and concrete. The Information Centre renders free enquiry, lending and online request services. (www.theconcreteinstitute.org.za)



The above summaries serve to highlight the main tasks performed by each industry body and are by no means a comprehensive reflection of the many tasks and activities that they perform on behalf of their industries and the concrete industry as a whole. They contribute enormously towards the success of South Africa's construction industry and should be wholeheartedly supported. ■

More information from Nico Pienaar,
Tel: +27(0)11 791 3327 / email: nico@aspasa.co.za
www.aspasa.co.za

Cameroon: contractors create national association

By Kimeng Hilton Ndukong

The National Order of Cameroon Contractors, NACOCAM, recently held its first executive bureau meeting in Yaounde with the resolve to grow membership in all 10 regions of the country.

The 13-strong executive committee headed by John Akere, took decisions on a wide range of issues aimed at publicising the body. The president and his secretary general, Tchaho Kamgang, were tasked with communicating frequently on activities of the association through various audio-visual as well as print media platforms.

The executive meeting also discussed plans for a ceremony to officially install the association's executive bureau members. The event will be overseen by the Ministries of Public Works and Public Contracts, both titular ministries of the association.

The president was also tasked with meeting other top officials to hold discussions and invite them to the installation

ceremony. The ministries include Finance, Economy, Planning and Regional Development, Communications and Urban Development and Housing. NACOCAM also invited members to propose candidates to be elected as regional representatives in all regions of the country.

NACOCAM is a legalised association of public contractors in Cameroon. The idea of its creation was prompted by the many harrowing experiences that continue to plague the public contracts sector in the country. The association aims, amongst many other goals, to help government chart a better path to a public contracts sector void of corruption, administrative bottlenecks and other government red tape. ■

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Cement consumption on the rise in East Africa spurred by 6.7% growth



East African governments, and Kenya in particular, are now focused on infrastructure delivery and ways to close the most important infrastructure gaps in planning for new cities. Both the transport and power sectors have critical infrastructure needs in the region and ICT infrastructure is another growing sector now considered key to development.

Throughout the region cement consumption is on the rise and construction sites are cropping up at a rapid rate. East Africa will be the fastest growing region in Africa in 2016 with regional growth rates reaching 6.7%. In Kenya the population of Nairobi is forecast to expand to 14 million people by 2050 and in Uganda cement consumption is forecast to increase by at least 12% over the next 3 years.

As East African nations implement policies and projects in line with growth and demand, Totally Construction East Africa featuring Totally Concrete East Africa has emerged as the leading platform in the region where infrastructure delivery goals are defined and strategic planning is implemented in order to meet more delivery targets while reducing construction costs in the local marketplace by up to 30%. This will be East Africa's first readymix concrete conference featuring Johan van Wyk the General Manager of Southern Africa Readymix Association (SARMA).

Every year the event is spear-headed by an Advisory Board of industry experts. The 2016 advisory board consists of more than 10 senior executives from a cross-section of organisations active in East Africa's cement, construction and property industries including Mucai Kunyihya, Chairman of the Kenya Property Developers Association, Prof. Gituro

Wainaina, Executive Director of Kenya Vision 2030, Eng. Milton J. Nyerere, Managing Director of Aquifer Construction Limited in Tanzania and many more. The board's role includes advising the organising team on the latest industry trends, challenges and discussion issues, thus creating an event developed by the industry for the industry.

One of the most imperative infrastructure demands in Africa today is housing delivery. Totally Construction East Africa, being held at the Safari Park Hotel in Nairobi, Kenya from 4 -5 October 2016, hosts the 2nd Annual Housing for East Africa Forum to unpack critical issues affecting housing delivery in the region.

Africa has the fastest urban growth rate worldwide although it is the least urbanised continent. Current trend projections indicate that 60% of Africa's populations will reside in towns and cities by 2030. This rapid growth has caught up to countries with insufficient capacity to plan. Unplanned urban growth leads to chaotic expansion of cities, slums, deficient and broken infrastructure, unemployment and poverty, as well as environmental pollution.

Totally Construction East Africa, sponsored by Wall-Ties & Forms, Inc. and Kumkang Kind and hosted in partnership with the National Construction Authority of Kenya, Kenya Property Developers Association and Kenya Vision 2030, will host over 300 participants and 40 exhibitors to provide strategic leverage for all construction industry professionals wanting to keep pace with East Africa's construction and property boom. ■

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With trees disappearing, Malawi turns to 'earth bag' houses

By Joel Chirwa

An innovative construction technique could be cheaper, safer and protect Malawi's dwindling forests.

At the local brick kiln, a truck laden with logs pulls up and unloads. Soon smoke is billowing, as a new set of bricks bakes inside the kiln.

Malawi's construction industry relies heavily on bricks – and the wood needed to make them is a major reason the country's indigenous forests are fast disappearing.

But an unusual home construction technique, using sand packed into plastic sacks and stacked, is now being trialled in Rumphu, northern Malawi, to cut back on bricks and save what's left of the region's forests.

As part of the project, undertaken by the Roscher Youth Development Centre (RYDC) with German backing, young people are being given technical and financial help to construct the environmentally friendly houses.



"Our mountains and hills that had thick forests are now bare except for a few trees and shrubs," said Moir Walita Mkandawire, executive director of the non-profit RYDC.

That loss of forest has led to more extreme weather and worsening droughts, he said, one reason the remaining trees need to be protected.

According to statistics from the Department of Forestry, Malawi has been losing 1.6% to 2.8% of its forests to increasing human activity.

As the forests have disappeared, natural disasters – including droughts, cyclones, landslides and floods – have become a regular and costly threat in towns like Rumphu, located 67 km from Mzuzu, the largest city in Malawi's Northern Region.

Heinrich Wegener of Support Malawi Heidelberg, which has provided technical and financial backing for the housing initiative, said he first heard about 'earth bag' homes in 2012 while on a visit to South Africa. He felt the homes would be an ideal solution for Malawi.

"I started to research the various ways to build houses with sandbags instead of bricks. My idea was to try a first earth bag house as a prototype working with the RYDC," he said.

If such houses catch on, Wegener believes they could become a major contributor to cutting deforestation in Malawi.

"Sandbag houses can help because they are cheap and simple to build," he said. "Just fill used plastic or other bags with soil, close them, stack them into walls, leave space for windows and doors, put a roof on top, plaster the walls. That's basically it, and it saves a lot of wood and time."

He said the cost of the houses depends on the size and amenities added, but a small village home without electricity or a toilet should cost around \$1,400.

Allan Chitete, a civil engineer and the Rumphu director of public works, said he thinks the homes will ultimately become widely used, and not just because they cut the need for wood for construction and for baking bricks.

"The building blocks (sacks filled with earth or sand) have a lot of advantages," he said. "They act like cushions or shock absorbers so that in times of earthquake or floods the structure cannot develop cracks or collapse," he predicted.

The idea of building low-cost structures of sandbags or soil-filled bags has been around for at least a century, and has been used in a range of places, from Africa to South Asia to North America.

Perhaps the toughest barrier to expanding use of the homes in Malawi will be winning over people to a dramatic change in the idea of what a house is made of, Wegener admitted. Most homes today are built of brick.

He said the main disadvantage of the earth houses is that hammering a nail into the wall to hang art or portraits can be hugely difficult.

Their backers hope the homes may find support from Malawi's government, which is trying to discourage the use of wood-baked bricks in construction in favour of cement blocks and 'stabilised soil' blocks.

The youth centre also plans to train more young people in the district in the building technique, and hopes to roll out the initiative to other disaster-prone areas of the country. ■

<http://goo.gl/zWGOud>



Eko Atlantic City completes Nigeria's first eight-lane city road



Ronald Chagoury Jr.

Eko Atlantic City, a unique, innovative development with many 21st Century facilities on the coast of Lagos has reached advanced stages in the project's first five million square metres.

Being built on 10 million square metres of land reclaimed from the ocean and protected by an 8.5-kilometre-long sea wall, Eko Atlantic will be the size of Manhattan's skyscraper district.

Self-sufficient and sustainable, it includes state-of-the-art urban design, its own power, clean water, advanced telecommunications, spacious roads and 110,000 trees.

The project is privately funded by South Energyx Nigeria Limited, a subsidiary of the Nigeria-based Chagoury Group of companies, working in strategic partnership with the Lagos State Government and supported as well by the Nigerian Federal Government.

One of the considerations when developing the Eko Atlantic city was to guarantee free flowing traffic. This has now been achieved with the major road network recently completed. Eko Boulevard, an eight-lane Boulevard, 1,500 m long (similar to Fifth Avenue in New York) and the focal point of the Business District, is fully completed from Ahmadu Bello Way in Victoria Island to the Ocean Front, where an exquisite waterfront entertainment area is being planned.

"We are extremely proud to have achieved another major milestone in the development of Eko Atlantic City. We strongly believe the new boulevard will enhance business activities and be the ideal location for company headquarters, luxury and business hotels and residential elements as well as attracting tourists from all over Africa," says Ronald Chagoury Jr.

In 2006 South Energyx Nigeria Limited, a subsidiary of The Chagoury Group was awarded the concession to reclaim land, develop infrastructure and act as the exclusive authority over the development of Eko Atlantic city, next to Victoria Island in Lagos. Furthermore, South Energyx Nigeria Limited was specifically created to oversee the planning and development of Eko Atlantic, the new city of Lagos. ■

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Renico Plant Hire relies tip-top tippers

One of Renico Plant Hire's pay-off lines: "The right equipment, at the right time, at the right price" perfectly embodies why the company is widely regarded as one of the leading and most dependable plant hire businesses in the country.

To cope with this demand, not only reliable and competent people are required, but also reliable earthmoving machines. The fleet consists of over 300 pieces of large earthmoving equipment and tipper trucks that are deployed on various sites around Gauteng and are also now operating in at least four other provinces around the country at any given time.

Sites include large-scale shopping centres and office developments, casino developments, highway upgrades, mining, in addition to a wide variety of other building and construction projects.

Large contracts are also undertaken, particularly by the Quarrying and Crushing division, which was established in 2007. The crushers and screens have played an important role in the development of sections of national highways and in the on-site conversion of waste materials from large demolition projects into re-usable aggregates, making a vital recycling contribution to the environment. It is evident that without their wide range of equipment, including vehicles, Renico would not be able to remain at the top of their game.

"Renico Plant Hire has been using Mercedes-Benz trucks since its inception in 1998. This relationship was solidified in 2012 when Nico Kriek from Sandown Motors formed what has become a strong bond with us," says Renico Group's managing director, Nico Louw.

"In our line of business, we not only need reliable people, but also earthmoving machines that never tire, and that is why we look to Mercedes-Benz trucks to do what others cannot. Needless to say, it did not take much convincing for us to purchase new Mercedes Benz 2628/33 AXOR 2 tippers recently," adds Louw.

The 2628/33 chassis cabs are fitted with MBC 10 m³ tipper bodies and their reliability enables Renico to efficiently attend to their extremely heavy workload, as a result of being awarded a number of large-scale earthworks tenders.

"Renico places a great deal of value in the various relationships we have nurtured over the last few years. Naturally, Mercedes-Benz is one of our most important relationships, as their vehicles enable us to continue being the best at what we do.

"In addition, our other partners have found their vehicles extremely easy to customise. MBC bodies have been building tipper and other bodies (including water tankers) for us since 2002 and they smile each time we bring a Mercedes-Benz truck to them, as they know exactly what to expect – only the best quality," says Louw.

Renico Plant Hire continues to grow in Gauteng as is evidenced by the large-scale tenders and contracts awarded to the company. With the company's recent acquisition of

on Mercedes-Benz

two Mercedes Benz 2628/33 AXOR 2 chassis cabs, with brick truck bodies manufactured by MBC and fitted with Palfinger cranes, the company's use of these chassis cabs has now been extended beyond tipper trucks.

Mercedes-Benz trucks are known for offering operators maximum UpTime, and for Renico, this means their vehicles spend as much time as possible getting the job done right at sites rather than sitting in a workshop for repairs.

Nico Louw goes on to explain: "All our equipment undergoes maintenance on a regular basis within our well-equipped and well-staffed workshop. All our equipment is run through a comprehensive checking process before being sent out to our customers or to be used on site for contract work, thus ensuring a minimum of downtime.

"As a company that hires out equipment, we cannot afford to have a fleet that will let us down, which is why we chose to go with Mercedes-Benz trucks. We know that when they are hired out to various customers, they will render a most satisfactory service. That makes our customers come back to us over and over," Louw concludes.

Axor Trucks: the lightweights that really pull their weight

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Of the many factors that determine how economical a truck is, payload is perhaps the most decisive. With its high payload capacity, two application-based cab variants and innovative technology, the Axor pulls no punches in the 18-ton to 35-ton weight class – be it transporting construction material on the road, or in light and medium off-road operations that demand plenty of traction.

It's a highly efficient truck, with a powerful six-cylinder engine and special powertrain configuration (specifically tailored for optimum efficiency), and long service intervals.

Available as an all-wheel-drive tipper or concrete mixer on two, three or four axles, the Axor offers larger cabs for more space up front and smaller cabs for increased payload. All of the cabs have been thoughtfully designed to accommodate optimal tailoring to specific driver or application requirements.

Features include slip resistant bottom steps to assist drivers and passengers when entering the cab, a multifunction steering wheel, large windows and mirrors for excellent all-round visibility. Driver satisfaction and motivation is, after all, an important economic factor. ■

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Cultural Concrete

Recognising the economic benefits of creativity, cities are motivated to invest in new cultural buildings as a way to improve their attraction and to assert themselves in the global competitiveness between cities. **Daniel van der Merwe, Architect at PPC** discusses how cultural architecture is thus increasingly regarded as a vital element of urban economies.



Cultural buildings serve a critical role in hosting public functions, but they are almost as important architecturally, as they leave a visual legacy for the city they represent. This article looks around the world to find newly completed public buildings that are architecturally unique whether it be in scale, materials or how they relate to their surroundings.

Concrete was used throughout these projects, not only because of its unique structural, maintenance free and robust characteristics, but as a poetic and sculptural material which makes possible the expression of the symbolic, conceptual and contextual intentions of the buildings.

Menis Arquitectos, CKK "Jordanki", Torun, Poland

Tenerife architect Fernando Menis claims to have developed a new construction technique, demonstrated by this concert hall in Poland featuring faceted surfaces of crushed brick and concrete. The building is located between Toruń's old town, protected by the UNESCO, and the new development area of the city. The concrete building strikes a fine integration with the existing cultural and natural landscape

Fernando Menis mixed concrete and broken red brick – a technique he calls *picado* – to create the cave-like interior of the CKK Jordanki concert hall, which is intended to provide optimum acoustics "Besides achieving a rough expression, the *picado* allows excellent acoustics results," said Menis, who first experimented with the technique for the Tenerife-based Magma Art & Congress in 2005 during music performances.

"Thanks to its dynamic ceiling, the building can be tuned to effectively absorb symphonic performances, chamber, theatre, opera, and film and meet any acoustic requirements the theatre designer requires," he added.

"While the concert hall's outer skin remains rigid, inside, the building acts like a fluid that brings together the different functions, its many different co-existing elements, slowly combining them and playing off each other," he said. "The visual effect achieved is that of a natural object, a rock."

The architect also had another image in mind, this time to describe the construction of the walls and ceiling: *zurek*, a



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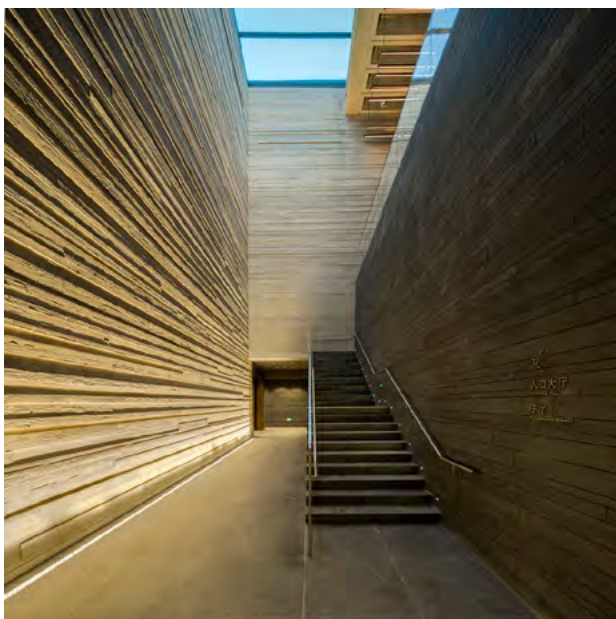
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sour rye soup popular in Poland, which is often served in a round loaf of bread. In the case of the Jordanki cultural centre, the bread stands for the outer concrete shell. This was cast in situ using rough timber formwork to give it textural depth and richness. The soup is the broken bricks used in the panels which were inserted into the wet concrete surface prior to proper hydration. To create the moveable interior panels, broken bricks were placed as a layer inside the steel precasting moulds to produce an exposed surface after demoulding.

Menis believes the working of the concrete is more than a mere matter of aesthetics: it is also meant to improve the acoustics in the hall by reducing reverberation time.

OLI Architecture, Mu Xin Art Museum, Wuzhen, China

This 'floating' art and literary museum by American studio OLI Architecture is housed in a grouping of textured concrete blocks, which are elevated over a lake in China's Zhejiang Province. The Museum is dedicated to preserving the life, legacy, and artistic output of the artist, poet, and writer Mu Xin (1927-2011). Located in the artist's hometown of Wuzhen, the Museum is the leading resource on the impact and continued meaning of Mu Xin's art.

The New York firm designed the Mu Xin Art Museum for Yuanbao lake in Wuzhen – a town at one end of China's Grand Canal, which is dubbed the Venice of the East for its network of off-shoot canals, lakes and waterfront houses.

"At the beginning of this project, we thought carefully about the location and siting of the museum," said studio founders Hiroshi Okamoto and Bing Lin. "In Wuzhen, one experiences a dense landscape of centuries-old canals, streets, markets, courtyards, bridges and verandas." "Taking a cue from the urban fabric of this 1,000-year-old ancient water town, the museum itself is a landscape of intersecting experiences," they added.

The museum's concrete walls were cast in situ, using various sizes and thicknesses of honed timber formwork to create a rich

tapestry of linear indentations, both inside and out. The building is a series of floating rooms that mirror Mu Xin's creation of space in his multi-layered abstract landscapes. By using texture and the subtle use of various shades of pigmentation in the concrete, the Museum's exterior was manipulated to mimic his ink brush watercolour landscapes.

**Zaha Hadid Architects, Messner Mountain Museum
Corones, Plan de Corones, Italy**

A concrete structure built into the side of the mountain, emerging only at certain points. This newly completed museum dedicated to renowned climber Reinhold Messner is at the top of Alpine peak Mount Kronplatz, featuring underground galleries and a viewing platform cantilevered over a valley.

Concrete forms emerge from the ground to create canopies that frame the building's entrance.

The Messner Mountain Museum Corones is the final instalment in a series of six mountaintop museums built by Messner – the first climber to ascend all 14 mountains over 8,000 metres high and to reach the summit of Mount Everest without additional oxygen.

Zaha Hadid prior to her death explained the concept of the design: "The idea is that visitors can descend within the mountain to explore its caverns and grottos, before emerging through the mountain wall on the other side, out onto the terrace overhanging the valley far below with spectacular, panoramic views."

The architect chose cast concrete to give the appearance of rock and ice shards, referencing the geology of the region. Glass-reinforced fibre concrete gives the building's exterior a pale grey tone, while internally the panels become darker

– intended to match the lustre and tones of anthracite coal buried underground. The walls of the building are between 40 and 50 centimetres thick in order to support the structure from the pressure of the surrounding earth, while the roof has thicknesses of up to 70 centimetres. Inside, galleries are organised over three floors, connected by staircases that the firm described as being "like waterfalls in a mountain stream". Hadid used concrete in most of her famous buildings. She loved the material as it allowed her to create highly sculptural buildings which pushed the edge of contemporary architectural design. In her own words she described concrete as "one of the most ancient yet one of the most contemporary materials available to allow an expressive architecture". ■

**More information from Daniel van der Merwe,
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Zaha Hadid's first posthumous project inaugurated

By Adam Williams

The Salerno Maritime Terminal is the first of four posthumous works due for completion this year.

It's always poignant when an artist's work is released posthumously, and the official completion of Zaha Hadid Architects' first project since its founder's recent death is no exception. Some 16 years in the making, the oyster-like Salerno Maritime Terminal was inaugurated recently by Italian Prime Minister Matteo Renzi.

Hadid won an architectural competition to design the terminal in 2000, and it is part of an ongoing redevelopment program in the area. The building comprises three major sections: administration offices, an international terminal for ferries and cruise ships, and another terminal for local and regional ferries.

Constructed primarily from concrete with an impressive 20-m cantilever, the three-storey building is topped by an asymmetric shell likened to an oyster by ZHA. The project definitely follows Hadid's usual design language and the trademark – or rather obligatory – curves are there. Still, it's a little harder around the edges than later designs, with more muscle and less grace.

Judging from the moody photos by famed architectural photographer Hélène Binet, the building takes its place well on the waterfront. The quayside rises as passengers approach from the city, with each interior space flowing into the next.

The overall impression of the interior is large, imposing and impressive, invoking confidence that it will stand the test of time. Indeed, the project could perhaps have proven a worthy, if not sublime, bookend to Hadid's career, but it's not to be.

