

CONCRETE

Journal of the African Cement and Concrete Industry

trends

VOL 19 No 1 February 2016



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CONCRETE trends

Volume 19 No 1 February 2016

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Renewables: the urgently-needed winds of change

While there can be little doubt by now that 2016 promises to be a year fraught with challenges, ironically the rather worn phrase 'there's light at the end of the tunnel' actually has very specific and positive meaning at the moment.

Like the rest of Africa, South Africa has been battling with unreliable and interrupted power supplies, the knock-on effect of which is being felt across the mining and manufacturing industries – and by everyone else.

The situation has seen sales of generators and gas-powered appliances sky-rocket. But it has, together with the growing emphasis on sustainability, also seen a move towards exploiting renewable energy sources. This is true globally, but the move is especially strong across the African continent where development has been hampered, substantially, by the absence of reliable, uninterrupted power supplies.

Dr Stephan Singer, director of global energy policy for World Wildlife Fund's Global Climate and Energy Initiative said: "The WWF has called for a world powered by 100% renewable energy by 2050. It is economically and technically possible and each year the prospects for renewables become brighter as technologies become cheaper, more widely available, efficient and reliable.

"Renewables offer three to five times more employment per unit energy generated than fossil fuels do. Renewables overcome erratic, unpredictable, and often high, fuel costs. They consume less water compared to coal, nuclear and shale gas – an important driver for water-stressed nations. They

do not emit conventional air pollution and there is no toxic waste or ash associated with nuclear or coal. Last but not least, renewables generally do not generate global warming gases."

And therein lies the potential for the construction and manufacturing industries. Alternative energy developments are being implemented in increasing numbers across the continent, in contrast to projects in other sectors which are generally moribund.

The South African Energy Minister Tina Joemat-Pettersson recently told a briefing at the World Economic Forum in Davos, Switzerland: "Even before we left South Africa people were clamouring to meet us... governments, banks, even the United Nations. Last Davos we said we are ready for investment; this Davos we have been over-run by requests from investors."

With the Rand plummeting, the country offers bargains for overseas investors, and they can supply South Africa with desperately-needed foreign investment inflows.

In addition, there are positive signs that government is looking into ways to help small businesses and emerging contractors survive these difficult times. They are actively moving to ensure that contractors are paid timeously and to simplify the legislation that makes creating employment so onerous for small business.

Perhaps it's not yet a 'wind of change', but it might be a small breeze picking up momentum. Here's hoping.

Gill Owens, editor



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Hilti: one memorable event after another

In October 2015, the Top Employers Institute certified Hilti South Africa as a Top Employer for 2015/2016, and also named them the No 1 Employer in the Construction Services Industry for the second year in a row.

Companies were assessed on the following: Talent strategy; Workforce Planning; On-boarding; Learning and Development; Performance Management; Leadership Development; Career and Succession Management; Compensation and Benefits; and Culture.

This honour was followed, on 11th January 2016, by the launch of Hilti's magnificent new building in the Waterfall Logistics Precinct in Midrand. Coinciding with the company's annual employee conference, the opening was attended by Hilti's employees and partners from all around Africa.

"We have been very involved in designing the building," says Hilti South Africa's managing director, Dirk Dijkstra. "One of the main reasons we are moving is because we have had three years of over 20% growth, out-performing our competitors. In 2010, we went from being everything to everyone, to a more focused strategy of spending time with our most loyal customers. This

strategy has proven to be extremely successful and has resulted in business doubling within five years.

The new building has enabled Hilti South Africa to grow its Tool Service Centre, as the company's reputation rests in part on its exceptionally fast tool repair turnaround time. "We are investing in our Tool Service Centre because we now have so many more tools in the market and we want to deliver on our turnaround time promise," Dijkstra says.

The new building also features a 600-m² Training Centre. All employee training can now take place in the new premises – as well as training Hilti's partners in neighbouring countries. The Training Centre will also be used to train customers.

"One of the reasons we are the Top Employer in the construction services industry is the incredible training we give our people," says Dijkstra. "While our Top Employer status really helps us to attract the right people, the inspirational new building will also play its part." ■

**More information from Tel: +27(0)11 237 3111/ 0800 023 331
www.hilti.co.za**

Chryso S.A. to open R&D Centre in Jet Park

The Chryso Group's plans to use South Africa as the springboard for increased penetration into Africa will be boosted by the establishment of a new Research & Development facility at Chryso Southern Africa's head office in Jet Park in early 2016.

This was announced by Thierry Bernard, Global CEO of Chryso based in France, when visiting South Africa recently. He met with the Chryso executive vice-president, Norman Seymore, who is also CEO of Chryso Southern Africa, which will next year celebrate its 20th year of operations in South Africa.

Bernard said: "Although the Chryso group does business in over 70 countries with subsidiaries in 20, Africa is one of our most important markets. About 25% of Chryso total sales are to African countries, with South Africa and Morocco our major markets on the continent. We have made substantial capital investments in our operations in South Africa in recent years and will use South Africa to drive further investments in Africa, some of which are imminent.



Thierry Bernard, Global CEO of Chryso, based in France, who announced the opening of a new R&D Centre at the Chryso head office in Jet Park during a recent visit to South Africa.

"However, our South African operation needs to maintain and improve its service to customers. There has been a growing need to develop specific products for the African market, and for more efficient and prompt testing services for Chryso customers in sub-Saharan Africa. The new R&D facility in Jet Park will be equipped with the most modern, high-tech facilities.

"The construction industry today also demands innovation and new solutions to 21st Century building philosophies and techniques. Local demand for construction chemicals must be met – locally, not from another continent," Bernard added. "The services it offers will be unique in Southern Africa."