Instead, the Salerno Maritime Terminal is the first of four posthumous works due for completion by Zaha Hadid Architects this year. The firm, now headed by longtime Hadid collaborator Patrik Schumacher, recently confirmed that it will continue to practice, for the time being at least, honouring all outstanding projects. ■

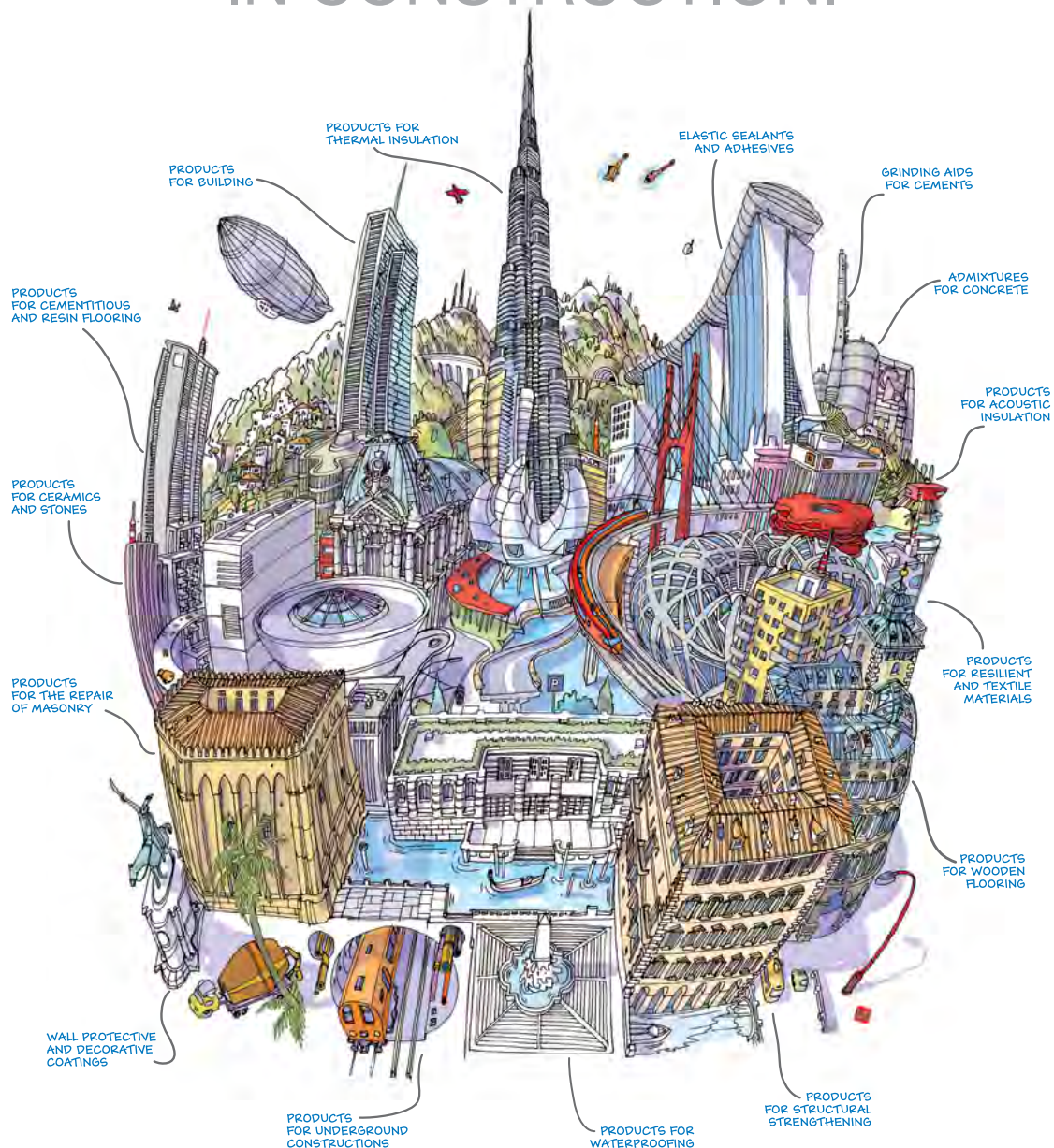
Photographs courtesy of Hélène Binet.

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AfriSam cements growth of concrete product manufacturers

South Africa is home to a vibrant concrete product manufacturing industry, ranging from small to large scale manufacturers, with many of these turning to an independent third party to advise them on best practice in terms of concrete technologies.

AfriSam's Centre of Product Excellence has been assisting the country's leading concrete product manufacturers (CPMs) to optimise their concrete mix designs while at the same time reduce their total manufacturing costs by advising them on the best selection of materials for their production processes.

Mike McDonald, manager of AfriSam's Centre of Product Excellence, says having access to this level of technical input and knowledge transfer is a significant advantage for many of these companies that do not employ internal cement technologists. It is a given that this type of knowledge transfer enables these companies to gain a competitive edge in the CPM industry.

"AfriSam, as the leading concrete solutions supplier, has the necessary depth of experience and access to skilled technologists who have an intimate understanding of concrete product manufacturing processes. Leveraging this, we are able to provide all CPMs with quality technical support," he says.

Importantly, the AfriSam Centre of Product Excellence has also helped many new players establish a presence in the market by imparting essential knowledge on the cement, aggregates and sand required to manufacture a quality product, and particularly early on in the conceptualisation stages of these factories.

McDonald says incorrect selection of materials not only has a significant impact on the quality of the end concrete product, but also on the cost of manufacturing. "For example, a poor quality aggregate could increase both cement and water usage," he explains.



AfriSam's value-add to concrete precast manufacturers includes on-site technical services, SANS-accredited laboratory services and product deliveries around customers' requirements.

One of AfriSam's strengths is its vast footprint with 17 aggregate quarries countrywide that produce their materials in accordance with the South African National Standards (SANS) 1083 specification. McDonald says this has provided many of these CPMs the flexibility needed when locating their plants.

Based on its close interaction and collaboration with this market, AfriSam has also developed a cement that meets the unique requirements of the sophisticated Gauteng CPM market. AfriSam's Rapid Hard cement meets the high early and late strength requirements of the industry.

"Users of this constituent product, with its high reactivity rate and sophisticated mineral components, benefit from shorter setting times and also quicker stripping capabilities, allowing quicker turnaround of moulds and optimal performance during the winter periods with their low ambient temperatures," McDonald says.

By using this AfriSam cement, CPMs have also reduced their cement consumption, while achieving better finishes and durability traits of their concrete products.

McDonald says it also facilitates the incorporation of downstream materials, such as slag. AfriSam has a regular supply of this material that is well known for its ability to enhance the performance of readymix concrete, while also substituting as much as 50% of cement in the mix design.

The CPM industry continues to grow as professional teams realise the gains achieved by these technologies which often allow for faster, safer and more aesthetically-pleasing builds, and AfriSam's expertise is at the core of this trend. ■

**More information from Maxine Nel,
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Topfloor prestressed slabs specified for massive naval security wall

A total of 3,400 prestressed hollow-core concrete slabs are being used to construct a five-kilometre security wall for the Department of Public Works at South Africa's naval base in Saldanha. Designed by Delta Built Environment Consultants in close collaboration with a leading prestressed hollow-core concrete slab manufacturer, Topfloor, the wall is being erected by KP Construction that is the project's main contractor.

According to Topfloor's director, Wessel Prinsloo, the slabs are being precast at Topfloor's Cape Town factory where they are prestressed with steel reinforcement before being delivered on flatbed trucks to Saldanha Naval Base.

"Prestressing provides hollow-core slabs with additional strength and the slabs being used for the Saldanha wall boast a strength rating of 50 MPa plus. As a result, nothing short of mechanised demolition equipment or high-explosive blasts would make any sort of destructive impression on the wall. This is why prestressed slabs are being used on an increasing basis to safeguard property of strategic importance or high value in other parts of the country," advises Prinsloo.

The wall is being built to a simple yet effective design which uses galvanised steel H sections to support all the six-metre-long slabs. The H sections are bolted onto six threaded bars cast into the reinforced concrete foundations. These extra heavy duty foundations were specified by Delta to ensure that the wall can withstand the frequent and sometimes gale-force winds that are prevalent on this stretch of coastline.

The wall follows the natural contours of the undulating fynbos-strewn land and rises 3.2 and 4.2 metres above ground level; a section of approximately 400 mm is buried below ground.

Construction, which began in December 2015 and is due for completion by the end of 2016, is effected by hoisting the slabs using a truck-mounted crane. A special grab mechanism had to be designed by Topfloor to lift and install the slabs. The crane has sufficient reach



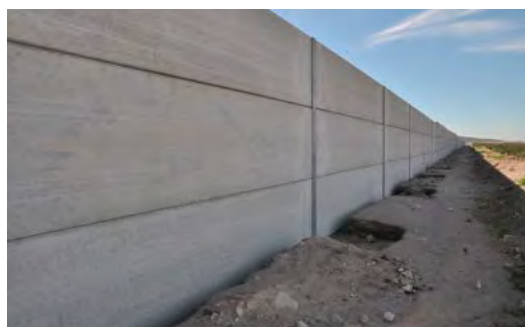
A section of completed security wall built with Topfloor prestressed hollow-core slabs at the Saldanha Naval Base.



Topfloor contracts manager, Norlando Nomdoe, stands on one of the concrete foundations.



A Topfloor wall slab is offloaded prior to installation between the steel H sections.



An inner section of the Saldanha wall in which the attractive V-shaped indentations between the slabs are clearly visible.

to service three wall bays from one location. Once installed, the slabs are caulked into the H sections with a plaster sand and cement mix.

Part of the contract involves the planting of a line of various types of trees on the outer perimeter of the wall to add a green and aesthetic element to what would otherwise have been a stark monolith.

Additional aesthetic appeal is achieved by mounting the panels so that the slabs' smooth soffit sides are positioned on the outer (public) side of the wall. Moreover, the slabs have been cast with bevelled edges which form V-shaped channels where the slabs meet to further enhance the appearance of the walls.

Prinsloo says that there are several advantages to this type of walling, speed of construction and the very superior strength of the wall being major considerations.

"Eight to 10 bays or 48 to 60 linear metres are being completed daily (eight hours). A conventional masonry wall, which is not nearly as strong or durable, would have taken two to three times as long to build.

"The cost of constructing a security wall using prestressed hollow-core slabs is considerably less than an in-situ wall offering the same properties. Moreover, precast walling requires no shuttering or propping, nor curing onsite, formwork or grouting.

"As with other walls built with prestressed hollow-core panelling, the Saldanha wall will have a very long life span. It is maintenance free, and other than occasional cleaning, no other servicing is required. The slabs can also be dismantled and re-used elsewhere," adds Prinsloo.

Topfloor's hollow-core concrete floor panels have been an important contributor to the growth of the building and construction industry in the Western Cape since 1997. Although Topfloor was acquired by the Echo Group, it has kept its name which is built on a concrete foundation of quality and dependability.

More information from
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Infrastructure Specialist Group assists the Viva Foundation

Impoverished South African communities face many issues, not least being the increasing development of informal settlements and the related problems that create an environment of insecurity.

The Viva Foundation, a non-profit organisation that strives to transform these informal settlements into stable and safe



neighbourhoods, relies heavily on support from the industrial and business sectors for funding and donations of materials that assist in the establishment of these safe havens known as the 'Viva Villages'.

Technicrete ISG, a subsidiary of the IS Group has donated 1,122 metres of concrete Palisade fencing to secure two Viva properties: 286 metres at the Mamelodi East Viva Village and 836 metres at the Refilwe, Cullinan Viva Sharehouse.

Group marketing and communications manager of ISG, Guinevere Thomas said: "Projects such as these Viva Villages provide so much hope for those living in informal settlements, particularly the children, that we at Technicrete ISG, wanted to assist in securing the facilities and equipment that the Viva Foundation worked so hard to acquire."

CEO of the Viva Foundation, Meleney Berry-Kriel said: "Both of these Viva facilities offer crucial activities such as education, sport and recreation, employment, social awareness support and developmental programmes, accommodation, farming and fresh vegetable projects. Obviously we have valuable training and computer equipment as well as hardware and tools. The concrete fencing from Technicrete ISG is most welcome, and affords our village community some security."

The Technicrete ISG steel reinforced concrete Palisade fencing is a high-quality security system and its open slat configuration acts as deterrent to intruders due to their presence being clearly visible.

The Palisade fencing is also suitable for airports, railway stations, hospitals, sports grounds, warehousing and other areas that require a strong, high-quality security fencing system. ■

Concrete cabins win CMA Award commendation



Receiving a CMA Award for Excellence in Innovation are, from left to right: Gerhard Rossouw, technical executive, Rocla; Guinevere Thomas, group marketing and communications manager Rocla; Servaas le Roux, civil engineer, Rocla; Fanus Viviers, business manager, Rocla; Jason Roberts, civil technologist, Rocla; Frans Minnaar, executive director CMA; Monique Eggebeen, chairperson of the CMA Awards Committee and Kevin Odendaal, executive business development, PPC Cement.

Rocla's locally manufactured concrete cabins for use at photovoltaic farms in the Northern Cape and Free State, were awarded an Innovation Category commendation at the Concrete Manufacturers Association (CMA) Award for Excellence 2016.

Rocla's group communications and marketing manager, Guinevere Thomas said: "We are extremely proud to have achieved a commendation at the prestigious CMA awards. At Rocla, we pride ourselves on innovative design and application using precast concrete. With energy generation paramount in South Africa, the burgeoning photovoltaic farm sectors needed an inventive means of housing and safeguarding the electronic components required at these installations and Rocla provided the solution."

The CMA Judges praised Rocla for their groundbreaking advancements in manufacturing cabins which proved vandal proof and quick to assemble. ■

More information from Guinevere Thomas,
Tel: +27(0)11 670 7733
email: Guinevere.Thomas@isgroup.co.za

Rebloc road barriers installed in Bloemfontein

The seven-month road-over-rail bridge upgrade on Curie Avenue, one of Bloemfontein's main arterial roads, was completed in 2015. Rebloc vehicle restraint barriers from Rocla, one of the subsidiaries of the IS Group of companies, were utilised because of the strong safety features of this precast concrete product.

The Rocla Rebloc system offers integrated coupling which creates a continuous chain of high-strength energy and force absorption, should a vehicle collide into the barrier. The connecting facilities are integrated into the specially profiled concrete which ensures that there are no loose parts or accessories that would require maintenance or be subject to theft or vandalism. Maintenance of the Rocla Rebloc road barrier is anticipated only in the event of motor vehicle collision with the barrier, and such maintenance would only be necessary in extremely severe cases of impact with the barrier.

Tau Pele Construction in Bloemfontein were contractors for the project and operations director Frans Bower said: "We have an established relationship with Rocla, and know that their products are of a high quality, offering the vehicle restraint safety features required for the Curie Avenue bridge upgrade. Rocla Rebloc was the best available system, due to its simplicity of installation, low maintenance and well-designed reinforcement,



which absorbs impact, and in turn may prevent even heavy vehicles from breaking through the restraint system."

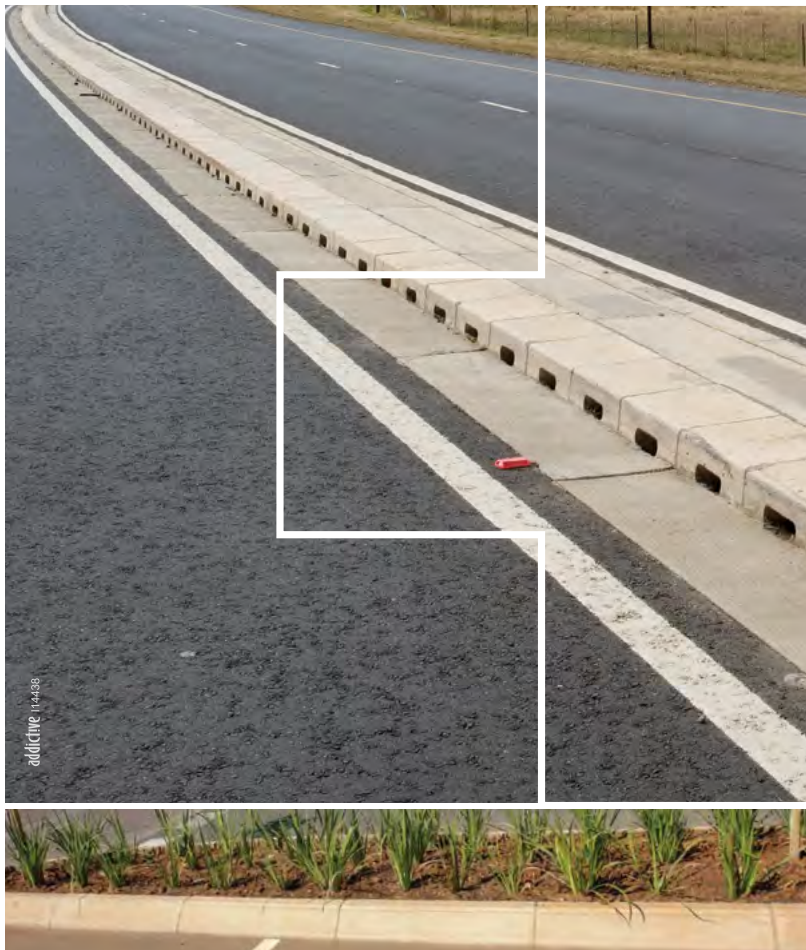
Virginia-based Rocla sales consultant, Lodewyk Brink, commented: "The unique Rebloc system utilises the internationally recognised F-Shape System, which also conforms to SANRAL'S standard profile requirements. The concrete barrier length of six metres enables faster installation and costs are reduced by requiring fewer couplings. Shorter elements are available for radius areas. Only the terminal elements at each end of the barrier chain are anchored to the road surface to cope with impact at those points, if required."

Rocla Rebloc barriers installed at Curie Avenue included 200 m of 107-cm-high barrier (RB107) in the median and 60 m and 80 m of the 81-cm-high barrier (RB81)

on either side of the road.

Rocla Reblocs can also be utilised for high-security areas, to contain land and mudslide debris, prevent illegal dumping, restrict entrance to specific areas, secure vacant land/buildings and separate bulk materials. ■

More information from Guinevere Thomas,
Tel: +27(0)11 670 7733 / www.rocла.co.za



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Sustainability with Concrete



Few people realise that concrete is the most used man-made material in the world, with three tons used annually for each man, woman and child. Twice as much concrete is used around the world than the total of all other building materials, including wood, steel, plastic and aluminium.

Apart from being versatile, durable and capable of providing sustainable infrastructure development and cost-effective products, it is recyclable without placing a burden on the environment. Concrete in its various forms offers design flexibility, structural integrity, cost effectiveness and low maintenance.

There are, of course, aspects of concrete manufacture that are not as green we would wish them to be...yet. According to the Cement Sustainability Initiative, Geneva, the production of concrete, notably its most important ingredient, cement, poses several sustainability issues that need to be managed:

"Cement production emits CO₂ and other air emissions, and the quarrying of raw materials produces local impacts such as noise and dust. Also, water use needs to be carefully looked at in locations where water is scarce. The industry is well aware of these impacts and addresses them both collectively, via the CSI or regional and national trade organisations, and individually as producers within their sphere of influence."

Says Bryan Perrie, managing director at The Concrete Institute, South Africa: "The local industry is very sensitive to energy consumption and environmental damage. Sustainability is a key driver. The cement industry has been and is continuously working on reducing energy consumption. The producers are using more and more extenders (which are secondary products with low embodied energy from other industries) in cement production. Rehabilitation of quarries is also being dealt with. The South African cement and concrete industry, compares very well with overseas countries."

One also has to take into consideration that some applications of concrete are greener than others, such as the different methods used to retain eroded earth or cut and fill slopes caused by excavation activity. The locally developed Terraforce concrete retaining wall and erosion control systems are considered to be sustainable products and have been since their development 35 years ago – long before it became fashionable to 'ride the green wave'.

It is a hollow-core and closed-faced system allowing for maximum water absorption and plant growth, once installed. It is also an easy-to-use, cost-effective mortarless system that requires less material and equipment staging areas and fewer requirements for large pieces of equipment for manufacture and installation than cast-in-situ solid concrete solutions.



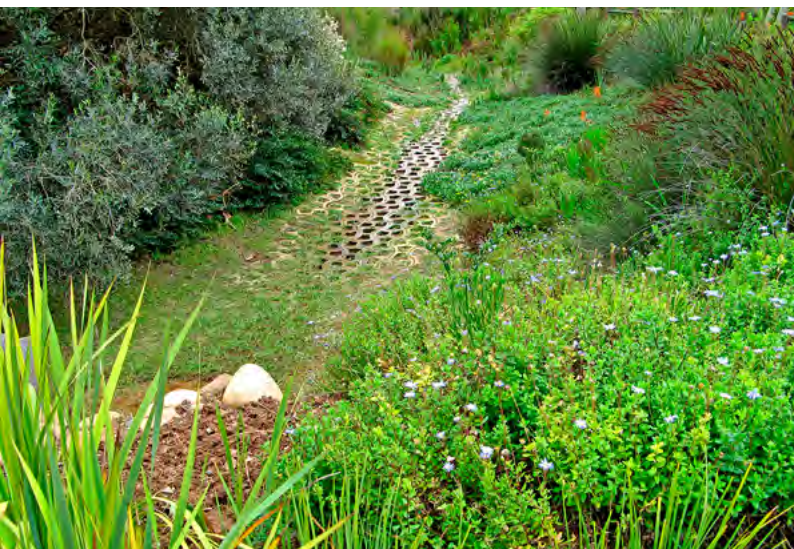
Says Johan van Wyk, CEO of Klapmuts Concrete, a concrete retaining block (CRB) manufacturer based in the Western Cape: "A well designed Terraforce wall, properly vegetated with water-wise plants, is as green as it gets. The walls can be constructed with curves and angles to fit into any slope profile, thus keeping in line with the existing environment. The blocks can also be manufactured in colours to match the environment."

In addition, most licensed Terraforce producers locally and abroad use concrete building rubble (an industry by-product) in the manufacture of the blocks.

"We recycle all reject blocks as well as blocks that get damaged during the 'split' operation of the rock face blocks. We accept 'clean' building rubble (no timber, plastic, metal, etc.) from builders as well as all the rejects from another building block manufacturer in our area. To ensure that the rubble can be used in our products without comprising quality, it was graded by a SANAS accredited laboratory," explains Van Wyk.

The bottom line is that durability is the key to sustainability. If the useful life of a structure can be extended by using concrete, that's a huge gain for sustainability. When concrete's natural benefits become the building blocks for other building systems, there are gains in energy efficiency. This is the direction for the next era. Developments in concrete technology will continue to improve the industry's ability to respond. ■

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



Concrete brise soleil cools a glass enveloped building in sweltering Ghana

By Maria Novozhilova



One Airport Square's passive design has received a 4-star GBCSA rating - the first commercial building in Ghana to do so.



If you associate concrete with bulky and unsustainable architecture take a look at this beautiful and innovative airport terminal in Accra, Ghana. Italian architect Mario Cucinella, in collaboration with Deweger Gruter Brown & Partners, has designed a new building in Accra, Ghana that uses concrete in a surprisingly light and eco-friendly way. The clever brise soleil passive design strategy allows the building to be bright and open to natural light while keeping out the sweltering noon/afternoon sun in the summertime, cooling the building when it needs cooling the most. The design has already received the 4-Star award by Green Building Council of South Africa (GBCSA), which makes Cucinella's One Airport Square the first green commercial complex in Ghana.

One Airport Square is a striking building featuring a very unique structure on its façade: a criss-crossing brise soleil made out of concrete. Its powerful aesthetic was inspired by the motifs of the traditional African fabrics and peculiar patterns of palm tree bark. While the design embraces local traditions, it also meets the needs of environmental sustainability.

The building's shell is a combination of overhanging slabs and diagonal frames that shelter the interior against direct sun rays. Thanks to this design, One Airport Square features an

unexpected envelope entirely made of glass and, therefore, 17,000 m² of bright interiors that are also protected from the intense sun. Who would have ever imagined a comfortable, completely glazed nine-storey building in the heart of Africa?

Besides acting as a giant brise soleil, One Airport Square's irregular grid is also a load-bearing element of the building.

Interestingly, Cucinella did not simply deliver an eye-catching and sustainable landmark. The development of the Kotoka International Airport area in Accra is also a great public space. From the urban point of view, One Airport Square project is a congregation piazza that's active day and night and capable of hosting various events and activities. The commercial gallery of the ground floor contains shops, restaurants and cafes, allowing One Airport Square to make a significant contribution to the surrounding community, landscape and providing an example in terms of ethics, cultural sensitivity and environmental sustainability. ■

Images via Fernando Guerra courtesy of Mario Cucinella Architects

Source: <http://goo.gl/cQ1mhl>

Tree-covered Italian skyscrapers epitomise 'green architecture'

By Chris Weller



For the Milan skyscrapers Bosco Verticale, 'vertical forest' in Italian, it's what's on the outside that matters.

The 256-foot and 344-foot towers are covered head to toe in over 700 trees and 90 species of plants, an achievement that was ingenious enough to win Bosco Verticale second place in this year's Emporis Skyscraper Award.

Bosco Verticale's foliage-heavy design goes way beyond eye-catching. The green architecture really is 'green.'

All the plant life helps reduce smog, dampen noise levels, produce oxygen, and regulate temperatures inside the two buildings.

During the winter, sunlight can easily pass through the bare plant life and help heat people's rooms. During the summer, the leaves can block harsh rays from making apartments too hot.

Inside the building, a complex irrigation system redirects the water people use back onto the porches to sustain plant life.

Designer and architect Stefano Boeri says the added greenery also serves as a way to vertically densify nature within the city to redefine the urban space.

And dense it is: If all the trees were laid flat on the ground, the forest would cover an area of nearly two acres.

Pruning the trees themselves took two years, Boeri says. They had to be specially designed to fit beneath balconies of varying heights.

Boeri has already inspired others to take up the 'reforestation' model. In Australia, architect Jean Nouvel and artist and botanist Patrick Blanc teamed up to create One Central Park, in Sydney. The structure houses over 190 native Australian plant species and features vines that climb the side of the building.

In Seoul, South Korea, a 70-storey urban Skyfarm stacks trees and other vegetation on a structure that, itself, looks like a mammoth tree.

That drive to bring the rural into the urban could end up being less of a novelty and more of the standard.

In 1800, 3% of people lived in cities. By 1950, that rose to 30%, and today it is 50%. In developed nations, the rate is even higher – approximately 74%.

If the trend of vertical forestation holds, we'd better get used to the sound of birds chirping much closer to home.

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

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Khobab Wind Farm strives for industry first

Khobab Wind Farm has announced the completion of its first foundation pour on 30 June 2016. The foundations are designed using an 89% replacement of cement, one of the world's lowest carbon wind farm foundation footprints, making use of the same formulation that its sister farm, Loeriesfontein Wind Farm, successfully used in the completion of its foundations. "We are currently testing an even higher cement replacement formulation and hope to achieve the desired strength test results soon," explained Kevin Foster, project manager for Khobab Wind Farm.

Situated in the Hantam Municipality, 60 km north of Loeriesfontein in the Northern Cape, Khobab Wind Farm currently employs over 100 local workers on site. All 61 foundations are due for completion by mid December 2016.

Khobab Wind Farm is utilising extremely low quantities of portland cement in the concrete formulation of its wind turbine foundations. "This revolutionary formula has been tested in the adjacent wind farm and we are confident to continue to use it in our foundations. The insights gained at Loeriesfontein have allowed us to continue to test lower levels of portland cement," said Foster.

The bases use a unique design comprising 35 kgs of high grade portland cement per cubic metre, almost 90% less than a standard concrete mix. This composition means that the wind farm's carbon footprint is reduced to approximately 90.7 kg of carbon dioxide per cubic metre. Ground Granulated Corex Slag (GGCS), a by-product from the iron industry, is used to replace 89% of the cement. "Cement manufacturing is typically a high energy intensive process; so by substituting the cement with a by-product the carbon footprint has been considerably lowered," continued Foster.

A twenty-eight day compressive strength test was completed when the formulation was originally tested; it indicated that the 89% replacement ratio achieved an impressive strength of 55 MPa, and an expected ultimate strength of 100 MPa, within a fifty-six day period. "The strength of concrete is measured in megapascals; theoretically a cubic metre of 30-MPa concrete is able to withstand the weight of six bull elephants, whereas these foundations are able to withstand the approximate mass of 20 bull elephants standing on a square centimetre of concrete – a phenomenal feat," explained Cyril Attwell, Murray & Roberts Construction, group concrete & research manager.

"The reduction we achieved in our carbon footprint is exceptional, especially considering that a standard 30-MPa concrete as supplied by the readymix industry equates to a carbon footprint of approximately 300 to 350 kgs of CO₂ per cubic metre," added Foster.

Traditionally, 30 MPa concrete requires between 300 kg and 350 kg of ordinary cement per cubic metre. But now scientists working for Murray & Roberts have developed a technology that meets the 30-MPa standard using just 25 kg of cement or even less. Not only does it meet the standard, it far exceeds it. To date strengths of up to 52 MPa have been achieved on

other sites using Murray & Roberts' patented ARC (Advanced Recrystallisation) technology and 0 kg of portland cement per cubic metre.

Khobab Wind Farm will comprise 61 wind turbines each with an output of 140 MW and will generate approximately 563,500 MWh/year of clean, renewable energy to the national grid. The wind farm will avoid approximately 550,000 tonnes of carbon emissions each year compared with traditional fossil fuel power plants and generate enough to power around 120 000 average South African households.

The 3,200-hectare site was chosen for its excellent wind resource, favourable construction conditions and straightforward electrical connection into Eskom's Helios substation. The wind turbines will be supplied by Siemens Wind Power, with the blades, hubs and nacelles arriving from overseas at a nearby port and being transported by road to Loeriesfontein. The majority of the 99-m turbine towers are to be manufactured by GRI, in Atlantis, in the Western Cape. Civil and electrical works are to be completed by a consortium comprised of Murray & Roberts Construction and Consolidated Power Projects.

The Khobab Wind Farm is part of the South African Government's Round 3 Renewable Energy Independent Power Producer Procurement Programme (REIPPP) is expected to be operational by December 2017. ■

More information from www.khobabwind.co.za

About Khobab Wind Farm

Khobab Wind Farm is owned by a consortium dedicated to providing clean, renewable energy:

- Lekela Power, a pan-African renewable energy platform, has over 1,300MW of wind and solar power projects in its portfolio. It is a 60:40 JV between Actis, the global pan-emerging market private equity firm, and Mainstream Renewable Power, the global wind and solar company.
- Khobab Community Trust: Established by the project company to carry out public benefit activities in enterprise development, education and health for the local community.
- Thebe Investment Corporation; one of South Africa's most established broad based BEE Investment management companies and leading investor in the Energy & Resources sector (advised by Bridge Capital).
- The IDEAS Managed Fund, is managed by Old Mutual Alternative Investments.
- Futuregrowth Asset Management, a pathfinder in fixed interest and developmental investing.
- Genesis Eco-Energy partnering with Lereko Metier Sustainable Capital.

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Concrete's reflective qualities can help cool cities

The relatively light colour of concrete has several important environmental benefits, particularly in urban areas, says Bryan Perrie, MD of The Concrete Institute.

"The two primary benefits of concrete's light colour are reduced lighting energy consumption, and a decrease in the 'heat island' effect in cities and built-up areas, both of which help to combat global warming," Perrie states.

He says, in the first instance, the light colour of concrete provides a safer environment and also enables lighting requirements in a town or city to be reduced. "For concrete roads or parking areas, research in the USA has shown that surface reflection readings on concrete pavements and other surfaces are four to five times higher than other road surface materials. This means increased visibility for drivers and increased security in urban areas. Similar research has shown that the increased reflectance of concrete roads calls for fewer lighting masts and up to 24% lower energy requirements. This principle also applies to various urban areas as well as car parks."

Explaining the benefits of the light colour of concrete in reducing the heat island effect, Perrie says that on hot summer days ambient conditions in urban areas can be to 2 to 6°C warmer than the adjacent countryside, thus making the built-up areas 'heat islands'.

These urban heat islands can influence rainfall patterns with higher rainfall downwind of cities compared to the upwind areas. The reflectance ratio – or 'albedo effect' as it is called – of reflected solar radiation to the amount that falls on the surface, rates from 0 when no incoming radiation is reflected, to 1 when all incoming radiation is reflected. The lighter the



Concrete's relatively light colour has several environmental benefits, says Bryan Perrie, MD of The Concrete Institute.

surface colour, the more solar radiation it will reflect and the less heat it will absorb. The solar reflectance of concrete varies between 0.2 and 0.4, compared with asphalt's much lower reflectance that ranges between 0.05 to 0.2.

"Exposed building materials with a high albedo reflect more heat, and lead to cooler cities. The average albedo of normal concrete is about 0.35 with reflectance values as high as 0.7 to 0.8 for white concrete made with white cement. In contrast, dark materials, such as new asphalt, can have an albedo or reflectance capacity as low as 0.05.

"The incorporation of high albedo concrete products in exposed surfaces, such as roads and parking areas, can significantly reduce the heat island effect and lead to cooler urban areas. In Arizona, for example, the summer temperatures of adjacent concrete and asphalt roads were measured: concrete was a staggering 11 degrees Celsius cooler," Perrie adds.

He says using concrete with its high heat reflectance ability can lower average summer afternoon temperatures in surrounding buildings by as much as 3 degrees Celsius, cutting air-conditioning usage by as much as 18%.

"The potential increase in cost during the design and construction phases in providing a green structure will generally be more than offset by the savings from reduced energy usage when concrete structures are used. Life-cycle cost analyses have shown that, because of concrete's durability, the whole life cost of many projects is lower when concrete is used as the major construction materials," Perrie concludes. ■

More information from Bryan Perrie,

Tel: +27(0)11 315 0300 / www.theconcreteinstitute.org.za



Exposed concrete areas, such as expansive parking lots, reflect more heat and help produce cooler cities, says The Concrete Institute.



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Soil conditions challenged a Pretoria contractor



J.C. van der Linde & Venter Projects recently completed new additions to the Hazeldean Office Park development in Pretoria East.

The ability of contractor, J.C. van der Linde & Venter Projects, to adapt to unforeseen challenging conditions played a major role in the successful completion of new additions to an office park development in Pretoria.

The Pretoria-based member of Master Builders Association North recently completed two buildings at the Hazeldean Office Park development in Pretoria East for prominent local property developer, Abland. This office park, near Silver Lakes Golf Estate, is an important component of an 800-hectare nodal development that also comprises residential and retirement villages, schools, churches, clinics, colleges, retail centres and showrooms.

Thomas Joubert, director of J.C. van der Linde & Venter Projects, and his team completed the buildings in June 2016, with the contractor joined in the professional team by architects, MWLF Architects, and structural engineering consultants, SiVest.

Joubert says J.C. van der Linde & Venter Projects and its piling sub-contractor, VNA Piling, were confronted by very complex ground conditions right from the early stages, with a large portion of the site that hosts the larger three-storey structure with its 800-m² footprint overlaid with large boulders and extremely loose soil.

"The boulders restricted drilling to a depth of just one to one-and-a-half metres to sink the piles that were initially specified for the foundations of the buildings. The removal of the boulders required the extensive use of excavators. And,

in some places, when the derrick was removed, the drill hole would rapidly fill up with sand and rocks which had to then be removed by hand," he says.

This problem significantly delayed the start of building activities on the larger building while construction of the adjacent three-storey structure that was founded on ground conditions that allowed for more routine piling, forged ahead effortlessly with no hold-ups.

To avoid further delays, Joubert, in consultation with SiVest, suggested that a large raft foundation to support the building should be erected on the challenging terrain. While it cost slightly more than the initial piled foundation design, a week of valuable construction time was saved and afforded J.C. van der Linde & Venter Projects the opportunity to steer the project back onto its critical path.

Designed by SiVest, the raft foundation employed was an 800-m² free-standing 600-mm-thick concrete slab. "A raft foundation is basically a concrete mat – or continuous footing – that can support an entire structure. On sites with low soil bearing conditions, the raft distributes the building's pressure over a large area so the soil is able to bear the stress," Joubert explains.

"The raft's construction called for about 420 cubic metres of concrete. We had to mobilise the entire resources of the Eastern Readymix batching plant nearby to supply our material needs, and had 13 concrete mixing trucks driving to and from the batching plant to feed two concrete pumps used to finish the 12-hour continuous concrete pour for the raft foundation," he added.

Once the raft foundation was completed, the structure rose rapidly out of the ground, with the team quickly catching up with its counterparts deployed at the other office block.

The two new office buildings each comprise five offices per floor, a communal area and elevator shafts.

The buildings have collectively brought an additional 5,600-m² of floor space to the very popular Hazeldean Office Park, with most of this already occupied by staff by the time J.C. van der Linde & Venter Projects was finalising the last phases of this very challenging project.

**More information from Charl Venter,
Tel: +27(0)12 803 0392 / www.vdlv.co.za**



A large raft foundation was used to support one of the two new office blocks built by J.C. van der Linde & Venter Projects at Hazeldean Office Park.



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One of the locks in the completed Panama Canal Extensions.

Mapei solutions for Panama Canal Expansion project

The 26th June 2016 marked the inauguration of the Panama Canal Expansion Project, also known as the Third Set of Locks Project, which doubles the capacity of the most important waterway in the world. Cutting across the Isthmus of Panama, the 77-km canal is regarded as one of the greatest engineering achievements of the 20th century. This vital channel for international maritime trade effectively links the ports of over 160 countries around the world.

For the last six years, Mapei has contributed technical support and supplied innovative additives and waterproofing mortars, as well as special products for protecting structures and waterproofing concrete basins. For example, Dynamon XP2 was used in the first six months of the project for concrete work on both the Atlantic side and the Pacific side.

Requested by the client to enhance workability and handling properties, Mapei developed a highly-evolved superplasticising admixture, Dynamon XP2 Evolution 1, to suit the specially designed 5,5 million cubic metres of marine concrete used for the Expansion Project.

The project added a new waterway, allowing a larger volume of vessel traffic and also increased the width and depth of the existing channels to accommodate Post Panamax vessels. With a length of 366 metres, width of 49 metres and draught of 15 metres, this new class of vessel is capable of transporting up to 13,600 TEUs, almost 2.5 times as much cargo as a standard Panamax ship.

Construction was carried out by an impressive international consortium led by Spain's Sacyr, and included Italy's Salini Impregilo, Belgium's Jan de Nul and the Panamanian firm Constructora Urbana.

Mapei was also involved in the refurbishing of the Gatún Locks on the existing canal, considered by many to be the most impressive reinforced concrete structure ever built. The work required a special type of concrete, incorporating two Mapei admixtures: Planitop 15, an inorganic powder for concrete cast

in formwork, and Mapecrete SRA, a liquid admixture specially formulated to reduce the formation of cracks caused by hygrometric shrinkage in normal and self-compacting concrete.

Other products supplied by Mapei since 2010 included Planigrout 300, Mapegrout 05/06, Idrostop PVC waterstops, Multi Idrostop 11, Mapegel UTT, Idrosilex Ready, Mapeproof Swell, Idrostop 10, and Idrostop Mastic.

Founded in 1937 in Milan, Mapei is today one of the world's leading manufacturers of adhesives and complementary products for the installation of all types of floors and walls, in addition to specialising in a wide range of other chemical products for the construction industry. Currently the Industrial Group consists of 79 subsidiaries, including 7 service companies, and 67 production facilities operating in 32 countries on five continents. ■

More information from Mapei South Africa,
Tel: +27(0)11 552 8476 / www.mapei.co.za

About Mapei South Africa

Mapei South Africa is part of the Mapei Group, an Italian-based multinational that is a leading manufacturer of chemical and adhesive products for the construction industry. As part of the multinational group, Mapei South Africa passes numerous benefits onto its client base by having access to knowledgeable technical experts, research capabilities and product specialists. Mapei South Africa distributes its products throughout sub-Saharan Africa.

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20 key facts about the world's longest, deepest rail tunnel

On 1 June, the world's longest and deepest rail tunnel officially opened in Switzerland, after 20 years of work. The 57-km twin-bore Gotthard Base Tunnel (GBT) provides a high-speed rail link under the Swiss Alps between northern and southern Europe. Switzerland says it will revolutionise European freight transport.



Approximate route of the GBT through the Saint-Gotthard Massif (Cooper/Wikimedia Commons).



Straight and flat, the GBT clears a major traffic bottleneck through the Alps.

Bringing to fruition a plan hatched in 1992, goods currently carried on the route by a million lorries a year will in future go by train instead.

For length, the tunnel beats Japan's 53.9-km Seikan rail tunnel and relegates the 50.5-km Channel Tunnel between the UK and France to third place.

German Chancellor Angela Merkel, French President Francois Hollande and Italy's Prime Minister Matteo Renzi joined Swiss officials at the grand opening.

"It is just part of the Swiss identity," Federal Transport Office director Peter Fueglistaler told Reuters news agency. "For us, conquering the Alps is like the Dutch exploring the oceans."

Here are 20 key facts about the tunnel and its expected impact:

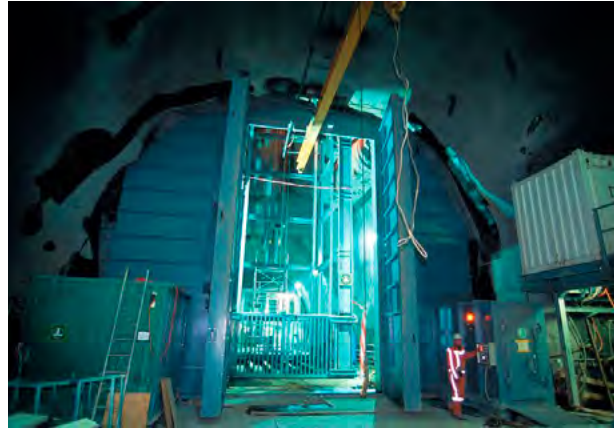
1. The project cost \$12.5bn to build, more than the gross domestic product of Nicaragua.
2. At its deepest GBT is 2.3 km below the surface of the Saint-Gotthard Massif above.
3. It's hot down there: the rock can reach temperatures of as much as 46°C.
4. To cope with the tremendous weight above the tunnel tubes, engineers pioneered using flexible steel rings which partly closed under the pressure and prevented deformations.
5. Swiss voters backed the tunnel by a 64% majority in a referendum in 1992 and work began in 1996. Two years after the referendum, the Swiss backed a proposal from environmental groups to start moving all freight travelling through Switzerland from road to rail.
6. GBT goes 600 m underneath the old, 15-km-long Gotthard Rail Tunnel, built in 1882.
7. It clears a major bottleneck in European north-south cargo and passenger traffic by superseding the old rail tunnel and a 17-km road tunnel built in 1980.
8. Because it is flat and relatively straight (the old rail tunnel twists and climbs more than 1,000 m), the GBT can carry bigger and faster trains.
9. Congestion is terrible on the single-bore road tunnel built 1980: it was meant to carry a million vehicles annually, but after only one year was carrying 2.5 million, and now carries 6 million.
10. The idea of a flat, straight tunnel through the Alps was first proposed in 1947 by Carl Eduard Gruner, an engineer and urban planner from Basel.
11. Every day, 260 freight trains (160 km/h) and 65 passenger trains (200 km/h) will pass through the GBT in a journey taking as little as 17 minutes.
12. When full services begin in December, the journey time for travellers between Zurich and Milan will be cut by an hour, to two hours and 40 minutes.
13. The tunnel is being financed by value-added and fuel taxes, road charges on heavy vehicles and state loans that are due to be repaid within a decade.
14. Between 2002 and 2012, nine people were killed on the project. Four came from Germany, three from Italy, one from South Africa and one from Austria.