"Future African penetration will include Egypt; West Africa, in particular the French-speaking countries like Ivory Coast and Senegal; as well as Nigeria. Chryso's entry into these countries will be undertaken in phases over the next two to three years." ■

**More information from Norman Seymore,
Tel: +27(0)11 306 9000/ www.chryso.com**

Wits honours Sir Jack Zunz

Sir Jack Zunz received an Honorary Doctorate of Science in Engineering from his alma mater, the University of the Witwatersrand, just two weeks before his 92nd birthday. James Oppenheim from Arup Johannesburg accepted the award on his behalf.

Zunz, who is known for leading the Arup team that solved the engineering challenges of the Sydney Opera House, graduated in Civil Engineering from Wits in 1948. The honorary degree was conferred on Zunz for his vast contribution to engineering and the built environment. He is also known for his philanthropic initiatives, implemented through the Ove Arup Foundation.

Zunz joined the Ove Arup in London in 1950, returning to South Africa in 1954 to establish an Ove Arup office with fellow Wits graduate, Michael Lewis. The firm was awarded the design of the 237-m-high Sentech Tower in Johannesburg.

This structure, requiring state-of-the-art engineering in its day, can resist winds of up to 200 km/hour and is able to deflect as much as two metres without damage. Zunz was tasked with the overall engineering leadership of the Sydney Opera House project when he returned to London in 1961.

Zunz led the design of many other structures with some of the most famous architects of the day, including Britannic House for BP, the Standard Bank Building in Johannesburg



with its hanging floors, the Emley Moor Transmission Tower (then the tallest structure in the UK), the iconic Hong Kong and Shanghai Banking Corporation Headquarters and the Stansted Airport Terminal.

Zunz became chairperson of the Ove Arup group from 1977 to 1984 and later co-chairperson of the firm globally from 1984 to 1989. The Jack Zunz Scholarship was established to provide advanced study opportunities for talented young engineers globally.

Some of Zunz's accolades include:

Knighthood (Knight Bachelor) in 1989

Institution of Structural Engineers Gold Medal (1988)

Honorary Doctor of Engineering from University of Glasgow (1994)

Honorary Doctor of Science degree from the University of Western Ontario (1993)

Fellow of the Institution of Civil Engineers (1966)

Fellow of the Institution of Structural Engineers (1965)

Fellow City of Guilds Institute (1990)

Honorary Fellow, Royal Institute of British Architects (1990)

Fellow of the Royal Academy of Engineering (1983)

Honorary Member of the Architectural Association (2011)

Oscar Faber Silver Medal (1968) and Bronze medal (1988)

Honorary Fellow of Trevelyan College, Durham University (1996) ■

For more information, go to

www.arup.com/Global_locations/South_Africa.aspx

Designing the World includes innovations from Africa

The new Cube Design Museum in Kerkrade, Netherlands opens its doors to the public with a collaborative exhibition curated by six of the world's top design authorities. The exhibition is curated by South Africa's Design Indaba, Cooper Hewitt New York, Powerhouse Australia, Mind Museum Manila, Design Museum Taiwan and Design Museum London.

'Designing the World' charts the most socially significant design creations worldwide, all of which focus on people-driven design solutions with a lasting, real-world social impact.

Each museum has selected ten designs representative of the innovation on its home continent.

The exhibition is divided into five themes (Food & Drink, Physical Health, Mental Health, Protection and Security), each of which is placed in their own physical 'island'. This division into sections by theme will enable visitors to truly experience the differences and, more importantly, the similarities in universal human needs and the design solutions that have been created to address them by various artists from across the globe.

African design objects being exhibited include The Hippo Water Roller, Street Sleeper, Moladi's Plastic Formwork System and the Freeplay Fetal Heart Rate Monitor (all from South Africa), the Mwangabora lamp and M-pesa mobile payment app (from Kenya), the M-pedigree Goldkeys mobile app (from Ghana) and Shine Shine and Sawa shoes (from South Africa and Ethiopia). ■

The exhibition is running at Cube Museum, Kerkrade from 24 October 2015 until 25 September 2016.
<http://goo.gl/Rtegd0>



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NMMU QS students dominate awards

Quantity Surveying students and staff at the Nelson Mandela Metropolitan University (NMMU) in Port Elizabeth received most of the awards presented at the 8th Annual SA Council for the Quantity Surveying Profession's Research Conference, 'Cementing the Future', held in Bloemfontein.

Leonard Wright, a BTech QS graduate at NMMU, was awarded the Association of SA Quantity Surveyors (ASAQS) prestigious 2014 Gold Medal Award for obtaining the highest marks in South Africa in the BTech QS programme.

The Gold Medal is awarded annually to worthy final academic year QS students whose "academic achievements are of outstanding merit and whose personal qualities promise to positively contribute to the profession". Wright was one of two Gold Medal Award recipients. Bjorn Anderson, a University of Pretoria BSc (Hons) QS graduate, won the other 2014 accolade.

However, staff members and BTech QS Honours students of NMMU's Department of Quantity Surveying dominated the 2014 awards at the conference, notably Port



NMMU Port Elizabeth student, Sinenhlanhla Ntuli, who received four awards for a paper she presented at the ASAQS conference in Bloemfontein.

Elizabeth student, Sinenhlanhla Ntuli, who received no fewer than four awards for her presentation entitled 'Quantity Surveyors' Ethical Behaviour' (co-authored by Prof Gerrit Crafford, Associate Professor in the NMMU Department of Quantity Surveying).

She received the Aecom Best Presentation and Innovation Paper award; the ASAQS Best Overall First-time Presenter award; the LimCo Best Youth Woman Presentation Paper award and the Leon Cronjé Best Overall Youth Presentation Paper award for under 35-year-old students.

NMMU QS student, Joshua Young, his lecturer Sharon Dent, and Prof Crafford received The Quantum Best Transformation and Sustainability Paper award for their paper, 'The Role of the Quantity Surveyor in the Green Building Process'.