The tunnel breakthrough occurred in October 2010.

A memorial service was held for them on 31 May before the official opening.

15. The first tunnelling breakthrough took place on 15 October 2010, with great accuracy: the aperture was out by only 1 cm vertically and 8 cm horizontally.
16. 80% of the drive in the main tubes was cut by tunnel boring machines, 20% by conventional drilling and blasting.
17. A total of 28.2 million tonnes of excavated rock was taken out of the tunnel, using 70 km of conveyor belts.
18. To save time and cost, the GBT was split into five sections with separate access, and work proceeded on the sections simultaneously. For the Sedrun section,



For the Sedrun section, access was provided through a 1-km-long tunnel and two 800-m-deep vertical shafts.

access was provided through a 1-km-long tunnel and two 800-m-deep vertical shafts.

19. In all, over 150 km of tunnels, galleries, cross passages and shafts had to be excavated for the GBT. (There are 178 cross passages between the two tubes, at 325-m intervals.)
20. 2,600 people worked on the tunnel, including top brass at AlpTransit Gotthard Ltd, the company responsible for building the GBT (a wholly owned subsidiary of Swiss Federal Railways). ■

Other photographs by AlpTransit Gotthard Ltd.

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



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BUILDING TRUST



Cutting-edge technologies crucial in Gotthard Base Tunnel



June 1st marked the official inauguration of the world's longest rail tunnel. Sika's front-line technologies and construction expertise played a crucial role in the successful completion of the 57-km-long Gotthard Base Tunnel, one of Europe's most important infrastructure projects. The immensely challenging quality requirements were met through the use of Sika's durable solutions for waterproofing, fire protection, coatings, and concrete and shotcrete production.

From its very early days, Sika was involved in the construction of the Gotthard railway tunnels. Sika-1 earned industry acclaim and commercial success in 1918 when the first Gotthard railway tunnel needed waterproofing. Today the new Gotthard Base Tunnel is once again a high-profile project for Sika.

The client specified an extremely long service life during which the concrete and waterproofing systems should require no significant maintenance. In the course of an elaborate prequalification process, Sika fulfilled all the stringent requirements specified by the client.

The partly newly developed products underwent rigorous practical tests by official testing laboratories prior to mass production and application. The high-grade shotcrete used to support the tunnel excavation served as the base for the Sikaplan® and Sarnafil® waterproof membranes. The concrete lining was then placed using Sika admixtures to achieve the high degree of precision required for the tunnel surface geometry.

For Sika too, the Gotthard project defies all superlatives. Since the start of preliminary testing in 1992, Sika's employees have worked more than 210,000 hours on the once-in-a-lifetime project. Approximately 20,000 tonnes of concrete admixtures were used for the concreting works. The tunnel was waterproofed with 3.3 million square metres of Sikaplan® membranes – roughly the size of 330 soccer pitches. Overall, some 40,000 tonnes of Sika products, equivalent to 1,700 freight wagons, were transported to the site. ■

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

About Sika AG

Sika AG, is a globally active specialty chemicals company with its South African head office based in Durban, and with branches in all major SA cities.

The company, located in Baar, Switzerland, supplies the building and construction industry as well as the manufacturing industries. 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. Sika has subsidiaries in 93 countries around the world and manufactures in over 170 factories. Some 17,281 employees link customers directly to Sika and guarantee the success of all partners.

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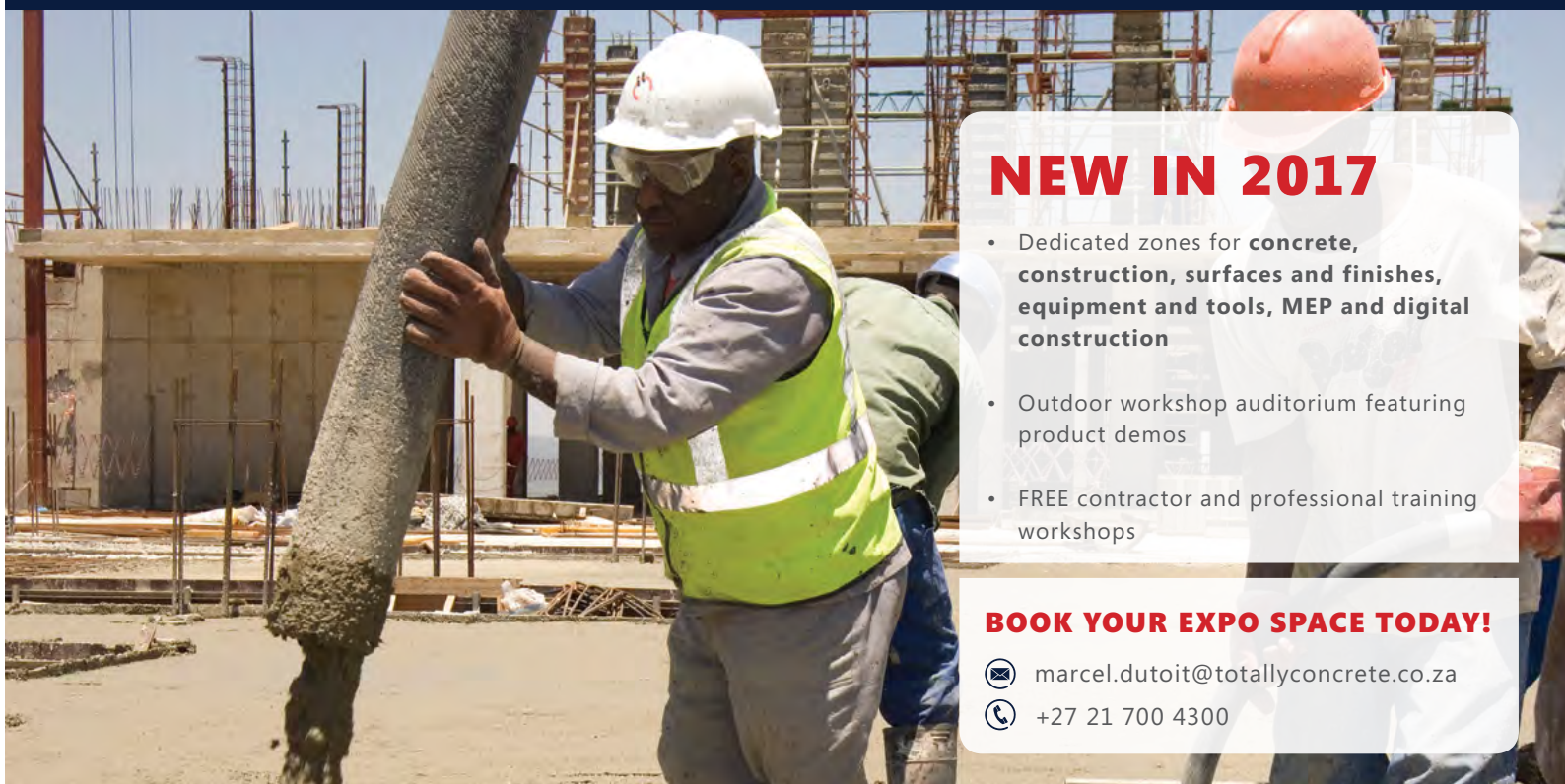
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Construction chemicals vital in the world's longest rail tunnel



After nearly 20 years of construction, the Gotthard Base Tunnel (GBT) in Switzerland officially opened on June 1. Construction chemical products from BASF helped make construction of the world's longest rail tunnel possible. "We are proud to have contributed our innovative solutions and know-how to help master the challenges of this monumental project," said Ralf Spettmann, president of the BASF Construction Chemicals division.

The 57-km GBT was built with around four million metric tons of concrete – roughly 40 times as much as was used in Burj Khalifa, currently the world's tallest building. BASF supplied concrete admixtures and cement injections to stop water ingress, as well as fire-protection mortar for the project.

Long distances and high temperatures in the tunnel

In the 20-km section between Erstfeld and Sedrun, the two parallel tunnel tubes and the connecting galleries that link the two tunnels approximately every 300 metres were built using BASF concrete admixtures.

"In underground construction, demands on concrete are contradictory. While being transported several kilometres deep into the mountain, it must remain workable for hours and cannot solidify. But the concrete also must set almost immediately when sprayed onto the tunnel wall. This was one of the greatest challenges," said René Bolliger, head of the Underground Construction unit at BASF Germany, Austria and Switzerland.

The right combination of BASF concrete admixtures overcame the challenges: MasterGlenium superplasticisers made the concrete especially flowable and workable, while shotcrete accelerators caused the concrete to solidify and harden seconds after being sprayed onto the tunnel wall. Furthermore, BASF developed an admixture especially for the project which considerably slows down cement hydration. In combination with the BASF superplasticisers, it ensured the concrete could be used optimally even after being transported long distances and exposed to the high temperatures in the interior of the mountain. This system of superplasticisers and retarding agents was used for initial securing measures after excavation as well as during the concreting of the inner shell.

Concrete solutions for deep shafts

Two vertical shafts descend more than 800 metres from the mountain village of Sedrun into one of two multifunction stations in the tunnel that serve as emergency stops and house ventilation equipment and technical infrastructure. BASF solutions can also be found here: just like the tunnel, these were first secured with sprayed concrete and then outfitted with a wall of poured concrete.

"Transporting the concrete via a vertical downpipe through the shafts was particularly challenging. We had to make sure that while the concrete fell down, its components did not segregate," explained Bolliger. By choosing the right concrete superplasticiser and finding the optimal dosage for the application conditions, BASF experts ensured that the concrete was still easily workable after falling freely for several hundred metres. To prevent water ingress, microcement was also injected into rock crevices and cavities.

Fire protection with BASF

Fires are a major danger in tunnels and there are strong fire safety requirements. If concrete gets hotter than 1,000°C, it loses its load-bearing capacity and the tunnel collapses. The wall of the GBT near the south portal was therefore coated with a special fire protection mortar from BASF. "This enables the tunnel walls to withstand temperatures of up to 1,400°C for at least 90 minutes. This is valuable time for fire-fighting operations," said Frank Clement, a BASF expert on fire protection solutions for underground construction. ■

More information from Stephan De-Maria,
email: stephan.de-maria@basf.com / www.basf.com

About the BASF Construction Chemicals division

BASF's Construction Chemicals division offers advanced chemical 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 about 5,500 employees form a global community of experts. To solve our customers' specific construction challenges from conception through to completion of a project, we combine our know-how across areas of expertise and regions and draw on the experience gained in countless construction projects worldwide. We leverage global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make our customers more successful and drive sustainable construction. The division operates production sites and sales centers in over 50 countries and achieved sales of about €2.3 billion in 2015.

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LafargeHolcim plays a major role in tunnel construction

With the opening of the 57-km Gotthard base tunnel in Switzerland on 1 June 2016, LafargeHolcim can add another major infrastructure project to the tunnel construction projects it has played a role in around the world.

The new railway link through the Alps is a Swiss centennial project and one of the largest environmental protection projects in Europe. By moving some of the passenger and freight transport from road to rail, it is expected that environmental costs of CHF130 million a year will be saved, with travel time between Zurich and Milan reduced by an hour. LafargeHolcim is the partner for construction materials and logistics on both the Gotthard and the Ceneri Base Tunnel projects.

Environmental concerns were a priority from the project's conception. The excavated material was transported in an environmentally friendly manner via conveyor belts for 70 km.



The total amount of excavated material weighed 28.2 million tons and LafargeHolcim was able to recycle a more than one third of this amount into aggregates for use in the manufacture of concrete. The remaining material was reused for many different purposes, including the natural landscaping of the access routes leading to the tunnel.

Involved in the project right from the beginning, Holcim Switzerland, began its research to find the right cement mix and application methods in 1996 with numerous cement formulae and applications being tested in a test gallery to take into account the characteristics of the rock to which it would ultimately be applied.

Logistics also had to be taken into account. The long journey to reach the tunnel meant that the readymix concrete needed to remain in a liquid state for twelve hours. A specially developed concrete train with a mobile concrete mixing unit and a tailor-made readymix concrete unit within the tunnel both played a critical role in ensuring that all the concrete was delivered in perfect condition.

The Group also invested in building the most modern cement plant in Switzerland and connecting it to the railway cargo infrastructure, as well as the operation of 400 cargo rail cars. These investments guaranteed that the Group would be able to create up to 2,300 m³ of concrete every day when working around the clock, without interruption, at peak construction times on the project.

Once the Ceneri base tunnel is complete, the Group will have supplied 2.3 million cubic metres of readymix concrete and one million tons of cement to this unique project.

About LafargeHolcim

As the new leader in the building materials industry, LafargeHolcim has the assets necessary to address the challenges of a new world. With a local presence in 90 countries, the most innovative cement, concrete, and aggregates solutions to meet our customers' needs, and a commitment to health, safety, and sustainability, we have the most efficient business model and the best performing operating models and teams.

Key facts and figures

- 90 countries
- 100,000 employees
- CHF 29.5 bn in net sales
- 374.0 mt of installed capacity worldwide
- 2,500 plants (including over 1,500 in readymix concrete, over 600 in aggregates and over 200 in cement and grinding plants)
- Our solutions and services: cement, concrete, and aggregate solutions for the following businesses: buildings, infrastructure, distribution, oil and gas, affordable housing, and construction systems
- CEO: Eric Olsen
- Founded in 2015 following the merger of Lafarge and Holcim■

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

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Pulling out all the stops on road builds

While the quality of materials is a prerequisite for any construction project, it is also the ability to guarantee an interrupted supply of cement that has proved to be a major competitive edge for AfriSam on recent road overhaul projects in the Free State.

AfriSam, the largest building materials producer in South Africa, has supplied cement for stabilisation activities on three South African National Roads Agency Limited (SANRAL) projects in the province.

This includes the more recent order for 20,000 tons of cement by Raubex Construction which is upgrading the National Route 1 from Sydenham (28.8 km) to Glen Lyon (62.4 km) in Bloemfontein.

Raubex is working with Roadmac Surfacing on this heavy upgrade, which will prolong the life of the road by up to 20 years. Raubex is building the pavement, while Roadmac Surfacing is handling the bitumen-treated-base (BTB) course as well as the surfacing components of the works.

As such, the sub-base component of the project is absolutely critical to Raubex. And Johan Acron, the company's contracts manager on this project, is impressed by the consistent supply of quality cement the construction team is receiving from AfriSam. He says this has definitely helped Raubex forge well ahead of schedule on the works programme.

The supply of cement on all three of Raubex's recent projects in the province has been managed by AfriSam's Stefan Roos who ensures that two loads of cement, each comprising 1,440 bags, are delivered to the site every day.

This cement is delivered from AfriSam's depot in Bloemfontein. It is located a mere five kilometres from the construction site,

and receives a regular supply of the material by rail from the company's Ulco clinkering and grinding operation in the Northern Cape.

As Roos notes, should an emergency arise, the cement producer can guarantee that it will have cement on site within only one hour.

The first loads arrive at 04h00 in the morning, and sub-contractors start unpacking and spreading the cement, ahead of the stabilisation operations.

The sub-base is an essential component of the high-specification road infrastructure, which also comprises a 120-mm-thick BTB layer. Work starts with the measurement of the natural ground levels, followed by the milling of 50 mm of the base of the existing pavement. Raubex is stabilising the sub-base to a depth of 350 mm with AfriSam's Roadstab 32.5N CEM II B-L cement. Some 20,000 tons will be used on this project.

On two of these contracts, Raubex has used mechanical spreading, a service that is also supplied by AfriSam. However, on this contract, it has opted for manual spreading practices to meet SANRAL's objective of developing small, medium and micro enterprises on all of its builds.

While building activity seems to have slowed down in Bloemfontein, Roos remains optimistic about the future. He definitely has reason to be, considering the growth the city has enjoyed over the past few years, and the infrastructure needed to support this. ■

More information from Cornel Burger,

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www.raubex.com



Raubex Construction is upgrading the National Route 1 from Sydenham (km 28.8) to Glen Lyon (km 62.4) in Bloemfontein.



Raubex is stabilising the sub-base to a depth of 350 mm with AfriSam's Roadstab 32.5N CEM II B-L cement.



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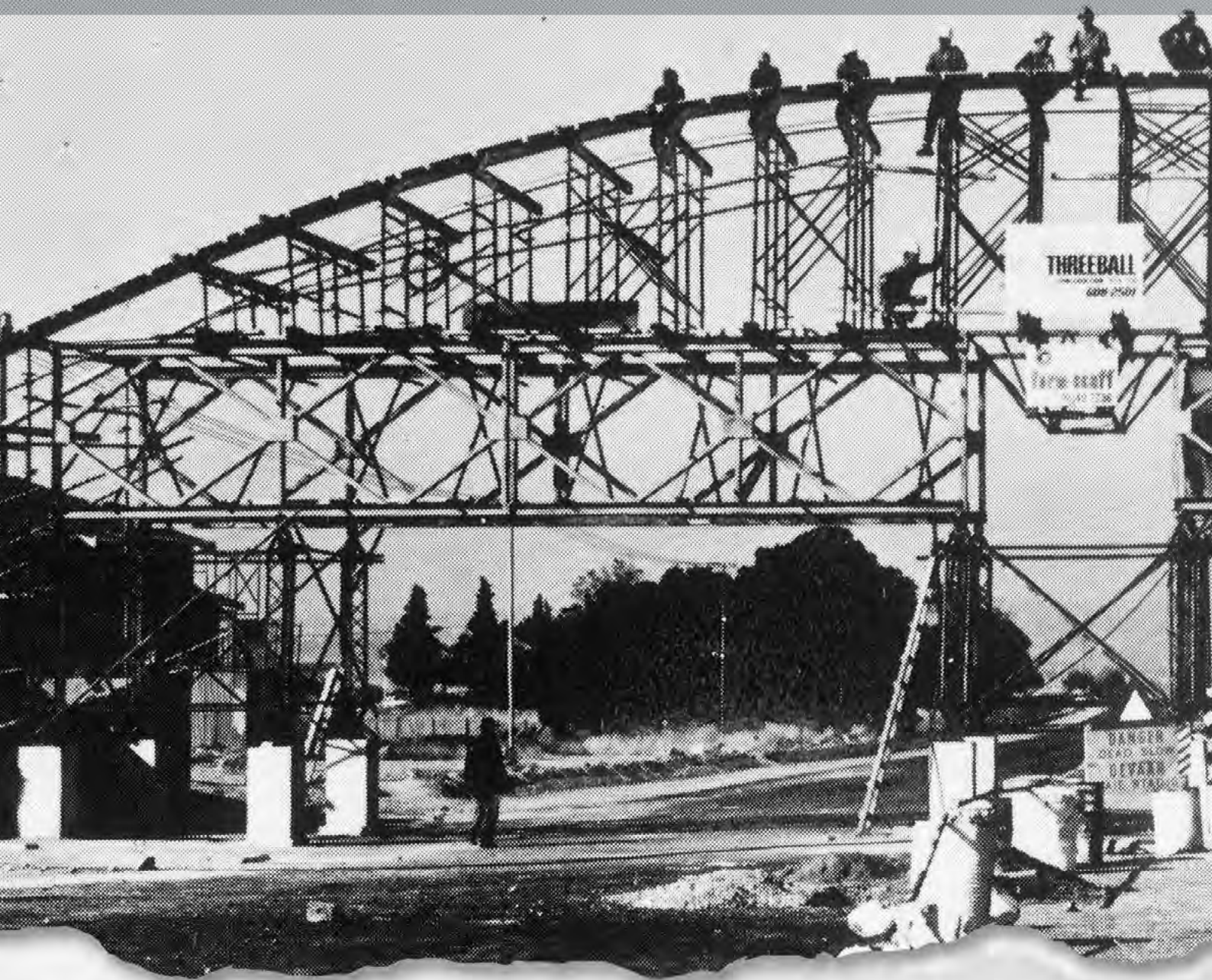
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But, perhaps our greatest achievement has been the development of our people into a world-class team that is respected both locally and internationally as an industry groundbreaker.

They are the foundation on which we will build the next 50 years.

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High-tech support for Sandton cable-stayed bridge

More than 1300 tons of Form-Scaff formwork and falsework is on site at the Katherine Street Bridge where WBHO is undertaking a technically challenging project to construct Sandton's very latest show-piece structure.

With a span of 120 m including two bus lanes and a pedestrian walkway, the ultra-impressive cable-stayed bridge will form part of the City of Johannesburg's new-generation Rea Vaya BRT route linking Alexandra to Sandton. Its span over South Africa's busiest highway will provide safer and faster access to the central business district for thousands of commuters every day.

During the construction phase however, the spanning of the highway without impeding workday rush hour traffic is the greatest challenge of all, requiring the assistance of the country's top structural support experts to design and build temporary structures to enable construction to continue unimpeded.