Sharon Dent and Prof Gerrit Crafford also received the Pentad Best Academic Paper award for their paper, 'Predicting Quantity Surveying Students' Performance'. ■

**More information from Larry Feinberg,
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Top student travelled 700 km for each MBA North lecture

The top student in the 2015 Master Builders Association (MBA) North Small Builders Development Course, Laaiqa Shaik Habeeb, not only outperformed the men in her class, but also travelled 740 km to attend each one of the fortnightly classes in Midrand.

Haneeb, who is project manager: administration for building contractors, Tshenolo Resources, was based at this MBA North member's Mafikeng branch when the SBDC started in April 2015 and undertook the four-hour trips to Midrand every second Saturday for six months. "They were long trips, about 370 km to get to Midrand early on a Saturday morning, and then the same distance back around midday after lectures. But it was well worth the effort," she recalls.

Nominated by her employers to attend the course, Habeeb immediately agreed. "I have been working mainly in an administrative capacity in the building industry for 16 years so I was keen to learn more about the technical aspects of construction. I found the course extremely beneficial and stimulating and now feel there is much room for me to grow in the industry – perhaps as consultant to assist in the



Laaika Shaik Habeeb, top student in MBA North's Small Builders Development Course 2015, receives her award from lecturer, Chris Jennings, while MBA North education, training & transformation manager, Dr Deon Landmann, looks on.

project control of contracts, or even becoming a contractor myself some time in the future."

Habeeb believes there is huge potential for women to pursue careers in the building industry. "All that is needed is for us to grab the opportunities – and believe in our abilities. I think I did well in the course because I am eager to increase my knowledge and learn new things. I also always set goals for myself and passing this course was a major one for me," she stated.

Chris Jennings who is from Eight J Construction, and has been the lecturer for the MBA North SBDC courses for several years, says there has been a steady increase in the

number of women attending. "The 2015 class started with 13 women and 14 men. The women who attended the 2015 course fared better and were more dedicated than the men, although there were also some very promising male students."

The first 2016 MBA North SBDC Course is scheduled to be held early in 2016. ■

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Nigerian Society of Engineers swears in new President

**Reported by: Kolawole Adisa Olonade,
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The Nigerian Society of Engineers is the umbrella body for all engineering professions in Nigeria. It was established in 1958. The Society's objective is to promote the advancement of engineering education, research and practice in all its ramifications. Members are grouped under divisions, which are discipline-biased, and branches enable engineers in the same locality to network.

Saturday, 16th January, 2016 was a landmark in the history of the Nigerian Society of Engineers (NSE) as Engr. Otis Anyaeji, was sworn in as the 30th President of the NSE. The Deputy President (President Elect), Engr Adekunle O. Mokuolu, along with other three Vice Presidents, Engrs: Mrs. Margaret A. Oguntala, Babagana Mohammed and Giandomenico Massariwere were sworn in. Six other executive members also took the oath of office.

The new president of the Society, Engr. Otis Anyaeji was born on 4th March, 1951 in Onitsha, an ancient city in the South-Eastern part of Nigeria. Engr. Otis is a Fellow of the NSE, Nigerian Academy of Engineering and fellow of several other professional bodies. He is an accomplished strategic planner and mechanical, automotive, plastic and cost and valuation engineer. He has contributed extensively to the growth of engineering practice worldwide and Nigeria in particular. He is the epitome of engineering excellence and will lead the Society to an enviable position in the comity of world professional bodies.

During the investiture ceremony of Engr. Otis Anyaeji, the outgoing president, Engr. Isaac Ademola Olorunfemi, bestowed encomium on the incoming president and assured the audience of the capability of Engr. Otis to move the Society forward. He then highlighted some of the successes recorded during his own two-year tenure in office.

He reported that the Society had established additional branches and divisions so that there were currently 60 branches across the country and 20 divisions. Membership had grown to 6,000 strong.

He also mentioned that the Society had been able to produce the first-ever Nigerian Infrastructure Score Card, which was formally presented to President Muhammad Buhari, through the Secretary to the Federal Government of

Nigeria during the 2015 Engineering Conference. The report was extremely well received.

While presenting his presidential speech, which he titled 'Missing link in Nigeria's Development: Insufficient Engineers in the Policy Space', Engr. Otis did not mince words when he asserted that Nigerian Engineers are very key for the many much-needed Nigerian development projects.

He stated: "The country will keep needing engineers to promote development, to reduce poverty, to achieve solutions on climate change, mitigation and adaptations, and cope with natural disasters and other requirements of the Sustainable Development Goals." He stressed that Engineers are able to provide feasible solutions to a myriad of human problems and situations.

He encouraged engineers to participate fully in policy formulation as politics is their "birthright." Nevertheless, he reminded Nigeria about the need to appreciate Engineers because the Engineer has two attributes that are germane to public policy and politics. These two critical attributes are:

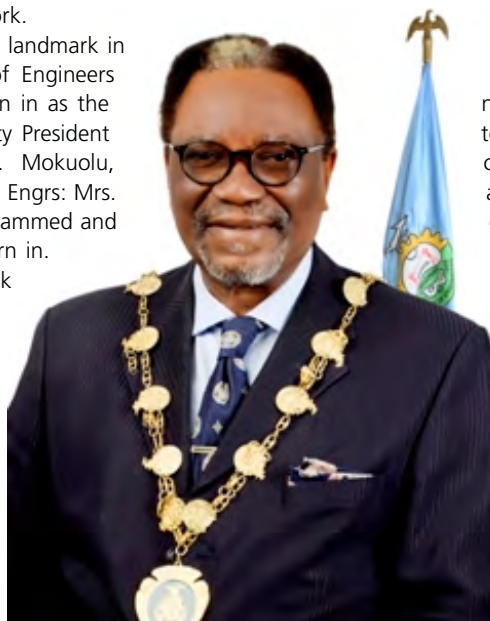
(i) the training of critical thinking on solving problems, together with training as to the very activities to develop and sustain a good quality of life; and

(ii) the moral and ethical obligations that they vow as part of their professional status to protect – the health, safety and welfare of the general public.

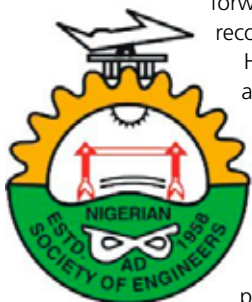
In the concluding section of his thought-provoking address, he placed emphasis on engineering ethics. He therefore posited that "Excellent Engineering practice minus ethics comes to nothing."

The occasion was graced with international engineering professional bodies, ministers of the Federal Republic of Nigerians, past presidents of the Society and several other distinguished dignitaries.

Meanwhile, the Gateway Engineers from Abeokuta Branch of the Society will be organising their engineering week between 5th and 10th March, 2016. The week will be filled with a variety of activities such as career talks, public enlightenment programmes, community engineering services, industrial visits and the induction of new corporate and graduate members of the Branch. The Chairman and members invites all to participate in this special event. ■



Engr. Otis Anyaeji FNSE, President, Nigerian Society of Engineers.





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Algerian acquisition boosts Chryso Group's African penetration

The Chryso Group has expanded its presence on the African continent with the establishment of production facilities in Algeria.

Norman Seymore, vice-president of the Chryso Group globally, and CEO of Chryso Southern Africa, says in 2014 the Chryso Group set up a joint venture with its Algerian partner, Hydipco, to boost Chryso business development in Algeria.

"Hydipco has a strong local team and modern production facilities which made the company an ideal Chryso subsidiary. Consequently, the Chryso Group acquired the Algerian company and formed Chryso Hydipco, which began operations under this banner very recently. Chryso Hydipco is now in a position to supply the Group's expertise and technical know-how as well as the full Chryso cement and concrete product range, including admixtures, to Algerian construction firms."

The Algerian construction industry is steadily growing, supported by private and public investment in infrastructure, residential, commercial and institutional construction projects, as the country strives to diversify its economy and reduce its dependence on oil. This has increased the demand for building materials in Algeria.



The Chryso Group has opened production facilities in Algeria, where the local construction industry is steadily growing.

This latest Chryso Group subsidiary follows the establishment in mid-2015 of Chryso East Africa, with headquarters in Nairobi – the construction chemicals group's first production subsidiary outside South Africa.

"It is the Chryso Group's intention to expand further into Africa, and there is a possibility of opening production facilities in West Africa. We already have increased our Group's representation in countries such as Angola, Mozambique, Ghana, Nigeria, Namibia, Zambia, Botswana and the Indian Ocean islands. The Chryso Group is, in fact, in the midst of an exciting phase of global growth," Seymore states.

The Chryso Group became an independent business in September 2014 following its acquisition from its parent company, the Materis Group, by French private equity firm, LBO France.

"The new credit line that the LBO acquisition has provided has increased the pace at which Chryso Southern Africa is being developed, and has resulted in Chryso Southern Africa becoming a springboard into Africa," he added. ■

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

Ethiopia: 250,000 condos to be built in the 20/80 Housing Scheme

By Zelalem Girma

The 20/80 Housing Scheme will not only be providing affordable houses, but will also be creating thousands of permanent and casual jobs which will contribute positively to the national economy.

The Addis Ababa Housing Development Project Office announced that the city administration plans to build 250,000



condominium houses in the 20/80 Housing Scheme during the Second Growth and Transformation Plan (GTP) period. It planned to build about 40,000 housing units each year in the Growth and Transformation plan.

Office Director General Haregot Alemu has said that although it was planned to transfer 170,000 housing units to beneficiaries in the last GTP period, 39,000 units could not be transferred as work on infrastructural facilities had not yet been fully completed.

Currently, their construction has reached 92% and they are expected to be handed over to beneficiaries this year, he added.

He also said that including those 50,000 housing units, whose construction started last year, the administration is carrying out the construction of 40,000 condos this year.

According to Alemu, most of those people already registered will benefit from the housing programme in the near future.

He said that efforts would be intensified to address the housing problem across the nation. ■

<http://allafrica.com/stories/201601180956.html>

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Kenya: Konza City to cost Ksh595.8 billion when completed in 2030

By Martin Ragira

Konza Techno City is expected to cost Ksh595.8 billion when completed in 2030, the Konza Technopolis Development Authority (KoTDA) CEO has said.

Engineer John Tanui said the Government will fund the waste water plant, roads, security access and KoTDA offices to the tune of an estimated Ksh52.2 billion while another Ksh43.2 billion, meant to finance the ICT network, electricity distribution and water distribution, will be sourced from the private sector through Private Public Partnerships.

The remaining Ksh500.4 billion is expected to come from direct private investments.

It is anticipated that the 'Silicon Savannah' will generate 200,000 new jobs and contribute 10% to the national GDP once it becomes fully operational by 2030.

According to Eng. Tanui, the IT City will have technology and research universities, schools, hospitals and computer software and hardware manufacturing industries, leisure and entertainment amenities.

Konza Technopolis City is located 50 kilometers from Jomo Kenyatta Airport (JKIA) on the Nairobi - Mombasa highway.



"Konza is expected to spur massive trade and create thousands of employment opportunities for young Kenyans in the Information Communication Technology (ICT) sector," Eng. Tanui told the new Cabinet Secretary for the Ministry of ICT, John Mucheru, when he toured the KoTDA offices located at Westlands in Nairobi.