Custom designed

Chris Erasmus, Form-Scaff technical director, explains that the entire weight of the bridge needs to be supported from the time of the first concrete being laid (early last year), until the massive cable stays are in place and carefully tensioned later this year. Until then, Form-Scaff's combination of Super-Beams and Kwikstage scaffolding will form the basis of the support for the bridge.

"We also manufactured special formwork to pour the towering 52-m-high main pylon and ensure that the cable anchors can be carefully aligned with the anchors on the road-level bridge beam. Lobster-back forms were also made for the casting of the piers that support the bridge as it touches down on either side.

"With limited headroom across the 24-m and 27-m-wide portals over the north and south carriageways, our heavy capacity Super-Beams provide the only feasible answer with a low enough profile for unimpeded traffic below, while being strong enough to support the thousands of tons of construction materials above. Another advantage is that the five separate beams, each comprising four connected Super-

Beams, could be preassembled offsite to save time and space on the crowded construction site."

Precast solution

WBHO construction manager for the BRT Cable Stay Bridge, Nicol van Rensburg, says the construction starts with the Super-Beams supporting 19 prestressed precast concrete transverse beams spaced at 3.5-m intervals across the bridge. These 8.55-m-long by 400-mm-wide and 750-mm-high concrete beams then provide support for the 100-mm-thick prestressed concrete planks which are in turn placed across the 3.5-m gap between the transverse beams.

Casting of the main beams and slabs follows with the main beams tying into the exposed rebar of the transverse beams. At the same time the main pylon is constructed with formwork designed to reduce in plan dimension from 6 m at the base to 1.5 m at the top of the pylon. This reduction allows for the construction of a slanting front face which, creates both functional strength for the pylon as well as being aesthetically pleasing. In addition, for the stability of the structure, the pylon base required 20 x 1.2-m piles to be cast, each more than 20 m deep, to make contact with the bedrock below.

The pylon also requires five cross beams to assist in torsion control to brace the two legs. These are spaced about 4 m apart and begin at 35 m from the base of the pylon. Once completed, the pylon legs will support the heavyweight 27-strand cables measuring up to 88 m long, as well as the weight of the structure, traffic and other calculated exterior forces. Following the final tensioning and completion of the concrete work, the final step in the construction of the bridge will be the addition of a bitumen running course to provide a smooth surface for the Rea Vaya buses, as well as a 'bolt-on' structural steel pedestrian walkway.

Dependable partnership

Van Rensburg's summation is: "For a job of this size and complexity we prefer to deal with a professional and dependable partner. Form-Scaff also helped us overcome some of the challenges associated with working on a project which





requires dynamic design solutions in very limited time spans.

"A good example is the cable formwork tubes that are cast into the pylon which needed to be lined-up perfectly with the ties at the bottom. This is not an easy task considering the tubes have to be held in place for multiple lifts as the concrete pouring progresses. In the end however we worked on solutions and in collaboration with Form-Scaff were able to overcome these potential pitfalls," says Van Rensburg.

"Another challenge was the balancing and anchoring of the bridge considering it has an 88-m reach on the Sandton side – and just a 33-m reach on the other. To overcome this, Hatch, the design engineers, called for the construction of a much thicker, solid deck on the short side of the bridge to help counterbalance the weight deficit. The piers also needed to be anchored from the deck level into bedrock on the short side to provide additional stability," he said.

Overcoming challenges

"Likewise, the solution for the cable formwork tube alignment issue has also been solved and involves slotting the formwork to allow them to be lifted after each pour without interfering with the cable tubes.

"Although these were technically challenging, they are just some of the many complex issues that you get on a live site.

In my experience the kind of technical support you surround yourself with ultimately determines the manner and success of the solutions created to address them.

"Having worked with Form-Scaff on a number of similarly complex projects in the past we are 100% confident in their overall ability to deliver according to the specifications of the project. On this particular site the expertise and technical support provided by them has been pivotal to the success of the project overall," concludes Van Rensburg. ■

More information from Form-Scaff,
Tel: +27(0)11 842 4000 / www.formscaff.com

BRT Cable Stay Bridge

Client:	Johannesburg Development Agency
Main contractor:	WBHO
Design Engineer:	Hatch
Form-and-falsework:	Form-Scaff
Location:	Katherine Street, Sandton
Project type:	Cable stay bridge



Dokadek 30 – the light, fast, cost-effective, modular slab formwork system

Dokadek 30 is a beam-less, hand-set formwork system designed as a lightweight steel structure with yellow coated frames faced with timber/plastic-composite sheeting.

Dokadek 30 combines the advantages of a panel floor formwork system with those of Dokaflex floor-slab formwork: its 3-m² large panels make it fast in typical zones, yet – thanks to Dokaflex – it is quick and flexible in the infill zones as well. Dokadek 30 – with or without drop head: the evolution of floor-slab formwork.

The galvanised yellow powder coated steel frame of the panel with riveted on Xlife sheet is long lived and permits many re-use cycles without changing the form-facing. The small number of joints and the neat joint pattern along with the uniform concrete finish make it easy to achieve great results.

The standard Dokadek 30 Prop-head for holding the panels firmly allows for integrated anti-liftout guard and prevents any of the panels accidentally falling off. This makes extra precautions (such as wind bracing) unnecessary.

The working posture is generally upright – with Dokadek 30, frequent bending down and inserting panels from above is a thing of the past. Even the job of removing the panels can be done without any laddering. Strenuous overhead work is reduced to an absolute minimum.

Fast formwork removal is a critical success factor, because this operation takes up around 33% of the total forming time. With Dokadek 30, the panels are stripped out without any time-consuming overhead work. The DekDrive then lets you shift up to 12 m² of Dokadek 30 at a time. The clearly defined erection sequence prevents the crew from attempting dangerous improvisations, and ensures a consistently high safety level – even when semi-skilled labour is deployed. Because of the number of props and how they are arranged, with Dokadek 30 there is no need to dimension the system in advance.

Dokadek 30 is fully compatible with the Doka edge protection system XP. This brings an added dimension of safety.

Since the launch of Dokadek 30, Doka South Africa and International have been involved and associated with a number of successful projects. Recent projects include The Johannesburg Zoo with Nale Trading and SBV in Pretoria with Formacon.

The SBV project with Formacon in particular has been a successful project due to fast cycle times of approximately 1,000 m² which had a formwork erecting turnaround time of one-and-a-half days per cycle with a team of six, exclusive of steel rebar and concrete placement.

Dokadek 30 was integrated with Dokaflex H20 Formwork beams for the infill patching around columns, which proved yet another significant aspect of the system as the need for props in these areas are eliminated by means of the Dokadek 30 Suspension Clamp H20. The only significant challenge worth mentioning was that this was an above the average propping height of 3.6 m which under normal circumstances could make erecting and striking of formwork from the bottom more time consuming than normal. Dokadek 30 Erecting and Striking tools made this a simple task.

Marinus Schoeman, the managing director of Formacon, has made the following statement based on his experience with the Dokadek 30 slab formwork system:

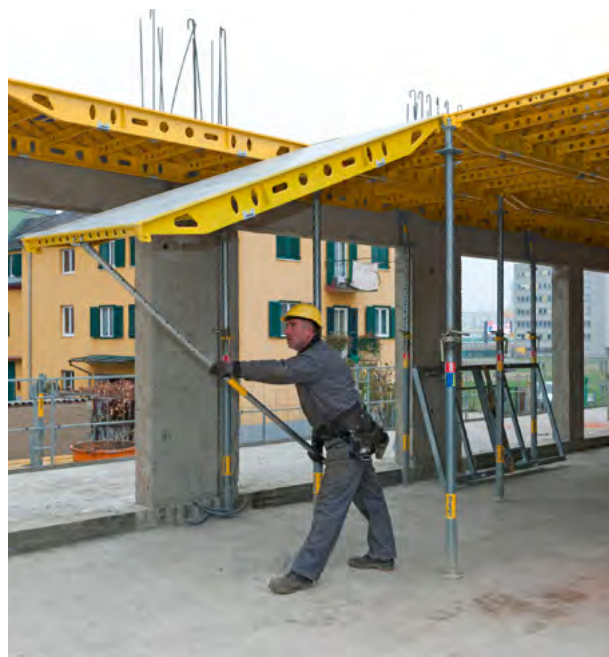
“We found Dokadek 30 to be very user friendly; with minimal labour you are able to cover large areas in a short time frame. With this new system there are very few safety concerns, as you are erecting the panels from below the deck. A big positive is that there are fewer components as the beam is integrated with the panel, as well as no additional strips between panels, saving costs.

“The finish is Class 1 as you can expect nothing less from Doka!” ■

More information on Doka South Africa and the Dokadek 30 system at www.doka.co.za



Wide spacing of props creates plenty of working space.



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www.doka.com/concremote



Test with 3D-printed concrete formwork a success

Hejmans and CyBe Construction have printed two formworks with a 3D concrete printer. It is the first time in the Netherlands that construction elements have been made in this way. The printed formwork remains part of the construction element and is therefore a form of permanent formwork.

The two companies carried out the test to explore possible 3D-printed formwork applications in civil engineering (road and hydraulic engineering). One of the formwork elements has been placed in front of the head office of Heijmans in Rosmalen.

"Although the technology still requires further testing and refinement, 3D concrete printing mainly provides the necessary opportunities," says Jurre van der Ven of Heijmans. "Our aim is to print a double-curved concrete formwork, which we will fill with reinforced concrete, and then use to construct a bridge or a viaduct, because if an element is strong enough for such heavy construction, it can be further developed and used for residential building. The tests we have recently carried out were extremely successful."

Innovation manager Jurre van de Ven: "3D printing concrete formwork, or even an entire construction, offers the potential to make free, organic forms of equal quality, but at lower costs."

"From the test on the first construction element it appears that the characteristic value of the concrete we printed (CyBe Mortar) is greater than previously calculated. We are extremely satisfied with this," says Berry Hendriks of CyBe Construction. "From practical research and tests of this nature we see that the technology is becoming more widely applicable. Above all, we notice from this that the advantages of 3D concrete prints are becoming more visible. Ultimately, it will help us to facilitate



This formwork has a straight and a double-curved side, the bottom of which was given a smooth finish.



The first 3D print was a hollow formwork (1.25 metres wide, 35 cm deep and 3.1 metres high), which was filled with water to establish the maximum 'formwork load'.

the sector with this technology so that construction can be carried out faster, cheaper and of a higher quality."

About the test

Heijmans and CyBe have printed two concrete formwork elements. The first 3D print was a hollow formwork (1.25 metres wide, 35 cm deep and 3.1 metres high), which was filled with water to establish the maximum 'formwork load'. It took approximately 30 minutes to print the formwork.

The second formwork has a straight and a double-curved side and is 2.5 metres high. During printing, the bottom half of the curved side was given a smooth finish. On the one hand, this was done to see how flat and smooth printed concrete is after treatment, and, on the other hand, to inspect the growth of moss and algae. The formwork was printed in approximately 25 minutes and, filled with concrete, was placed in front of the head office of Heijmans.

Why Print Formwork?

Clients are increasingly demanding more complex designs and forms for houses and structures such as viaducts. This requires a lot of effort in terms of implementation and the design. These complex forms can be made through the traditional process; however, it costs a lot of design time and man hours to implement. 3D printing a concrete formwork, or even an entire construction, offers the potential to make free, organic forms of equal quality, but at lower costs (up to 50% lower).

Heijmans and CyBe anticipate using a printed formwork element in a project by mid 2017. ■

More information from Rik Hammer,
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Source: <http://goo.gl/0kDMP6>

A brief history of RMD Kwikform

RMD Kwikform, which has serviced the South African construction industry since 2007, had an interesting start in the United Kingdom (UK) shortly after World War II ended.

At that time there was an acute shortage of building materials and both timber (the traditional formwork material) and steel, with only small quantities being available on permit from the Ministry of Supply.

Robert M Douglas Ltd was the main contractor for the construction of a steel works in Wales which necessitated the use of 200,000 cubic yards of reinforced concrete which, in turn, required formwork for its construction.

The shortage of both timber and steel led to an innovative use of timber. It was used as framing for the steel plate. When the steel ran out, old Anderson air raid shelters were rolled flat to augment the steel. This was the very first steel panel formwork in the UK.

The system was so successful that in 1948 it was mass-produced for the greater construction industry. This led to the formation of Rapid Metal Developments Ltd, a subsidiary of Robert M Douglas Ltd.

The first export order was to Australia in the early 1950s for the construction of the Woomera Rocket Range. Export markets were opened around the world from the 1950s to the 1980s. The UK branch network had also developed during this period with its focus being on formwork hire.



In 1975 RMD received the Queen's Award to Industry, acknowledging the firm's export success. This was followed by the Group's Chairman becoming 'Sir Robert.'

Following the acquisition of R M Douglas by Interserve in 1991, RMD accelerated overseas expansion and introduced a number of product lines to broaden and deepen its service offering. In 1999, following Interserve's acquisition of RMD, the UK operations were transferred to RMD Kwikform.

RMD Kwikform subsequently received the Queen's Award for Enterprise International Trade 2010, for increasing its export business by 185%, to 30 countries over six years, and generating an income of £154m.

RMD Kwikform arrived in South Africa in 2007 and has already quadrupled in size. The footprint of the business has also increased to having branches in Centurion, Johannesburg, Durban, Cape Town, Bloemfontein, and Nelspruit.

RMD Kwikform is a customer-driven business which makes safety its highest priority, offers tailored solutions to meet specific needs, and does so by offering compelling value. It aims to succeed by doing and not talking to create a sustainable competitive advantage and establish a basis for future growth. ■

More information from Tel: +27(0)12 004 1001
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Formwork Exchange: breathing new life into old formwork

Formwork Exchange (FEX) is a new company established in 2015 to tap into the current economic downturn which has resulted in large quantities of formwork and scaffolding not being utilised any longer due to the end of contracts or because they are no longer suitable for the client's application.

Formwork Exchange will purchase this equipment if it is still in usable condition and refurbish it back to life so that it can be used again on other projects.

The company also has alliances with renowned factories in South Africa and Spain that produce new formwork and scaffolding to suit both the local and export markets.

The much respected Kwikstage scaffold system and Economy steel panels are still very much in demand in the construction industry in South Africa and its neighbouring countries. Formwork Exchange has the capacity to supply these systems on demand in either the new or the used options depending on cost considerations.

In addition, any special steel formwork for a specific application can be manufactured at the firm's current premises in Chloorkop, Gauteng.



Formwork Exchange

When it comes to state of the art formwork engineering systems Formwork Exchange can depend on the resources of the ULMA CONSTRUCTION formwork systems being available from their partner company in Spain. This enables Formwork Exchange to compete with those companies that are importing formwork into the South African and neighbouring countries' markets.

FEX is your supplier of good used and refurbished formwork and scaffolding equipment at low cost. ■

More information from Tel: +27(0)71 334 5403

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Exceeding customer expectations

In order to meet, and even exceed, customer needs and expectations, Fives has developed and implemented a cement grinding plant which is able to produce various types of cement, several having a high cement to clinker ratio, and able to use additives that have a high moisture content. In addition, Fives has taken into account an increased usage of alternative fuels rather than fuel oil for drying of additives.



The Teresa grinding plant

Fives provides a proven solution based on FCB Horomill® technology, which facilitates efficient drying of additives within the grinding process, thanks to its unique arrangement of separated grinding and classification processes combined with a flash dryer within the circuit. In doing so, the complete system offers the highest cement quality at the lowest cost.

A P892 million FCB Horomill® grinding mill has been implemented and successfully commissioned at Lafarge Republic Inc's Teresa plant in the Rizal province of the Philippines. The new cement mill increases production capacity at the plant by more than 50%, producing 850,000 tpy of cement and bringing the plant's total capacity to two million tons.

The plant chose a Horomill from Fives FCB, because it is energy efficient, fully-automatic, and uses no water in the process. This aligns with Lafarge's sustainability goals: the plant sources 30% of its energy requirement from its waste heat recovery system, which generates 4.5 MW of electricity.

Following the successful commissioning of the cement grinding plant in Teresa installed by Fives, and to support the increasing demand for cement in the country, Republic Cement started its new cement grinding plant in Norzagaray (Bulacan Province) on 15th March 2016. The Teresa and Norzagaray plants have similar production targets.

This plant, basically a repeat order of the Teresa Plant, also operates with FCB Horomill® technology, and will also have the capacity to produce 850,000 tpy of cement.

This technology is designed to lower the wear rate and decrease the plant's energy consumption. It can also use CO₂ neutral cement additives such as fly ash, thereby reducing carbon dioxide emissions.

These investments will increase Lafarge's production capacity in the Philippines to over seven million tons.

FCB Horomill® technology is committed to sustainability thanks to its ability to grind any type of cement without water injection, with the lowest energy consumption, and with the incorporation of large amounts of additives. This combination is synonymous with the lowest carbon footprint and with a very low wear rate and high availability.

The advantages of FCB Horomill® system are:

- Energy savings;
- Low installed power;
- No water injection;
- Better product quality;
- Low wear rate and low maintenance cost;
- High reliability of parallel gear trains reducer;
- Full automatic mode, for start/stop operations as for switch of product;
- Same nominal capacity during the whole lifetime of wear parts;
- Low noise;
- Automatic preventive maintenance of the roller sleeve (optional).■

More information from Loïc Pottier,

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About Fives

Fives is an industrial engineering group with a heritage of over 200 years of engineering excellence and expertise. Fives designs and supplies machines, process equipment and production lines for the world's largest industrial groups in various sectors such as aluminium, steel, glass, automotive, logistics, aerospace, cement and energy, in both developing and developed countries. In all these sectors, Fives designs and manufactures equipment and innovative solutions, which better anticipate and meet the needs of the customers in terms of performance, quality, safety and respect for the environment. Fives brings its high-level expertise and services to supply tailor-made solutions and to ensure an optimal performance and improved availability of the plant.



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FCB HOROMILL®, GRIND YOUR CEMENT WITHOUT A DROP OF WATER

In dry climate countries and wherever water is a scarce resource, FCB Horomill® offers the opportunity to grind cement or any other mineral without a drop of water.

With zero-water injection, FCB Horomill® technology sustainably combines the lowest energy consumption with the highest flexibility, thus enabling cement producers to reduce their environmental footprint while optimizing grinding operations. With energy consumption up to 65% lower compared to ball mills and up to 20% lower compared to vertical mills, and a high cement/clinker ratio, FCB Horomill® produces high quality cement at lower Blaine, providing a competitive advantage in grinding operations.

For ultimate sustainability, trust Fives ! www.fivesgroup.com


fives ultimate machines
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Looking to light highways with light-emitting cement



The new material created by a Mexican researcher absorbs solar energy by day, and returns it to the environment with the onset of darkness.

In order to light roads, highways or bicycle lanes without the need to use electricity, Ph.D. researcher José Carlos Rubio, from Michoacan's University of San Nicolas Hidalgo created a light-emitting cement that has a life span of 100 years.

"Nine years ago, when I started the project, I realised there was nothing similar worldwide, and so I started to work on it. The main issue was that cement is an opaque body that doesn't allow the pass of light to its interior", pointed out Dr. Rubio.

He explained that common cement is a dust that, when it's added to water, dissolves as an effervescent pill. "In that

moment it starts to become a gel. At the same time, some crystal flakes are formed, these are unwanted sub-products in hardened cement"

Dr Rubio focused on modifying the micro-structure of the cement to eliminate crystals and make it completely gel, helping it to absorb solar energy and then return it to the environment as light.

Dr Rubio explained that in 2015, global cement production was about 4 billion tons, giving the new material an extremely wide commercial market. During the day, the building, road, highway or structure built with this new cement can absorb solar energy and then emit it during the night for around 12 hours.

He said that most fluorescent materials are made out of plastic and have an average three-year life span because they decay when exposed to UV rays; however, this new cement is sun resistant and has an estimated lifespan of 100 years.

Furthermore, it is ecological because it is made out of sand, dust or clay that becomes the gel and, during the process, the only residue produced is steam. Currently, it exists in a blue or green colour, and the light intensity can be regulated to avoid dazzling drivers or cyclists, or creating an unnecessary glare.

This Mexican project has inspired other countries to follow this line of research. "In the UK, we received recognition from the Newton fund, awarded by the Royal Engineering Academy of London, which chooses global success cases in technology and entrepreneurship," concludes Dr Rubio. ■

Reported by Investigación y Desarrollo, 5 May 2016.

Source: <http://goo.gl/8Wgj47>

World's biggest low-carbon cement plant to open in UK

The world's first large-scale production plant for an innovative low-carbon cement will open in the UK this August.

The factory, located in Coleraine, Northern Ireland, will produce around 200,000 tonnes a year of banahCEM, a two-part geopolymers cement, based on a calcined clay.

Reduced firing temperatures during manufacture mean the material produces around 80% fewer carbon emissions than regular portland cement, and it requires 60% fewer virgin raw materials to fabricate, according to the firm behind the product, Banah UK Limited.

"Banah UK is the first company to produce commercially available geopolymers cement in large quantities," said Andrew McIntosh, director of R&D at Banah UK.

Geopolymers cements, also known as alkali-activated cements, fall into two categories: some, like banahCEM, use processed raw geological materials; others incorporate industrial byproducts, such as fly ash from coal-fired power stations or ground granulated blast-furnace slag (GGBS) from steel production.

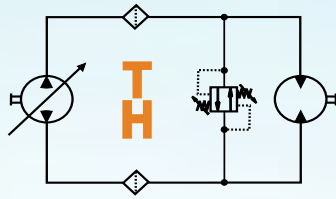
Raw materials are used due to dwindling resources of fly ash and GGBS in Europe and competition for supply from the portland cement industry, which uses them as supplementary cementitious materials, says Banah UK.