He said that the Techno City will establish Kenya's global leadership in knowledge-based industries while providing world-class infrastructure, education and research facilities which will create technology-enabled business innovations in the country.

"Konza City will have a vibrant mix of businesses, workers, residents, science and technology and urban amenities," added Eng. Tanui. ■

<http://goo.gl/SFGVWZ>

Zambia: ZCCM-IH to build cement plant

By Judith Namutowe



ZCCM-IH chief executive officer, Pius Kasolo

The Zambia Consolidated Copper Mines Investment Holdings (ZCCM-IH) is in the process of constructing a cement plant in Ndola with an initial investment of US\$600 million.

ZCCM-IH chief executive officer, Pius Kasolo said the plant which would be built at Ndola Lime on the Copperbelt would be completed in three years and is expected to create over 1,000 permanent jobs.

Dr Kasolo said the plant's production capacity would be 5,000 tonnes per day and would absorb a good number of retrenched miners on the Copperbelt.

He said at construction stage, ZCCM-IH would create about 10,000 jobs, reducing to 1,000 once construction was completed.

"We will be generating our own energy from the cement plant," Dr Kasolo said.

Dr Kasolo said once the price of cement dropped further more people would be able to construct houses, businesses and factories.

He said the more the price of cement dropped, the more industrialised Zambia would become. ■

<http://allafrica.com/stories/201601181315.html>

Ethiopia quietly dispels Africa myths

By Nimrod Zalk

For many – in the West and South Africa – Ethiopia evokes images of all that is wrong with Africa: a hopelessly poor, backward and famine-prone country. But a book by Arkebe Oqubay, 'Made in Africa', dispels these myths and describes the quiet revolution that has been under way since the early 1990s – roughly the period since South Africa's democratic transition.

From 1998, Ethiopia's new government embarked on a series of increasingly ambitious programmes of agricultural modernisation, public infrastructure development and private sector industrialisation.

The current policy thrust promotes the rapid growth of light manufacturing and 'industrial' agriculture. Policies have been successfully implemented to channel scarce public resources, largely through state-owned enterprises, into water, electricity, telecommunications, cement and rail infrastructure.

Between 2003 and 2013, average annual growth has been 11%. Per capita income, albeit off a low base, was four times higher in 2013 than it was in 1991 (rising from \$120 to \$558 per capita). Poverty has been halved in two decades and life



Arkebe Oqubay, whose book 'Made in Africa' charts the Ethiopian success story.

expectancy increased from 48 in 1992 to 63 in 2012. According to the World Bank, if Ethiopia sustains this level of growth, it will have shifted from being the second poorest country in the world to a middle-income country by 2025. ■

<http://goo.gl/0U92Mf>



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AfriSam has become a recognised leader in production of advanced composite cements that harness by-products from steel manufacturing and coal-fired power stations, together with chemical activators, to improve the characteristics and performance of traditional portland cement.

AfriSam drives environmental stewardship and sustainability

AfriSam signalled its seriousness about its environmental stewardship over 15 years ago with the introduction of its first environmental policy in 1994. AfriSam operates this drive towards 'greening' the industry at several different levels simultaneously, making it an acknowledged leader in environmentally responsible cement and concrete manufacturing in southern Africa.

"Environmental stewardship is a business imperative for all companies today, and indeed at AfriSam our continued focus on this aspect of sustainability has seen best practice initiatives implemented across our operations," says Nivashni Govender, environmental specialist at AfriSam.

Significantly, AfriSam was the first cement, aggregate and readymix producer in southern Africa to publish an environmental policy in 1994. Today, the organisation has a comprehensive sustainability roadmap which covers a broad range of focus areas, including waste management, water conservation, biodiversity conservation, emissions reduction and energy management. The company has established performance indicators that continuously monitor and track compliance to the company's sustainability roadmap targets.

Biodiversity conservation

Mine rehabilitation is an area where AfriSam had led industry with mine rehabilitation plans for all the company's quarries completed in 1984. This was followed by the establishment of a dedicated Nature Conservation Trust in 1986 to provide funding for the closure of these mines.

"Rehabilitation of land impacted by AfriSam's mining activities is not just a legal requirement but a moral obligation, and this level of long-term planning by AfriSam demonstrates a commitment that will ensure that land can be returned to a self-sustainable landform to be enjoyed by future generations," Govender explains.

AfriSam actively practices concurrent rehabilitation at its sites where possible, which is in line with its policy to restore mined-out land to as close to its original state as possible. In many instances alternative use is found for the land such as turning it into reservoirs, dams or recreational facilities.

Environmental stewardship also requires that a company is proactive when considering its impact on the environment and this has been the case in Saldanha Bay. AfriSam has received

approval from the Department of Environmental Affairs and Development Planning for the construction of an integrated cement manufacturing facility on the Saldanha Peninsula in the Western Cape. This piece of land, owned by AfriSam, contains pristine vegetation of exceptional conservation value and therefore needs to be adequately protected to prevent extinction of these rare species of flora.

To ensure the sustainability of the relevant flora, Govender says AfriSam has set aside over 500 ha of the land it owns in Saldanha for conservation purposes. This land has received contract nature reserve status, the highest level of stewardship, and underscores AfriSam's commitment to conserving natural resources, including flora, for future generations.

Perhaps one of the least known and exceptional examples of AfriSam's commitment to environmental stewardship is that of the significant archaeological and paleontological finds at its Sterkfontein quarry near the Cradle of Mankind. In this exceptional case, when AfriSam discovered the find it took a business decision to cease all mining operations in the interest of preserving this human heritage site. It has rehabilitated the area and is in the process of donating it to the University of Witwatersrand for further promotion of education.

Water conservation

"The current water crisis has featured prominently in headlines recently, but conserving water is not something new for AfriSam," Govender says. "We have long been implementing measures to reduce water consumption. All operations have water balances in place which allow for optimisation of the resource, and we practice recycling of grey water, which reduces reliance on fresh water." An example Govender cites is the AfriSam readymix operations which specifically use as much grey water as possible for batching purposes.

Waste management

Apart from water, recycling is extended to other areas of the business and to minimise concrete waste returned, it is recycled at AfriSam's readymix facilities. This is used to manufacture interlocking concrete blocks and paving stones which are then used at AfriSam's facilities for various other applications. In doing this, waste that would normally go to landfill sites is completely eliminated.

An active campaign in the organisation encourages AfriSam employees to recycle paper, plastics, batteries and fluorescent tubes. "The programme is aimed at entrenching a culture among our employees of being environmentally responsible not just at the office, but at home as well," Govender states.

Energy reduction and the use of Alternative Fuel Resources (AFRs)

Marieta Buckle, process engineer at AfriSam, says that an important part of sustainability is the need to reduce energy consumption and this is an imperative for AfriSam. "AfriSam has set itself stringent targets aimed at reducing energy consumption as well as converting to alternative fuel and alternative energy sources."

Explaining the process, Buckle says limestone together with additional additives is converted into clinker in a kiln process. "To produce clinker requires temperatures in excess of 1,450°C – meaning that vast amounts of thermal fuels, such as coal, are used. This ultimately results in large volumes of CO₂ emissions. Our main focus, when it comes to reducing this environmental



AfriSam ceased all mining activities at its Sterkfontein quarry near the Cradle of Mankind when it discovered significant archaeological and paleontological finds. The company has rehabilitated the area and is in the process of donating it to the University of Witwatersrand for further promotion of education.

impact, is on reducing the amount of thermal fuel used to reduce the amount of CO₂ emitted."

"Another lever that AfriSam can use to reduce total carbon emissions is utilising waste material instead of coal. Use of alternative fuels in cement kilns is widely practiced globally and AfriSam has started utilising various alternative fuels," she says. "Similarly, to reduce the consumption of natural resources, the additives required in the clinker process as well as in cement manufacturing can be replaced with alternative resources such as phosphogypsum, boiler ash, magnetite, granulated blastfurnace slag and fly ash.

"A critical part of reducing energy consumption is to continue optimising our processes," Buckle says. AfriSam saw a significant reduction in energy consumption in 2015 as a result of implementing new high-level control systems at its clinker-producing plants. "These systems facilitate more stable operating conditions and eliminate potential human error. It enables continuous monitoring of operational parameters and makes incremental changes to ensure the most optimum process conditions prevail."

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AfriSam was the first cement, aggregate and readymix producer in southern Africa to publish an environmental policy in 1994. Today, the company has a comprehensive sustainability roadmap, ensuring that its business activities enable conservation of the planet for future generations.



AfriSam's Ulco cement manufacturing plant in the Northern Cape received an award for the National Association for Clean Air (NACA) in 2013 for the installation of world-class bag house filter technology as well as for the operation's dust suppression systems to control a wide range of gaseous emissions.

In addition, AfriSam is in the process of implementing a waste heat recovery system at its cement manufacturing facility in the Northern Cape.

The high temperature of the clinker manufacturing process produces large volumes of high-temperature air which leaves the kiln system. Buckle explains that the energy in this hot air stream can be recovered and used. The waste heat recovery system uses the hot air to heat a liquid, this liquid is evaporated and drives a turbine to generate electricity. "Use of this electricity will reduce our consumption from the national grid and it is another example how AfriSam leverages technology

to positively repurpose waste products. Electricity generated by the waste heat recovery system is generated with zero increase to AfriSam's carbon footprint. However, if it was consumed from the grid it would have carried the carbon footprint from Eskom. This, therefore, reduces the overall CO₂ emissions in the country," Buckle says.

Buckle says that AfriSam has also committed to the implementation of energy management systems. "To increase the focus on energy, we have introduced a standalone energy policy whereas previously it was addressed as part of the environmental policy. It stipulates AfriSam's clear commitment to achieve reductions in energy consumption and covers all operational aspects of the business.

Emissions reduction

AfriSam was responsible for pioneering kiln emission improvement in southern Africa. "We chalked up an impressive number of firsts including being the first producer to install Continuous Emission Measuring equipment capable of measuring 13 gas streams on a continuous basis. We were also the first producer to conduct regular metal and dioxin and furan emission measurements in stack emissions. AfriSam was also the first in the industry to install bag-house filter technology for kiln emissions," Buckle says.

Another focus for AfriSam is to optimise the utilisation of mineral components or extenders in its final cement products. The utilisation of mineral components reduces the overall consumption of clinker, which therefore eliminates the CO₂ emissions that form part of the clinker manufacturing process. An example of this is Eco Building Cement which has the lowest measured carbon footprint in South Africa.

This product is a blend of high-performance cement and reactive mineral components with excellent cementitious properties and is produced using a unique combination of portland cement and mineral components and is the most environmentally friendly cementitious product.

AfriSam has been actively participating in the carbon budget process being run by the Department of Environmental Affairs, and Buckle says this underpins the company's commitment to the sustainable operation of its business and its drive towards reducing its carbon footprint.

AfriSam-SAIA Award for Sustainable Architecture

Together with the South African Institute of Architects, AfriSam is the founding partner of the AfriSam-SAIA Award for Sustainable Architecture. Since 2009, the awards have grown into South Africa's most prestigious sustainability awards, honouring outstanding achievements in sustainable architecture and creating public awareness and debate on architectural issues and sustainability in the built environment. Entries for the 2015/2016 AfriSam-SAIA Award for Sustainable Architecture, which closes at the end of March 2016, have introduced two new categories – Sustainable Products and Technology and Sustainable Social Programmes. More information about the awards and the submission of entries can be found on www.sustainabledesign.co.za.