The energy expended during material extraction is easily offset by savings during manufacture, McIntosh said: "There is no limestone being converted into calcium oxide and therefore releasing CO₂, the temperatures involved are much lower than those required for cement, so massive savings are made in carbon emissions. "The amount of CO₂ emitted during manufacture of one tonne of portland cement is ±800 kg. By contrast, one tonne of banahCEM produces 200 kg."

Geopolymers cements harden at room temperature and provides greater resistance to sulfates, abrasion, acid and fire.

Strength gain is rapid. At 20°C, 50% of 28-day strength is achieved after nine hours, 80% after one day and 95% after seven days. Compressive strengths of up to 130 MPa can be achieved. ■

<http://goo.gl/ApAI98>



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Bates Technology Group: South African agents for Zoomlion products

The Bates Technology Group introduced the Zoomlion range of concrete machinery products into the South African market in 2014. Its product range includes truck-mounted pumps, stationary pumps, placing booms and concrete mixers.

The Zoomlion-Cifa group is the leading supplier of concrete machinery products globally.

Since 2014 The Bates Technology Group has successfully commissioned both 33-m and 36-m pumps using Mercedes Axor 2628 and 3335 models respectively, and have installed their first concrete placing boom in Sandton, Johannesburg.

Their commitment to quality build and spare parts supply should provide the building blocks for a strong and competitive alternative brand in South Africa.

They share superior workshop and warehouse facilities with the Zoomlion Crane division situated in Midrand, Gauteng.

BATES GROUP ZOOMLION

Zoomlion Capital Finance in Johannesburg will provide financing for your new concrete pump. All the products are covered by Zoomlion warranty, and service support is provided nationwide by a trained in-house technical team. ■

**More information from John Paul,
Tel: +27(0)21 001 3675 /email: jp@batesgroup.co.za
www.batesgroup.co.za**

PPC always moving forward



As the leading supplier of cement and related products in Southern Africa, PPC Ltd has nine manufacturing facilities and three milling depots in South Africa, Botswana and Zimbabwe that can produce around eight million tons of cement products each year. PPC is expanding its operational footprint into the rest of Africa, including Botswana, DRC, Ethiopia, Mozambique, Rwanda and Zimbabwe. Our building materials and solutions proposition includes aggregates, metallurgical-grade lime readymix, ash, technical support and superior customer and relationship support. ■

**For more information visit www.ppc.co.za
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Lafarge building better cities

Lafarge South Africa, a member of LafargeHolcim, is one of the major building material manufacturers in Southern Africa, offering cement, aggregates, ready-mixed concrete, and pulverised fly ash. The company applies its unparalleled technical strength to continually develop innovative building material solutions for the construction industry and contributes to Building better cities and communities across the country, while reducing the environmental footprint of its products and manufacturing processes.

The company has over 50 batch ready-mixed concrete plants throughout South Africa. In addition, Lafarge has a fleet of mobile and semi-mobile concrete batch plants that enable it to provide a rapid response on urgent projects, together with the benefits of an on-site service in remote locations.

The Aggregates business line operates a number of quarries to service all sectors of the local construction industry. Lafarge



quarry materials fall broadly into three categories: road, concrete and specialised materials – washed or blended aggregates for use in the road, paving, brick and block industries. ■

More information at www.lafarge.co.za

CHRYSO's range serves the whole construction industry

CHRYSO Southern Africa manufactures, sells and distributes admixtures and cement additives that service the mining, readymix, precast, gypsum and cement sectors as well as the building and construction industries.

Our product offering to the readymix market comprises:

- Accelerators - CHRYSO@XEL Range
- Air entrainers - CHRYSO@Air Range
- Environmentally friendly concrete cleaners - CHRYSO@Barracuda
- Fibres - CHRYSO@Fibre Range
- Pigments - CHRYSO@Colour Range
- Plasticisers - CHRYSO@Omega Range
- Retarders - CHRYSO@Tard Range
- Superplasticisers - CHRYSO@Optima Range
- Water repellants - CHRYSO@Fuge Range, CHRYSO@CWA 10

We have an extensive footprint in South Africa with three manufacturing plants and seven branches. A responsible company, CHRYSO Southern Africa complies with ISO 9001 and OHSAS 18001.

CHRYSO

CHRYSO Southern Africa can give daily technical support to its customers while ensuring high levels of quality control through the concrete laboratories at its various production sites and the excellent relationship that we enjoy with local commercial laboratories countrywide. In addition, CHRYSO has academic partnerships with universities around the world as well as with an international network of technical specialists who can provide technical advice.

The CHRYSO Group has 23 industrial sites and a presence in 70 countries. CHRYSO Southern Africa is one of 20 subsidiaries. ■

More Information From Kirsten Kelly,
Tel: +27(0)11 395 9700/ email: kirsten@chrysosa.co.za
www.chryso.com

Putzmeister: economical and safe machines

Putzmeister develops, produces, sells and serves all its customers worldwide with technically high-quality and service-oriented machines in the following areas: concrete placing, truck-mounted concrete pumps, stationary concrete pumps, stationary placing booms and accessories, concrete mixing, industrial technology, pipe delivery of industrial solids, concrete placement and removal of excavated material in tunnels and underground, robot and materials handling technology, mortar machines, plastering machines, screed conveying, grout injection and special applications.

The M 47-5 truck-mounted concrete pump is extremely economical to run, as the operating cost of the machine has been reduced across the board. The individual components of the machine are highly resistant to wear. A high proportion of the components are completely maintenance-free. Overall, the machine achieves an exceptionally long service life and an attractive resale value. This has enabled the quantity of costly functional fluids such as hydraulic fluid used to be significantly



reduced. The operating cost of the 47-5 remains extremely low throughout the entire service life of the machine.

In terms of the safety, 47-5 is a clear winner. All current standards have been taken into account in full. ■

For more information please contact Rudy Myburgh,
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email: myburgh.r@putzmeister.co.za
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AfriSam: creating possibilities

AfriSam is the largest black-controlled concrete materials group in the southern African region, and has operations in South Africa, Lesotho, Swaziland and Tanzania

It has an annual cement production capacity of over five million tons, produced from its seven production facilities and distributed to its customers through strategically-located distribution centres.

With a readymix production capacity of over two million cubic metres of concrete, AfriSam's readymix operations can produce almost any concrete mix required by customers from any one of its 43 readymix concrete plants. It also has the capacity to produce in excess of ten million tons of aggregate from its 17 quarries and aggregate operations every year.



Its Slagment business unit, located in Vanderbijlpark, has produced Slagment over the last 50 years that has been used in the construction of major structures, including buildings, dams, bridges, roads and water retaining structures.

AfriSam is a Level 2 Broad-Based Black Economic Empowerment (BBBEE) contributor and is the majority shareholder in Tanzania-based and listed Tanga Cement Company Limited.■

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www.afrisam.co.za

Ordering quality concrete on site

To get the best quality and workability from readymix concrete on site, contractors need to carefully note a number of factors which can take the concrete's performance from mediocre to excellent.

Apart from basic strength and slump parameters, contractors can utilise the knowledge of their readymix suppliers to get greater value for money in terms of ease of delivery to the required point, concrete placement and workability.

All Southern Africa Readymix Association (SARMA) members are required to have the necessary knowledge and correct processes in place to manufacture concrete according to strict criteria. In addition, they have technical knowledge enabling them to manipulate mixes to meet customer requirements exactly. They can also advise on the required properties and best mixes to ensure that the job is done more quickly and effectively.



Placing concrete on site.

A SARMA-accredited supplier can add far more value than merely meeting a strength and slump specification," says Van Wyk.

The following criteria should be discussed with the readymix supplier upfront in order to draw up an adequate specification:

1. Strength requirements
 2. Workability requirements
 3. Application (i.e. structural column, floor etc)
 4. Location (address, coordinates, etc)
 5. Contact person
 6. Time required on site
 7. Access requirements
 8. Site transport (wheelbarrows, pumps, etc)
- (The above is a specification and has to be measurable. Must be on quote and preferably on invoice).

SARMA difference

"It's all part of our members being proactive and adding value to contractors who may not be aware of the vast possibilities of concrete and the importance of effectively specifying concrete," explained SARMA general manager Johan van Wyk.

"As a progressive industry it is our job to enlighten our customers and to ensure that, apart from the basics, they also get concrete that is easy to work with, appropriate for the task and is tailor-made to on-site resources. For example, if the concrete has to be transported long distances via wheelbarrow, the readymix supplier may need to retard setting to allow time to place the concrete.

"There are many other ways to make placement easy, to save time and ensure the highest strength and quality. It's all about communication and ensuring that your readymix supplier understands every parameter of the usage of the concrete on site.

Receiving concrete

When receiving concrete, all resources must be ready. The truck should spin for at least five minutes on site before discharging. Upon discharge, ensure that all requirements on site are in place (rebar and formwork have been inspected, etc) and necessary testing is done to agreed methods by nominated persons.

Upon placement, ensure that compaction is done correctly and that protection and curing methods are implemented immediately. Communication with all parties on site is critical.

"As long as these basics are in place, the readymix company knows what is required and can prepare mixes to meet these requirements. On-site cooperation and communication invariably ensures the success of the project," concludes Van Wyk.■

More information from Johan van Wyk,
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www.sarma.co.za

Ciolfi Readymix (Pty) Ltd



Established in 1951 by Anthony and Vincenzo Ciolfi, the company is now run by the third generation of Ciolfi's who continue the proud tradition and uphold the reputation for personalised service built up over the last 61 years.

Ciolfi Readymix is the latest addition to the Ciolfi Group, launched in September 2008 with the full backing of the Ciolfi Bros Group.

Investing in a German-designed wet batch concrete plant and new Mercedes trucks has proved to be a good decision. In a very difficult market, the company has expanded substantially by providing high-quality concrete, and good service with personal interaction.

Ciolfi Readymix has successfully supplied to many major contractors, including WBHO, Power Construction, Steffanuti Stocks, Grinaker LTA and Group Five.

Current contracts include the Curro School Century City; SANRAL Bellville Green Star Office Building; China Shoprite

Park Parow; and Alan Grey Silos Waterfront, an award winning Green Star five-storey office and residential block situated in the V & A Waterfront.

The company's distribution plants in Philippi, Stellenbosch and two in Durbanville, along with a fleet of 20 Mercedes mixers, are capable of delivering over 800 m³ of readymix concrete each day.

This is complemented by a team of highly qualified staff with many years of experience in the readymix industry.

As a proud member of the Southern African Readymix Association (SARMA), Ciolfi Readymix batching plants are annually audited to ensure compliance with the highest standards and quality. ■

More information from Tel: +27(0)21 557-1111

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www.ciolfireadymix.co.za

BASF: we create chemistry for a sustainable future

BASF's Construction Chemicals division offers advanced chemicals solutions for new construction, maintenance, repair and renovation of structures. Our very comprehensive portfolio encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing systems and sealants as well as 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 approximately 5,500 employees form a global community of construction experts. To solve our customers' specific construction challenges from conception through to completion of a project, we combine our know-how across areas of expertise and regions and draw on the experience gained in countless construction projects worldwide. We leverage global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make our customers more successful and drive sustainable construction.



The division operates production sites and sales centres in more than 50 countries and achieved sales of about €2.3 billion in 2015.

BASF in Africa is divided into four country clusters, with headquarters in Midrand, South Africa for Southern Africa; Nairobi, Kenya for East Africa; Lagos, Nigeria for West Africa and Morocco for North-West Africa. BASF employs around 1,600 people in Africa. Since 2016, the BASF African headquarters is based in Nairobi. ■

More information from BASF, Tel: +27(0)11 203 2400

www.basf.com/za

SARMA MARKET SIZE SURVEY

Executive Summary

- There are an estimated 340 ready mix plants in South Africa. 224 are operated by SARMA members and 116 are operated by non SARMA members (2015)
- The estimated market size for ready mix concrete in South Africa in 2014 was 6 490 905 m³

Data Sources and Methodology

Sources

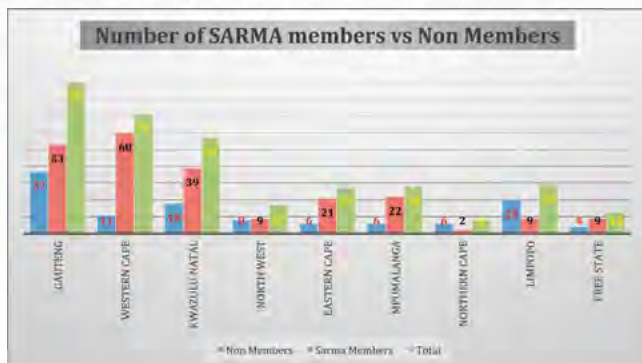
Numerous sources were used for gathering the data. We should recognize the following sources in the compilation of the data:

- BMI
- Levitt Kirson Business Services (Pty) Ltd
- SARMA members

Methodology

The total market size for ready mix concrete was sourced from BMI. This is an extrapolation from the last segment data provided by cement industry players combined with total cementitious industry sales in South Africa. The regional allocation was extrapolated by combining a portion of the residential and non-residential market activity by province.

Plant Detail

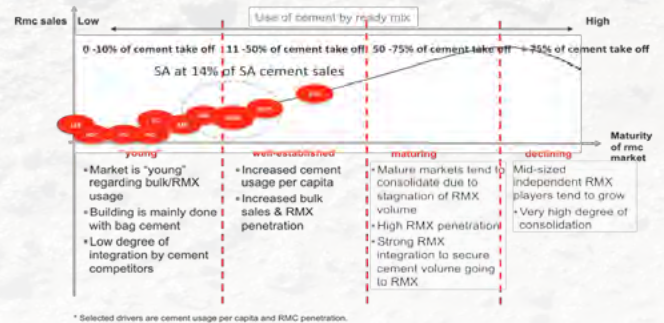


NUMBER OF PLANTS PER REGION	NON MEMBERS	SARMA MEMBERS	TOTAL
Gauteng	37	53	90
Western Cape	11	60	71
Kwazulu Natal	18	39	57
North West	8	9	17
Eastern Cape	6	21	27
Mpumalanga	6	22	28
Northern Cape	6	2	8
Limpopo	20	9	29
Free State	4	9	13
Total	116	224	340

Ready Mix size in South Africa

The ready mix concrete market in South Africa is estimated at 6.5 million cubic metres per annum. This will change in line with cement consumption. Gauteng and the Western Cape contribute to around 67% of the market substantiating the maturity model graph used in the strategy build up (shown below)

Readymix Maturity Model



Market Size per Region



Broader appeal for readymix conference



Johan van Wyk, general manager of SARMA.

Those involved in manufacturing concrete products or using and specifying concrete on construction sites are being specially invited to the Southern Africa Readymix Association's (SARMA) conference on 25 - 26 August at the Misty Hills Conference Centre in Muldersdrift, Gauteng.

The aim is to stimulate discussion and foster innovation in the industry based on the changing needs of the construction industry. Working together, the industry could change the way that concrete is manufactured, delivered and received on site and lead to smarter and better construction in future.

"This year's readymix conference will be about a new way of thinking, about using concrete wisely to exploit its properties fully, about partnering with likeminded stakeholders and about forging cooperation between suppliers to the industry, concrete producers, users and specifiers of concrete products.

"We want architects, engineers, quantity surveyors, precast concrete manufacturers and contractors to attend and find out more about exciting developments within the readymix industry. Also, to share ideas and forge relationships with the many professional members of SARMA who will be there and are eager to work with delegates to find solutions to their construction challenges.

"In addition, this year the conference will look at strategic information related to the economy and the industry that may help decision makers to develop strategies that will enable them to make better, more informed decisions based on the most current information available," says Johan van Wyk, GM of SARMA.

"The many technical talks will appeal to the widest possible audience and will include providing solutions to real-life technical challenges, case studies, best practices, changes in standards relating to how concrete is manufactured and used, as well as brand new technologies aimed at better, faster and more efficient construction techniques," he adds.

Speakers are drawn from the industry and are those who, by sharing their experience and knowledge, can inspire greater understanding of and renewed enthusiasm for the readymix concrete industry.

The conference will also focus on ways of utilising resources more effectively – including the use of fly ash as an admixture and/or extender and its potential benefits.

These and many more topics will be discussed at our Readymix by SARMA Conference and we invite all stakeholders in the construction industry to be part of this ground-breaking forum. ■

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To find out more about the conference, contact the SARMA office on Tel: +27(0)11 791 3327, email: johan@sarma.co.za or register online as soon as possible at www.sarma.co.za for early-bird booking promotions.

Concrete footprint in growth nodes



AfriSam delivers 600 m³ of concrete to the site every day.



By the end of the year, it is anticipated that there will be about 2,000 people on the site.

South Africa's leading concrete solutions provider, AfriSam has strengthened its readymix production and supply capacities in the northern areas of Durban, KwaZulu-Natal.

Since September 2015, its new batching plant in Phoenix has been supplying concrete for the construction of the massive Dr Pixley ka Isaka Seme Memorial Hospital, and it will also supply material for a large low cost housing project in the area.

AfriSam's Marietjie Thompson says the building materials supplier is positioning itself to seize a share of the promised massive spend on infrastructure by eThekweni Municipality in the Inanda, Ntuzuma and KwaMashu (INK) areas. The local government has already made known its plans of investing billions of Rands into housing projects to help uplift these areas over the next five years.

While the company has bolstered its production and supply capacities in the area its strong Broad-Based Black Economic Empowerment credentials places it in a very strategic position when tendering for public sector contracts.

This was one of the main reasons that AfriSam clinched the concrete supply for Dr Pixley ka Isaka Seme Memorial Hospital.

More than providing members of the INK community with important health care services, the KwaZulu-Natal Provincial Department of Health wants the build to uplift INK communities during the construction programme. For example, one of the key objectives of the construction programme is that 30% of all sub-contracts go to 100% black-owned companies.

This is over and above its strict requirements to maximise employment opportunities and skills transfer during the build. By the end of the year, it is anticipated that there will be about 2,000 people from the INK communities employed on the site when fittings and finishing works start.

AfriSam is supplying 40,000 m³ of concrete to Aveng Grinaker-LTA Building and its joint venture partner, Enza Construction, who arrived on site in January 2015 to start tackling the four-year contract.

Strong supply

The Phoenix batching plant is a mere 1,5 km from the site and has a production capacity of 40 m³ an hour. This plant services what is referred to as the P.I.N.K. area which encompasses Phoenix, Inanda, Ntuzuma and KwaMashu.



Dr Pixley ka Isaka Seme Memorial Hospital is a positive signal of more construction to come in the surrounding areas.

Six readymix trucks deliver 600 m³ of concrete to the construction site per day, while three more ferry concrete from AfriSam's Ottawa operation. This strategy mitigates any risk to customers should there be an unforeseen interruption at one of the plants.

In addition to supplementing production and supply capacities at Phoenix for the hospital project the Ottawa plant, located just more than 12 km away from the construction site, is supplying major developments well under way in Cornubia and Umhlanga.

Both plants receive a steady supply of quality cement from AfriSam's grinding station in Roodepoort and aggregates from its Verulam quarry.

Thompson says the company did four mix designs for the Dr Pixley ka Isaka Seme Memorial Hospital.

These were for the slabs, suspended slabs and columns. About 80% of the concrete for the structure has a compressive strength of 30 MPa, while 35-MPa concrete is being used for the columns and suspended slabs. The materials producer also helped the JV to co-ordinate the use of the different mixes on site, once the batches had been delivered.

Thompson says that one of the highlights of the supply contract has been ensuring timely delivery of quality concrete to site considering the very strict construction schedule.

Aveng Grinaker-LTA Building and Enza Construction intend completing the bulk of the structure this year, giving them a long enough timeframe in which to handle the extensive and intricate finishings and fittings component of the project ahead of practical completion in the first week of October 2018.

Up to 18 decks are prepared a day, with between five and seven completed in a week. The concrete supplied by AfriSam has been designed to cure over 28 days.

Thompson says orders are placed at least a week in advance, with deliveries starting at 07h00 in the morning and ending by 17h00 when the construction shifts end. In line with AfriSam's policy, trucks are turned around within 45 minutes.

The outlook for construction activity in INK areas of Durban remains strong and the construction of Dr Pixley ka Isaka Seme Memorial Hospital is sending a positive signal of more to come from both provincial and local government. And, AfriSam is in a very strategic position to play a meaningful role in many of these builds. ■

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AfriSam readymix has been used for the slabs, suspended slabs and columns.



Infrastructure

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ASPASA About Face Audit reflects gratifying improvements

The ASPASA About Face Audit forms part of the ongoing ASPASA About Face strategy to increase the awareness and capacity of operational management and employees to meet the challenges of changing environmental requirements that have serious potential penalties for non-compliant companies. The 2016 About Face Audit protocol was significantly upgraded, placing increased emphasis on:

1. Setting objectives and targets;
2. Environmental Legal Requirements and compliance;
3. Physical conditions on and around the operation; and
4. Management and employee training and awareness.

The 46 companies audited by 17 June (of 110 registered to be audited in 2016) showed improved environmental performance – despite the current difficult economic trading conditions.

Audits involve a ±3-hour training session, a 2-hour operational physical inspection followed by the Management System Audit. Training focuses on Environmental Legislation, the various offences and penalties and the Environmental Management System. Training concludes with industry 'Bad' and 'Best' practice illustrated by Audit photographs from Member operations between 2012 and 2016.

Some statistics:	
Number of Audits to 17 June 2016:	46
Highest Independent Member improvement:	64% in 2012 to +95% in 2016
Highest Independent Member score:	80% in 2012 to +98% in 2016
Lowest score (new Member):	57%
Highest score (new Member):	65%
Highest score (new Member):	From 17.6% in 2012 to 71.74% in 2016
Average Scores 2012 to 2016:	2012 = 87.7%; 2014 = 91.2% 2016 YTD = 93.1%



Without exception comments that were received from management and employees who had attended the Training Sessions confirmed the value of the sessions.

Physical inspection focuses on a selection of operational areas that have been identified to present the highest risks of non-compliance with legal requirement. These include diesel storage and handling, oil and chemical storage, wash bays, wash-water and waste handling, salvage yards and storage. Where possible, stormwater, overburden, topsoil and alien vegetation are also covered.

The Environmental Management System Audit has, since 2012 showed significant improvement in the quality and coverage of system documentation. In most cases the documentation is world class and addresses both the requirements of ISO 14001:2004 EMS and the more comprehensive ASPASA About Face requirements. Participation in the ASPASA About Face Programme has clearly provided valuable assistance to members in their Environmental Policy commitment to continued Improvement.

The Lead Auditor's conclusions stated: "Without doubt there has been a significant improvement in the quality and implementation of company Environmental Management Systems at all participating operations.

Physical conditions across ASPASA Members have shown continued improvements significantly reducing the potential environmental liabilities that may be faced at the operations.

"Perhaps the most pleasing observation for us as Auditors is the very apparent management and employee buy-in to the need for, and benefits of environmental stewardship at all their operations." ■

More information from Nico Pienaar,
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Since 1988 Keestrack has designed and produced mobile screening and crushing equipment in-house. The complete production process is privately owned. Quality, innovation, flexibility and after-sales support play a central role for the company while Research and Development ensures that Keestrack keeps up with the expectations of its customers.

At Keestrack we listen to our dealers and customers. We use their experience and knowledge to build machines that are recognised as market leaders in quality and performance all over the world.

We comply with all European legislation so our machines have as little impact on the environment as possible. ■



More information from Stan Fischer,
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AfriSam's success set in stone

AfriSam has the capacity to produce over 10 million tons of aggregate per annum from its quarries and crushing plants.

AfriSam Aggregate products are available in Gauteng, Mpumalanga, KwaZulu-Natal and the Western Cape, allowing builders, developers, architects and engineers access to AfriSam expertise, technical backup and quality assurance, based on years of experience in the aggregate market.



All the AfriSam Aggregate operations, including the plant laboratories, have ISO 9001 certification, ensuring that its aggregates are fully compliant with the relevant specification and with the customer's requirements.

As a member of the Aggregate and Sand Producers of South Africa (ASPASA), AfriSam's plants are subject to regular audits and inspections and its awards are on display in the relevant plant offices.

AfriSam is also fully committed to complying with relevant statutory and regulatory requirements as well as its own AfriSam Environmental, Health and Safety, and B-BBEE policies.

Planning and foresight govern AfriSam's surface mining and the subsequent rehabilitation of mines is a land use transformation that not only contributes to current needs for construction materials, but also allows the return of the mined land to a new land use once mining operations end. A Trust Fund provides for rehabilitation on closure to a positively useful or self-sustaining landform. ■

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Weir Minerals Africa

Weir Minerals Africa is a global supplier of excellent minerals solutions, including pumps, valves, hydrocyclones, wear-resistant linings, dewatering solutions, as well as high-pressure grinding rolls, crushers, centrifuges, screens, hoses and rubber products, all backed by a superior technical service which enables customers to achieve significant improvements in their process efficiencies. With the addition of Trio, this extends to crushers, feeders, screens, washers and material handling equipment for hard rock mining, sand and aggregate, and industrial markets. This



focussed approach provides our clients with a host of benefits, including optimised performance, maximised capacity, efficient operations, ease of maintenance and equipment longevity.

Weir Minerals Africa prides itself on providing customers with application-specific products tailored and customised to cope in often demanding and arduous conditions.

To find out how we can assist you in achieving the lowest cost of ownership for your equipment, contact us on (011) 9292600. We look forward to being of service to you. ■

PPC: a supplier of high-quality aggregates

A leading African provider of materials and solutions to the basic services sector, PPC has a national footprint that includes nine cement factories, four milling plants, five blending facilities and nine readymix batching plants. Its diversified product offering includes aggregates, milled slag, metallurgical-grade lime, burnt dolomite and limestone.

Eight of PPC's cement factories in South Africa, Zimbabwe and Rwanda include a limestone quarry – the main ingredient in the production of cement.

PPC Lime also operates a large quarry in the Northern Cape. It supplies metallurgical-grade lime, burnt dolomite and related products and solutions directly to key local industries including steel and alloys, food manufacturing and mining.

PPC Aggregates also has four quarries – two in Gauteng and two in Botswana, which supply quality construction aggregates to the building and civil construction sectors. The Mooiplaas



quarry in Gauteng produces quality aggregates for the civil construction sector and products for the chemical, metallurgical and agricultural industries. ■

More information at www.ppc.co.za

Loadtech Group

LOADRITE™ offers a range of weighing systems designed for wheel loaders, excavators and conveyor belts, from entry-level through to advanced functionality options. Whether you require basic weighing information for a small loader, or greater accuracy and data capture capabilities for production-



sized loaders and excavators, we have the solution for you. The LOADRITE™ loader scale product line is widely recognised as setting the standard for our industry. This is the result of over 30 years of industry expertise gained by working closely with machine owners and operators. Feel free to contact me if you require any additional information. ■

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Mobile: +27(0)82 372 1117
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'Maximize your Investment' with Maximum Equipment

Maximum Equipment was established in 2004 and has its head office and premises in Midrand, Johannesburg.

The company specialises in excavators and attachment solutions to suit the mining, material handling and construction sectors.

Maximum Equipment are the recently appointed dealers for Hidromek Excavators in SA and Feel Eng Rock Drills – the first fully detachable, excavator-mounted rock drill on the market.

Maximum are also established dealers for Komac and Torpedo Hydraulic Breakers and attachments, including demolition shears, pulverisers, quick couplers and grabs.

Newly introduced into the market and jointly developed with Feel Eng from Korea, is the Maximum Vibro Ripper. This is a

vibrating Ripper Tooth that mounts on the excavator to give superior rock breaking and material ripping performance.

Maximum are also recently appointed dealers for the Simex range of crusher buckets and rotary cutter heads.

Maximum Equipment offers the complete solution for getting the Maximum investment from an excavator. A full team of service vehicles and product support experts are on hand to provide a superior back up and after-market service to our clients.

Maximum are also approved dealers for all the major banks and an in-house rental plan is on offer.

Contact Maximum Equipment, excavator and attachment solution specialists, to 'Maximize your Investment.' ■



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Malleo Equipment: a trusted supplier

Malleo Equipment is a local company offering the Sangdo range of hydraulic breakers and specialist attachments in South Africa and has designs on becoming an industry leader. Sangdo, an established South Korean brand, includes hammers and attachments for specific applications in a number of industries including quarrying, mining, smelting, blasting services, demolition, civils and construction.



Along with the hammers sold through Malleo Equipment we provide the associated parts and spares, as well as the necessary repairs and maintenance services associated with this product.

At Malleo Equipment we provide the appropriate solution by focusing on our customer's objectives of minimising costs and maximising profitability. We do this with the long term in mind as our ambition is to be Southern Africa's preferred and most trusted supplier in this industry. ■

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email: luke@midmargroup.co.za / www.malleogroup.com

The worldwide leader in vibration technology

OLI is the world's top selling manufacturer of electric and pneumatic vibrators. A high level of customer service is guaranteed through 19 OLI Trading Subsidiaries, 36 local warehouses and five manufacturing plants worldwide.

Originally specialising in immersion vibrators for concrete consolidation, OLI is now the worldwide leader in vibration technology, with a complete range of electric and pneumatic internal and external vibrators.

By supplying competitive, high quality products for wide-ranging applications, OLI combines performance and reliability by adapting to the ever-changing market. A strong believer in innovation, OLI is constantly striving to be ahead of the opposition. As a global player in industrial vibration technology, the key focus of OLI's business strategy is rapid stock delivery, anytime, anywhere in the world.



OLI

Excellent customer service is of pivotal importance: the company guarantees quick order processing and customers worldwide can enjoy access to the same high quality product and services.

OLI has access to credible expertise when it comes to finding suitable solutions to customers' requests. A team of engineers specialising in designing efficient, reliable and safe solutions is backed by a globally certified management team.

OLI provide their customers with state-of-the-art equipment and the blueprint for the next generation of products is already in progress. ■

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Martin Engineering: making materials handling cleaner, safer and more productive

Martin Engineering is the leading international developer, manufacturer and supplier of innovations to make the handling of bulk materials cleaner, safer and more productive.

Our global team of experts from every part of the world, work together to produce and manufacture high-quality products that deserve the Martin seal of approval. Our service technicians average 27 years of experience in bulk material handling. Our product engineers and development teams work side by side with our sales and service leaders to share innovative ideas within our



corporate community around the globe and to help facilitate the development of new products that make bulk material handling cleaner, safer and more productive worldwide.

Martin offers an expansive selection of blades, tensioners, mainframes and accessories to effectively meet the unique demands of any material handling challenge. ■

More information from Tel: +27(0)13 656 5135

www.martin-eng.co.za

I-CAT launches new stockpile dust suppression solution

Stockpile dust suppression has been dramatically simplified with the I-CAT retractable stockpile dust ring (R-SDR) system, which was introduced to the local market to efficiently address dust issues at conveyor discharge points.

I-CAT technical manager Morne van Wyk explains that the R-SDR system creates a virtual curtain around material flow for outstanding particle containment. "Engineered to industrial strength and longevity, the R-SDR system surrounds the discharge flow on all sides, providing simple, focused dust management that is well suited to continuous duty applications, such as radial stackers."

The R-SDR system boasts a stainless steel misting ring designed for mounting at the end of conveyor belts to aid in dust suppression at the discharge point. What's more, a variable configuration allows nozzles to be added, removed or replaced with different types and sizes to suit specific applications.

Van Wyk continues: "Thanks to variable particle sizing (VPS) technology, it also features a number of customisable options. It

is an intrinsically safe, mounted option, with a fully retractable and serviceable configuration for ease of access, installation and nozzle maintenance."

The PLC-controlled system also consumes low amounts of water, and a booster pump can be added to increase water flow and pressure. Van Wyk says a hose can be supplied with the unit, which also comes with the option of being equipped with a two-way valve for manual control of water flow.

"The water hose connects directly to male pipe threads on the ring. Water flow can be controlled between 12.3 to 200.44 l/pm at 6.89 bar of input. A water filter can be added for use with non-potable water, for droplet sizes ranging between 50 and 200 microns," he concludes. ■

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www.i-cat.co.za

CHRYSO drives future sustainability by innovative product and service development

Innovation is necessary to develop products and services that underline environmental stewardship. This is according to Andries Marais, general manager – operations at CHRYSO Southern Africa, who says that in order to create a sustainable future for Earth's inhabitants, it is critical that organisations contribute to preserving non-renewable resources.

He suggests that organisations allocate a predetermined percentage of turnover for research and development into products that focus on energy reduction in their manufacturing process. The CHRYSO Group invests approximately 4% of all global sales in the investigation of green product innovations that are based on bio sourcing, renewable resources and biodegradability principles.

The goal is to emphasise product lines that assist customers in promoting their energy efficiency while simultaneously reducing their carbon footprint. Marais says that ongoing review of CHRYSO's existing product portfolio and a customer needs analysis results in the development of approximately 30 new CHRYSO products each year with an average of 12 product patents filed annually.

Marais suggests organisations take a critical look at the way in which they operate their processing and manufacturing plants to ascertain how they handle natural resources. He cites the CHRYSO Group's Green Factory Model which has been adopted by the Cape Town, Durban and Jet Park plants. Careful thought has been given to a wastewater management system, a rainwater catchment programme and a sludge waste management system to minimise negative environmental impact.

In addition, CHRYSO places great emphasis on the use of non-hazardous materials and the implementation of recycling initiatives. Marais says that companies should consider demarcating a specific area in their facility where collection bins for glass, paper, plastic, metal and wood are placed and employees are encouraged to participate. The recycling initiative is echoed in CHRYSO's use of recycled packaging wherever possible and bulk deliveries of products to maximise load capacities and reduce the use of non-renewable fuel resources.

Some examples of products that are underpinned by good environmental stewardship are CHRYSO® Dem Bio 10, a biodegradable vegetable based demoulding oil; CHRYSO® Deco Lav P, a range of aqueous based surface retarders; CHRYSO® Environmentally friendly cleaning agents; EnviroMix®, a technology engineered to boost the use of cement extenders reducing the use of clinker without comprising on the quality of the concrete or cement product.

Marais points out that sustainability should also extend to the development of an organisation's employees and the communities adjacent to manufacturing and processing plants. "In addition to bringing all stakeholders on board with environmental awareness programmes, there should be an emphasis on accountability to encourage safe practice both in the workplace and at home. Together with commitment to environmental compliance and certification programmes such as ISO 14001, these elements will make a great contribution to preserving resources for the future," Marais concludes. ■

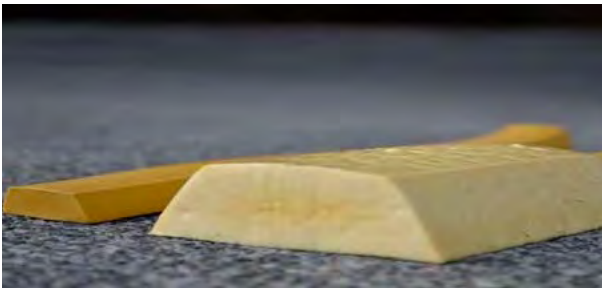
**More information from Kirsten Kelly,
Tel: +27(0)11 395 9700 / www.chryso.com**



A proven waterproofing solution for construction joints

With a long list of performance based features and benefits, there is little wonder why Krytonite Swelling Waterstops continue to replace Bentonite (clay-based waterstops that can deteriorate over time with prolonged water exposure) on jobsites around the world.

Krytonite exhibits excellent cohesive properties and will not deteriorate over time – even when exposed to extreme hydrostatic pressure and after repeated swelling and drying cycles. Krytonite offers unrivalled swelling performance, easy installation, and the superior cohesion properties when in a swollen state will lead to longer water stopping ability and lifelong performance



Krytonite Swelling Waterstops have excellent cohesive properties and will not deteriorate over time - even under hydrostatic pressure.

Krytonite's advanced synthetic rubber technology has been designed to swell up to 4 times more than conventional swelling waterstops. This superior technology also exhibits greater swelling pressure to stop water in horizontal and vertical construction joints – even when exposed to salt and chloride water or contaminated soils.

Krytonite can easily replace common swelling waterstops to offer the best single protection waterstop available. Additionally, Krytonite can be used with the Krystol Waterstop Treatment as part of Kryton's Dual Protection Krystol Waterstop System (KWS).

Moreover, when Krytonite is used with Krystol Waterstop Treatment (using Crystalline Technology), the Dual Protection that it offers not only stops water, but protects outboard facing rebar from the damaging effects of water.

When Krystol technology is used with Krytonite, it provides a crystalline barrier before the water can come into contact with the outboard facing rebar. Protection of the perimeter rebar from the corroding effects of water will add long-term durability to the concrete structure.

Trust Kryton to protect your structure from the smallest joint to the entire structure by using their effective and world renowned concrete waterproofing product range. ■

For more information or to purchase Krytonite and other waterproofing solutions contact Sanika Waterproofing Solutions, Tel: +27(0)11 425 3061 / email: info@sanika.co.za / www.sanika.co.za or www.kryton.com

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KRYTONITE SWELLING WATERSTOP

Krytonite's advanced synthetic rubber technology, designed to swell up to 4 times more than conventional swelling waterstops. Krytonite exhibits greater swelling pressure to **stop water** in **horizontal and vertical construction joints**—even under **extreme hydrostatic pressure**.

Krytonite **will not deteriorate over time** even under repeated swelling and drying cycles and exposure to salt and chloride water or contaminated soils.



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By establishing associations with leading technology providers in Europe, PMSA is ideally placed to offer the most advanced solutions for the manufacture of concrete products. This goes hand-in-hand with PMSA's own home-grown technology.

The leading manufacturer of brick, block and paving machines on the continent, PMSA services a wide and diverse customer base. "We can start with somebody who wants to start a brick business with a small hand-operated or electrically hand-operated machine, all the way up to a customer who wants to control every single detail of the factory process to maximise product quality and minimise production costs," Walter Ebeling, MD of PMSA, comments.

"To make a good concrete mix, you need consistent raw materials and a consistent moisture content. You need highly accurate addition of water in the mixing process. Our mixers are designed for mixing concrete intensively so that the customer has a better blended concrete in order to reduce the cement content, while giving the same or superior strength."

The addition of PMSA's new Ultravibe vibrators to its machines provides enormous flexibility in producing compacted concrete for pavers, bricks, blocks and kerbs with reduced cement content. "With our curing systems we can place the product that needs to be cured in an environment that allows it to cure at its best rate, reducing the curing time, increasing the early strength and again being able to optimise the cement content so as to be able to make a superior product."

Ebeling adds that PMSA has been fine-tuning its internal processes and systems over the last five years, from automated



PMSA offers the most advanced solutions for the manufacture of concrete products. Its stand at Totally Concrete 2016 showcased some new machinery.

tracking of spares and parts to a new CRM system. "We have expended a large amount of effort and energy on putting systems in place to enable the company to grow."

Now the company is in an ideal position to focus on technical innovation, which Ebeling cites as the next stage of its internal development. "Having all this technology and skills available to us, it makes absolute sense that we drive the technology. Naturally it is an intensive process, as it requires the input of everyone in the company. It requires testing, research and development and, where necessary, acquiring new skills."

An example of PMSA's ongoing product development is its new Eco range of automated handling systems, which was officially unveiled at Totally Concrete 2016. This latest technology gives customers the option of automated handling plants at a far more affordable price compared to top-of-the-range systems. The new Eco range of handling systems includes forklift options as opposed to more conventional but higher-cost finger and transfer car systems. ■

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PMSA also focusses on home-grown technological development such as its new Ultravibe vibrating system.

About Pan Mixers South Africa (PMSA)

PMSA 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. PMSA has been servicing the needs of local and overseas customers since 1976. PMSA brick-making machinery produces two million bricks a day in the Johannesburg area alone.

Turnkey Hydraulics: over 30 years of service excellence

Turnkey Hydraulics is a leading supplier, designer and installer of hydraulic equipment in South Africa. We supply our services to a very comprehensive array of clients, including the mining industry of South Africa. Since our inception in 1984 we have developed a name for service and product excellence. With over three decades in the hydraulics industry, Turnkey Hydraulics has developed a renowned reputation due to our streamlined and extremely efficient services. From advanced hydraulic power pack products to complex hydraulic solutions, we have the hydraulic systems you require.



evolves, so too will Turnkey Hydraulics. We will always be one step ahead in the industry, guaranteeing only the most superior and streamlined of services.

Over the years, having developed a name for excellence throughout the industry, we have acquired premier agencies that have allowed for us to offer comprehensive and professional in-house solutions. We have consistent interaction and communication with these overseas principals and this ensures that we are up to date with current trends in the hydraulics industry. All technological developments will be applied to our own designs to ensure our clients receive only the highest standard of service.

The Turnkey Hydraulics Philosophy

We opened our doors 30 years ago with the intention of offering the most premier hydraulic services in South Africa. Our goal was to create long-lasting and trusted relationships with all of our clients. Our founding philosophy is still in place and, due to our unyielding commitment to service excellence and client satisfaction, we continue to grow as a leading hydraulics specialist in South Africa. ■

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Bosch launches its first Calibration Centre in South Africa

Bosch has opened its first Calibration Centre in South Africa. Launched officially on 1 August 2016 in Johannesburg at the Bosch Service Centre in 35 Roper Street, the new centre will not only service Bosch power tools, but also calibrate Bosch measuring instruments.

Calibration is important because it improves the accuracy of measuring instruments. "Accurate measuring instruments, in turn, improve both work and product quality," comments Bosch Power Tools brand manager Sebastian Johannes.

"The hidden costs and risks associated with uncalibrated measuring instruments can be much higher than the cost of calibration itself," he cautions. Therefore it is recommended that all measuring instruments are calibrated by a reputable company to ensure that any measurement errors are within the acceptable range specified in the user manual.

The following Bosch products can be calibrated at the new Calibration Centre: all line and point lasers, optical levels, rotating lasers and receivers. Johannes adds that instruments need to be calibrated once a year, as the accuracy degrades over time due to normal wear-and-tear.

It is also advisable to have instruments recalibrated following any hard knock or fall, or if operated or stored outside the



Bosch Calibration Centre will not only service Bosch power tools but also calibrate Bosch measuring.

operating or storage temperature range, specified in the technical data or user manual. ■

**More information, contact the Bosch Service Centre
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Scaw Metals supports infrastructure development by manufacturing quality products

Leading steel product manufacturer, Scaw Metals is the only Green Steel accredited manufacturer of rebar in South Africa – a testament to the company's commitment to sustainability in the development of its products.

Scaw Metals regards it to be of paramount importance to supply products that comply with industry standards and best practice. Notably, as rebar is an important component to concrete users, Scaw rebar is manufactured to comply with SANS 920 and BS4449 requirements and, in addition, is ISO accredited. Scaw's Rolled Products division is one of the largest suppliers of long steel products in South Africa, and rebar falls under this division.