AfriSam believes in 'creating concrete possibilities' for future generations by approaching sustainability in a holistic manner and investing in manufacturing processes and business practices that make a positive contribution towards conserving our planet. ■

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PPC Imaginarium: Creativity in Concrete

A better showcase of the possibilities of concrete doesn't exist says Daniel van der Merwe, Architect, PPC Ltd

PPC Ltd launched the PPC Imaginarium in April 2014. The finalists' work which was selected was curated and showcased across the country at various galleries, the Turbine Art Fair and at the 100% Design Expo. An estimated 87,000 visitors were exposed to the concrete artwork and it generated wide-spread media exposure on all platforms. The general feedback and responses received was one of positive astonishment at the possibilities and versatility of concrete.

The primary aim of the PPC Imaginarium Awards is to recognise innovation and design using portland cement-based concrete as a primary inspiration and/or material. In just over a year the programme has incentivised, awarded, mentored and enabled fantastic exposure and profiling to nearly a hundred emerging South African artists and designers.

Imaginarium 2016

Now in its second annual cycle, a total of 942 registrations were received with more than 260 artworks submitted for the final round of judging to select the winners in six categories, namely: Architecture, Fashion, Industrial Design, Jewellery, Film and Sculpture. The scale and scope of the initiative has thrust PPC Ltd into the limelight as one of the biggest supporters of the Arts fraternity in South Africa. It is a demonstration of PPC's recognition that art and design are major contributors to innovation in many fields.

Work was submitted and judged at six regional collection points across the country and with a core national panel and regional artists and academics in the various cities. The national judging panel was convened to select winners in each category and reads like a 'who's who' in the art and design world. The impressive list of jurors included respected names such as artists Wilma Cruise, Professor Ledelle Moe, Aaron Kohn, curator of MOAD, Alayne Reesberg, former CEO of the CT World Design capital, and the famous architect Mokoena Makeka.

The finalists' work will be curated and exhibited at the Cape Town-based Young Blood Gallery and First Thursday event in February. Thereafter it will move to Johannesburg and Pretoria at various events, culminating in a first for South Africa – a 100% Concrete pavilion at this year's 100% Design expo which runs concurrently with Decorex Jhb in August 2016. Creativity and design workshops will be offered with walkabouts by finalists to give insight into their work at the various exhibitions.

The next step in developing the platform is to enable online digital tutoring, a digital gallery of artists and their work and to collaborate with e-commerce design websites to expose work to a worldwide audience. Call for registrations will commence at the end of February and artists will have until October to register. They will need to submit their physical entries in January 2017 for judging.

Interesting 2016 submissions that showcase the versatility of concrete

Marina Walsh: Sculpture finalist



"I wanted to take the 'material' I made out of the concrete beads I used in my piece for the 2015 PPC Imaginarium Awards further, and use it to express a more emotive concept. I am intrigued by the amorphous shapes that homeless people make out of their blankets, when lying on pavements and standing on street corners. I created figurative sculptures, making an actual portrait of a familiar beggar, whom I pass every day, yet whose name I don't know. It is a type of monument to 'the homeless person', thereby elevating him to the level of a famous person and showing him as a 'somebody' instead of a 'nobody'.

As I did in 2015, I made the blanket out of beads, this time envisioning that if he were to be placed somewhere, I would encourage small plants to grow in the blanket, which would in turn attract small insects and beetles looking for a home. Furthermore, the concrete represents the environment in which homeless people spend so much time, the weight of the blanket being the weight of poverty. I would like to place this sculpture on a kerb, next to a traffic light – the kerb being the 'plinth' on which most beggars reside."

Gordon Froud: Industrial Design finalist

A cast concrete table with a series of oxymoronic statements on art etched into the surface. These are filled in with white to contrast with the table's aged look. The legs are solid cast concrete with ball and claw feet. This slightly worn and wobbly table now carries comments made by various artists, writers and commentators about art and its practice. It creates a humorous visual reading table that is sure to delight the viewer through its content and its nostalgic quality.

Angie Berman: Jewellery finalist

"My inspiration is drawn from many different facets, such as luxury, fashion and materials. All my jewellery is handcrafted and one-of-a-kind. One of my objectives is to create wearable art, which is at the root of every item I create. My clientele have an eye for detail and value individuality, quality and personality. My jewellery is sophisticated, eclectic and classy. It is dynamic enough to be worn on the catwalk or an evening out. This specific piece was inspired by the different phases of cement: from powder, to liquid, to solid. The dynamic way that cement is used to create art in the form of architecture is very similar to the way that jewellery is designed. A glaze was used on the beads in order to make them look wet, which echoes the liquid phase while still being a solid object. This juxtaposition of solid and liquid is very interesting to me. I decided to investigate the opposition of different textures and how they are associated and differentiated. Cement – being hard-edged, rough and durable and often, therefore, symbolising masculinity – is juxtaposed with beading, whose elegance, sophistication and delicacy can be regarded as feminine traits. The use of PPC cement was a pivotal moment as I have learned so much from working with such a unique material and will continue to push the boundaries of my designs."

Edna de Bruyn: Jewellery finalist

"Our existence exhibits a constant state of struggle between fragility versus strength and humans versus nature. Humans are the most successful species on earth but we are eroding the planet to support ourselves. We are so adaptable that we change the environment around us to suit us. It is almost as if we have declared ourselves independent from nature. But we are not separate from the natural world; we forget that the very air we breathe in is what trees breathe out. It is an interesting notion in life that something that appears delicate has unseen strength and things that appear strong can be very delicate. Both humans and the natural world exhibit both strength and fragility. We are resilient against certain impacts, but yet certain changes in the environment make us extremely fragile. Although humans are destroying the natural world, nature is fighting back to reclaim its space in our concrete jungles; it is visible in our daily lives, whether it is a flower pushing its way through a crack in a sidewalk or the roots of a tree enveloping structures and breaking through concrete barriers, cracking foundations and walls of neglected buildings. The inspiration for my creation for PPC Imaginarium (in this instance a ring) is to depict the co-existence of strength and fragility between humans and nature by utilising concrete to depict humans and delicate flowers created in metal to depict nature."