Building on its exceptional track record for rebar products, Scaw Metals provides tremendous value to concrete users, ensuring quality and consistency. Scaw Metals' partners are assured that they are receiving a well manufactured product that will guarantee safety in use in a variety of infrastructure projects and is further verified by being CARES approved.

Steve van Wyk, Scaw Metals Group executive head of operations says, "We regard ourselves as industry role players who have been operating for many years due to our excellent track record and keeping ahead with industry requirements."

As Scaw Metals becomes a catalyst to technological and innovative products, the importance of partnering with a company that values and recognises sustainable practices is becoming increasingly critical.

Over the years, Scaw Metals customers in the construction and manufacturing industries have invested in a product that is well assessed and complies with the necessary safety and environmental requirements. The manufacturing of the products are backed by industry-trained experts who understand the importance of complying with strict standards.

Scaw Metals calls on the construction and manufacturing industries to support the use of locally manufactured quality products – products which are also on a par with global manufacturing standards.

Scaw has evolved and is well equipped to deliver and meet the requirements of our rapidly growing country's infrastructure roll-out plans.

Van Wyk adds that reliable services and recognised products are indeed adding value to the development of the steel industry and of infrastructure in South Africa.

About the Scaw Metals Group

Scaw Metals is a South African-led company producing highly specialised and critical consumable components for the mining, rail, power, offshore oil and gas, construction, commercial and other industrial sectors. The business operates through four product focused business units with facilities in South Africa. Grinding Media produces high chrome and forged grinding media. Wire Rod Products produces steel wire rope, chain, wire and strand and other related products for mining, industrial, construction and offshore oil drilling applications. Cast Products designs and produces a variety of cast steel products for the mining, metal processing, power generation and railway industries. Rolled Products is a manufacturer of low and high carbon long steel products. ■

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Weir Minerals launches Trio® TP cone crusher range

Weir Minerals has announced the global release of its Trio® Top Performance (TP) cone crusher range to the mining and construction aggregate market. Combining aggressive crushing action, high crushing force and high power, this new generation of top performing cone crushers takes the user to the next level of cone crushing.

"Throughout Weir Minerals, we strive to provide our customers with the best possible equipment to meet their crushing needs, which is why we developed the Trio TP cone crusher range," Kurt O'Bryan, global product manager for crushing and screening at Weir Minerals, says. "The new TP cone crushers operate at a higher speed than their predecessors which provides higher reduction with better shaped material."

These compact, robust crushers are built with advanced cone crusher automation technology to ensure continuous high performance and application versatility. All Trio® TP cone crushers feature a steep crushing chamber angle, a large crushing stroke and optimum speed to deliver a finer product through increased interparticle comminution.

"Safety has always been the number one priority for Weir Minerals, which is why our Trio TP cone crusher range is designed with self-protecting features to help achieve high levels of mechanical reliability under severe operating conditions while ensuring the safety of both the operator and the equipment.

"Typically cone crushers are operated with high tension belt drives that are inefficient, require frequent maintenance and also become OH&S entanglement risk zones. Our engineers



The entire Trio® TP cone crusher range is backed by the Weir Minerals Services network, operating in over 70 countries worldwide and is available locally from Weir Minerals Africa.

at Weir Minerals recognise the importance of energy efficiencies and reducing operating costs. With this in mind, they designed a reliable direct drive option for cone crushers. The direct drive system can be combined with a Variable Frequency Drive to further optimise crusher performance, resulting in significant energy savings."

The Trio® TP cone crushers' unique combination of high flow, high pivot point, large throw and large head diameters results in enhanced and superior performance.

All the Trio® TP cone crushers are fully instrumented, having advanced lubrication and hydraulic systems, allowing customers to monitor vibration, motion, temperature, flow and pressure.

For the customer, the advanced Trio® TP cone crusher range delivers high performance, safe and mechanically reliable crushing.

"At Weir Minerals, our reputation for quality engineering and exceptional service is second to none. Combining decades of experience with innovative designs and the highest quality materials, we believe that our Trio® TP cone crusher range leads the industry in terms of reliability, productivity, ease of operation and maintenance."

The entire Trio® TP cone crusher range is backed by the Weir Minerals Services network, operating in over 70 countries across the globe and is available locally from Weir Minerals Africa. ■

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Find flooring facts easily

Flowcrete South Africa has launched a new website, www.flowcretesa.co.za, designed to make it easier for contractors, architects and end users to find the flooring information they need while on site, on the move or in the office.

The website focusses on usability to ensure that technical information, contact details and Flowcrete's flooring advice is all as readily available as possible.

Centralising the content and shortening the user's pathways around the site makes it quicker and easier to navigate, while the responsive design means that the website works equally well across desktop computers, tablets, laptops and cell phones.

Flowcrete South Africa MD, Craig Blitenthall, said: "We know that construction professionals often need to access information quickly, but are frequently the middle of a building site working from their phones, which makes an unresponsive, slow or clunky website a real headache!

"We've streamlined their research by making our new site fast and mobile responsive. So the answers to your floor questions are only a quick click away."

Searches can be made via one of three routes: by the benefits required (e.g. antimicrobial, anti-static, decorative), by the flooring range (e.g. car park coatings, industrial resins,



polyurethane floor screeds) or by the market sector (e.g. automotive, food and beverage, healthcare).

Users can also access a vast library of technical data, flooring ideas and advice. All Flowcrete South Africa's product data sheets can be downloaded from the site along with brochures, white papers and complementary literature. Videos detailing application techniques, high-profile case studies and Flowcrete's news stories are all available on the website to inspire, inform and advise.

To future-proof the site against the rapidly changing digital world, up-to-date web concepts were taken into account during its development. Along with being mobile responsive, this included a contemporary image-focused aesthetic and an emphasis on content that benefits users not keyword algorithms. ■

To visit the new website, head to www.flowcretesa.co.za, and begin browsing all the product benefits, technical information, expert guidance, flooring ranges and more.

New a.b.e. bandage sealing system used for Savana City Reservoir

a.b.e. Construction Chemicals' new durajoint flexband joint bandage system offers the ideal solution for waterproofing expansion and construction joints, including critical joint areas with high or frequent movement, says a.b.e. technical sales consultant, Steff Dalton.

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

a.b.e.'s durajoint flexband system – together with a wide variety of other a.b.e. products – was recently used to seal a new 10-megalitre concrete reservoir at Savana City in Sebokeng. Basil Read and Southey Contracting were the main contractors for the project.

Dalton says the durajoint flexband system is particularly suitable for the sealing of joints in potable water concrete reservoirs and also in other water-retaining structures and consequently was ideal for the reservoir project.

"The system includes durajoint flexband adhesive, a special epoxy adhesive for bonding the durajoint flexband thermoplastic elastomer membranes. This adhesive is a two-component, solvent-free epoxy resin bedding mortar/adhesive with low slump characteristics. It can be applied in sections of up to 20 mm thickness horizontally, and 10 mm vertically in a single application without the need for formwork. Greater thickness can be achieved by the application of more layers. The adhesive can be hand mixed on a flat clean surface," Dalton states.

Some of the advantages of the adhesive include early high strength which reduces downtime, high peel strengths to the membrane, and resistance to chemicals. Priming is usually not required unless the concrete is very porous. Food and Drug Administration-compliant, durajoint flexband adhesive is supplied in 2-litre kits. The solvent wipe, used to clean the surfaces to be sealed, is produced in 5-litre containers. The system's HDPE strips are 3 mm thick, 50 mm or 75 mm wide, and produced in 3-m lengths. The strips are used to centrally straddle expansion joints when support below the flexband membrane is required.

In addition to waterproofing concrete reservoirs, the flexband system can be used on a variety of substrates, including damp substrates. It can also be used in contact with potable water. The bandage is supplied in 20-metre rolls and several widths.

Other a.b.e. products used for the sealing of the new Savana City reservoir include a.b.e. durajoint external E and Dumbell, duraproof Kristalkote, durarep GT MCI and FC, epidermix 345, durasheet, durakol GMH, and Dow Corning 888 sealant. The project was completed at the beginning of July 2016. ■

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Work in progress on the new concrete reservoir at Savana City in Sebokeng.

CESA and Aon Celebrating Engineering Excellence

Consulting Engineers South Africa (CESA) is gearing up to celebrate Engineering Excellence in its annual CESA Aon Engineering Awards showcasing innovation, quality, outstanding workmanship and professionalism in the consulting engineering sector.

The CESA Aon Engineering Awards has been dubbed 'a feast of engineering talent and rewards an explosion of engineering plans and projects that provide the economic growth that leads to better lives.

Sponsored by one of the leading global Risk Advisors, Insurance brokerage Aon South Africa, the Awards are a platform to showcase the important role that infrastructure plays in the sustainable development of our country. The Awards focus on engineers and the excellence in service they provide to their clients in providing buildings, structures and infrastructure that lasts.

According to Aon, "CESA members play a pivotal role in South African society and in the greater South African economy. The progress of this country and its sustainability is touched on a daily basis by some facet of engineering. Without this application of the sciences, the vast majority of development and upliftment we need would not happen. The role that engineers play in terms of the wellbeing of our citizens is immense."

An adjudicator once commented that it was a privilege to be on the judging panel of the Awards and be exposed to the creativity, tenacity, skill and sometimes sheer determination of this industry.



All the 2015 CESA Aon Award winners.

Engineers solved the cholera problem related to contaminated water, in the 19th century, designed and built intricate highway interchanges in the tightest of spaces, suspended bridges from cables, converted sunlight into electrical power and sometimes indulged in a round or two of snakes and ladders. No challenge seems too big or too complex for this talented group of people, who, like magicians, make the impossible, possible.

This year's CESA Aon Awards Gala Dinner will be held at Vodacom World in Midrand on the 17th August, 2016. ■

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SAVE THE DATE CESA INFRASTRUCTURE INDABA

Dates: 6 – 8 November 2016
Venue: Southern Sun Elangeni
& Maharani Hotel, Durban



Hydration is essential when working in hot environments

Working in hot conditions poses special safety and health hazards. Heat illnesses combined with dehydration are a direct cause of about half the heat stroke cases among South African miners. It can cause loss of concentration, lower productivity, a decrease in morale and consequently increases costs to a business operation.

North Safety exports manager Hayley Arnesen explains that during heavy work, muscles need more blood flow, which reduces the amount of blood available to flow to the skin to release heat. "The body defends itself from heat through breathing, sweating and changing the blood flow. Individuals with high blood pressure or some heart conditions and those who take diuretics may be more sensitive to heat exposure."

Conditions that can result from heat exposure include heat exhaustion, heat stroke, heat cramps, fainting, or heat rash. "To prevent these conditions, it is advisable to replace the fluids lost from sweating by drinking an electrolyte solution, wearing loose-fitting clothing and a hat, and getting sufficient cool air. Businesses should ensure that employees and supervisors have proper training to detect early signs of heat stress and understand the importance of replacing fluids and salt," she continues.



North Safety's exports manager Hayley Arnesen.

Heat exhaustion can result from working up a sweat and not replenishing the body with enough fluids. Resting in a cool place and avoiding caffeinated beverages can help relieve the condition. Heat stroke, which can result in death, is caused by the failure of the body to regulate its core temperature. To reduce the effects, the victim should be moved to a cool area and soaked in cool water, amongst other things.

Dynaforce, which is developed by North Safety, is a rehydration drink that replenishes the body with essential nutrients for those working in hot environments. It is available in four flavours: naartjie, tropical, blueberry and cherry grape. "The drink, which comes in a 60 g, 240 g and 25 kg bulk pack, has a potassium content that exceeds that of other similar drinks. The benefit of this is the positive fluid retention effect that the potassium exerts at a cellular level. The powdered drink contains other vitamins and minerals and has no preservatives. It is available at all North branches," Arnesen concludes. ■

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ALCO-Safe launches Lion 700 Alcometer

ALCO-Safe, the supplier of quality electronic Breath Alcohol Detectors and Drug Detection equipment and accessories in South Africa, has recently launched the Lion 700 Alcometer, a portable alcohol breath analysis (breathalyser) instrument specifically designed for use in law enforcement, industrial safety, and health and well-being programs.

Alcohol use and abuse in the workplace is a longstanding issue, one which can be addressed by regular testing of employees and visitors entering any business premises, industrial space or, really, anywhere where the use of alcohol poses a threat to health and safety. By using the new Lion 700 Alcometer, businesses can not only test the alcohol levels of anyone entering their premises, but they can also take legal action, using test readings as valid and accurate evidence in a labour court or CCMA hearing.

The instrument is compact and also completely portable, for use in the field as well as on company premises. Despite its neat size, the Lion Alcometer 700 has significant memory built into the instrument. Up to 3000 readings can be stored, retrieved and printed at any time, allowing for easy record keeping. Should printouts be required for legal purposes, users can now simply search the memory, retrieve the relevant test results and reprint them.

The Lion 700 has a simple multi-button user interface for increased ease of use. Menu scroll buttons and a select button, which doubles as a power button, allow for simple use and information retrieval. The device also has a range of

complementary accessories, such as a carry case and portable printer, making it the perfect device wherever large batch alcohol testing needs to be conducted, and in any situation where test results are required as legal evidence.



"The device meets the European standard for handheld breathalysers for police use, making it ideal for the enforcement of law in any environment," says Rhys Evans, director at ALCO-Safe. "When implemented in an enterprise or industrial environment, test results from the device may be printed and used as valid evidence in any disciplinary and resulting labour court case.

"Of course, with this certification, police forces can also benefit from the ability to keep records of any alcohol testing done, adds Evans. "Police officers are able to neatly and accurately provide evidence of use of alcohol in cases against drunk driving, or any other crime where the consumption of alcohol is considered an influencing factor. Test results can also be easily retrieved in the event of a case being contested by an individual, ensuring accurate enforcement is maintained."

For companies, and particularly industry, the evidence is regarded as solid and credible and can be used in hearings. It is also instrumental in highlighting the ramifications of alcohol use and abuse in the workplace. ■

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Tackling safety 'The Meerkat Way' paying dividends for Chryso Group

The Chryso Southern Africa Group's 'The Meerkat Way' occupational health and safety programme is paying substantial dividends with no incidents reported at the company's plants since the programme was launched in 2015, says Andries Marais, GM Operations for Chryso, which is this year celebrating 20 years of operations in South Africa.

Chryso Southern Africa's implementation of The Meerkat Way (devised by UK workplace safety specialists, Latitude Productions) has been globally hailed by the Chryso Group and won the company's annual international 'Best Initiative: Management' trophy last year.

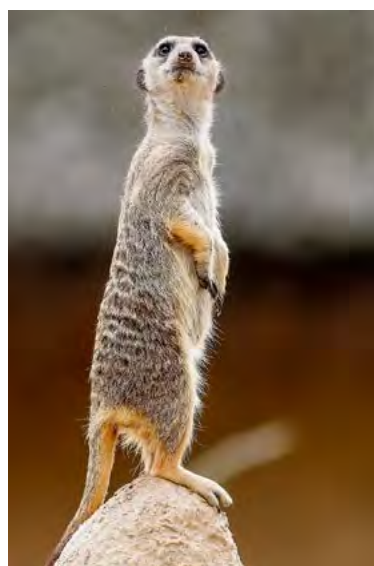
"The drop in incidents at Chryso and its subsidiary, a.b.e. Construction Chemicals, since we introduced The Meerkat Way – with its 'all for one' principle – has been most gratifying. An incident is an unexpected event that did not cause injury or damage but had the potential to do so. The fact that the volume of 'near misses' has risen since our new safety regulations were launched means that staff are now far more vigilant about preventing incidents, or accidents that could have caused lost time. Near misses, in safety terms, represent events that could have caused harm but did not, mainly because of preventative action," Marais explained.

The Meerkat Way promotes the implementation of five major safety rules:

- Wearing the correct personal protection equipment (PPE) appropriate to the work station or safety zone;
- Safe forklift operations, including correct fork positions, and wearing seatbelts;
- Plant and warehouse safety: reporting any dangerous attitudes and incidents, including near miss incidents;
- Ensuring that visitors and sub-contractors are in a safe environment and adhere to the Chryso Group's safety rules;



Chryso Southern Africa's annual Safety Days in March involve everyone. Here Andries Ledwaba, warehouse assistant at the Chryso head office in Jet Park, signs a pledge to uphold safety in his work environment.



The ever-vigilant meerkat has inspired the Chryso SA Group's health and safety campaign.

- Ensure that safety equipment is available and fully-operational.

When launching The Meerkat Way, Marais visited 11 Chryso SA Group sites all over South Africa, and made 21 presentations to staff members, from CEO to factory worker.

"Successful safety programmes rely on repetition: constantly hammering the message that nothing is more important than looking after personal and colleagues' safety at work. Human nature makes us look for operational short cuts and that's where most mishaps occur," Marais reflects.

To illustrate its commitment to safety, the Chryso Southern Africa Group has punitive measures in place which, in keeping with the 'one for all' culture, affects all staff if one member breaks cardinal safety rules.

All members of the Chryso Group, globally, hold their Safety Days in March every year. Chryso Southern Africa this year made 'Never give safety a day off' its theme for 2016.

Chryso SA attained the international occupational health and safety standard certification, OHSAS 18001 in 2011, and a.b.e. Construction Chemicals is striving for this accreditation, which will hopefully be awarded later this year.

Marais says The Meerkat Way has helped strengthen staff members' commitment to uphold the requirements of the certification. "Staff now carry a plastic keyholder chain with a photo of a meerkat - wildlife's most iconic symbol of vigilance - on their person at all times. It reminds them to listen to their safety instincts, communicate with one another, speak up when they notice a risky situation or procedure, and to keep consistency and teamwork in mind at all times," he adds. ■

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It now has cup test mode



LION ALCOLMETER® 600

The LION ALCOLMETER® 600 has a touch screen display for entering names, surnames and ID number of test subjects for printing and record keeping



The most unexpected of concrete additives

It may be ugly and smelly – but it works, Malaysian researchers have found. Jan de Beer reports.

Researchers in Malaysia have discovered that dried sewage sludge, of all things, could be added to cement to make concrete.

According to a recent report in *Global Concrete Review*, these enterprising researchers believe the revolutionary discovery could solve two problems in Malaysia: the growing demand for concrete; and disposing of a rising volume of sewage sludge.

Their experiments showed, however, that just a little of this somewhat unsavoury additive goes a long way: the more sludge in the concrete mix, the poorer the product's performance, according to the study conducted by researchers from Universiti Teknologi MARA, published in the *Pertanika Journal of Science and Technology*.

The researchers first collected domestic waste sludge which was then dried and burnt to form a cake which was then ground and sieved to make sludge powder. Using between 3% and 15% of the powder, they mixed the material with cement to produce normal strength and two higher strength grades of concrete. They then compared these concrete mixtures with normal concrete in terms of compressive strength, water absorption, water permeability and permeability to salt and found that while the sludge powder has a potential role in the manufacture of concrete, the performance of such concrete blends tends to decline with increasing concentrations of domestic waste sludge powder.

The compressive strengths generally decreased as the proportion of the sludge powder was increased. Also, both water absorption and water permeability increased as the percentage increased. However, resistance to salt increased for concretes containing up to 15% of the powder.

"Overall, there is potential for using waste sludge powder as a partial cement replacement," the researchers concluded. "However, more detailed research should be conducted to yield better quality powder."

So back they went to the somewhat smelly drawing board for more facts about faeces.

The task now is to establish if good quality concrete can be produced when higher temperatures are used to incinerate the sludge. They are currently studying the effect of a range of incineration temperatures, i.e. from 600°C to 1000°C and to evaluate the quality of the sludge after incineration, they will mix it with cement at various concentrations and then measure the strength and durability of the mortar or concrete subsequently formed.

Needless to say, strong masks must form part of their working attire and spouses probably don't run down the garden path to welcome them home.

At the end of the article, GCR published comment from a reader, Mr Gursharan Singh, who informed the publication that Sikh missionaries of old used human excrement mixed with grass to create fuel for the baking of the bricks used for the foundation of the Sikh Golden Temple in Amritsar. They had found that if human excrement was mixed with the grass, the heat could be as high as 2000 degrees Celsius which will ensure that all bricks will be fully baked and strong.

A community leader then made what must surely rank as the supreme sacrifice. He offered to collect poo from the houses in the village every morning to help fuel the flames. The villagers gave their all and from then onwards, all the bricks were fully baked and strong. Just goes to show what a united front (or rear) can achieve for a community.

And this is not even the end of our happy story.

Just a few years ago the lake around that very same Sikh Golden Temple was emptied for engineers to inspect the foundations. The experts found that the over three centuries-old foundations were so strong that no repairs were needed and suggested that no changes should be made as they could not ascertain the concrete mix.

"Above is understood to be a historical fact," Mr Singh concluded in his letter to the editor.

One wonders if those engineering experts now know what lies at the bottom of their investigations. ■



Master Builders South Africa CONGRESS 2016

31 AUGUST - 2 SEPTEMBER 2016 | DURBAN ICC



INNOVATIVE AND TOPICAL CONVERSATIONS

The Master Builders South Africa Annual Congress is a major highlight on the construction industry calendar, and is an event that addresses relevant issues and opportunities within the South African building and construction industry. It is an inclusive event, covering contributions from government, building industry leaders and all relevant stakeholders. Attendance is by leaders and owners of established and emerging businesses in the industry, senior government officials from sector departments, representatives from local government, financial institutions, suppliers in the construction industry and many more. Approximately 350 delegates are expected to attend this year's event, where the keynote address will be delivered by the Minister in the Presidency: Honourable Minister Jeff Radebe.

www.congress.masterbuilders.org.za

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