August de Wet: Industrial Design finalist

"The concrete used for the construction of the Eddystone lighthouse in 1793 catapulted the use of the material into its commercial form as we know it today. This relationship between light and concrete is the basis of 'BEAM'. Conceived as a beam of light that cuts through a solid concrete mass, the design mimics the form and directional light of a lighthouse yet it does away with a visible light source. This allows one to look into the beam and perceive the hollowed out interior space of the concrete where the texture and colour of the material

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provide a unique tactile visual experience. The concrete shapes the light and the light in turn shapes the concrete, creating an interrelation between the two. It is, in essence, a meditation on the intrinsic qualities of concrete (heavy, solid, impermeable) and light (ephemeral, intangible, magical) fused into one object. A conical void is subtracted from an upright cylindrical form to generate the form of a beam of light. This is achieved by moulding the concrete around a solid cone that intersects the cylindrical mould. The interior surface of this void is illuminated from below with a hidden light source that bounces outwards to create a secondary horizontal beam. This light can be used indoors as a table or floor lamp and outdoors as a garden lamp or bollard. The floor lamp will also be able to rotate the concrete cylinder to face different directions."

Evan Brown: Industrial Design finalist

"My design is a concrete beehive. Beekeepers lose up to 30% of their stock and equipment each year due to vandalism and theft. Beehives are kept in locations where they cannot be inspected regularly and the hives are often damaged by people, animals or extreme weather conditions. Bees are also under threat globally due to diseases such as American Foul Brood (AFB). The practice of migratory beekeeping is a leading cause of the spread of the disease, however farmers view beekeeping as too risky to undertake themselves. The current method preventing the spread of AFB involves burning infected hives and their contents. Standard wooden hives also deteriorate over time and can cause bees to abscond. My solution is a permanent concrete beehive that will help farmers and beekeepers to create more sustainable apiaries. I have designed a concrete beehive that will reduce the risk of theft and vandalism, improve the bee colony's insulation and thermo-



regulation and support good beekeeping practices. Concrete provides key values such as durability, insulation and weight. However, the ease of use and ecological effectiveness will need to be addressed through well-considered and innovative design work. To test the success of the final outcome, I will introduce a swarm of bees to the hive and measure its progress." ■

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The Bride: to be the world's tallest building?

Anglo-Iraqi architect AMBS has unveiled a design for what would be the world's tallest building in the Iraqi city of Basra.

The 230-storey, 1,152-m-tall Bride Tower in Basra would be made up of four buildings joined together. These would contain a 'vertical city' comprising 1.5 million square metres of offices, hotels, shops and apartments, as well as parks and gardens. A facade described as a 'veil' would cover the exterior of the



Here comes the Bride: architect plans world's tallest building in Basra.

structure and provide shade to surrounding buildings. It would be topped with a 188-m-high antenna and would even be served by its own railway.

The tower aims to generate as much energy as it uses, partly by means of a 670,000-m² canopy covered with solar panels. AMBS, which has offices in Baghdad and London, said: "Super-tall towers are perceived as objects in the distance; aliens planted in the city, disconnected from the urban scale at ground level. "The Bride, in contrast, will be conceived as a city itself vertically, but also horizontally from the ground. It will be enjoyed by thousands of people in endless ways, within it, on it or under it. From walking in vast shaded parks and promenades at ground level, to lunching or shopping in a square that is hundreds of metres above sea level."

The Iraqi government is creating a masterplan for Basra and The Bride is intended to be its centerpiece. However, although Basra is relatively peaceful and prosperous, no location, construction schedule or price have been suggested. The tallest building under construction is the 1-km-high Kingdom Tower in Jeddah, Saudi Arabia. The tallest building completed is the 830-m Burj Khalifa in Dubai. ■

Images courtesy AMBS architects

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Admixtures facilitate silo slide in Northern Cape

An innovative solution, applied by Chryso Southern Africa, contributed to the successful completion by Renniks Construction of six grain and wheat silos in Kimberley in the Northern Cape using slip-form construction.

These large silos, 33 metres in height with a 200mm wall thickness, used a total of 6,300 m³ of concrete and were commissioned by GWK, a leader in the agribusiness sector.

Renniks Construction has a longstanding relationship with Chryso Southern Africa and is one of the few South African companies that has specialist slip-forming capabilities. The two companies have worked together on many projects; most notably, the Fulton Award-winning Impala Shaft #16 project.

"Slip-forming is a sliding construction methodology that requires the assembly of a sliding system at ground level. This system is lifted incrementally as concrete is poured; creating a structure with no joints. Reinforcing is fixed into position as

the slide progresses so as not to slow down the placement of concrete. Once the required height of the concrete structure is reached the sliding system is dismantled," explains Wayne Kamoo, site manager at Renniks Construction.

Brenton Brouard, Chryso Southern Africa's technical manager: concrete, says that Chryso Southern Africa played a key role in the concrete mix design for the project.

"The particles of the river sand in the area are not as rounded as those of conventional river sand. We therefore decided to use a larger-than-usual quantity of crusher sand. However, this could have caused a potential problem as there were fewer fines in the overall grading of the blend," Brouard says.

"Typically, concrete used in a slide should be cohesive with sufficient fines. The concrete has to have good finishability properties in order to create the 'slip effect'. If there is material segregation with aggregates protruding, then the slide will not be smooth and there will be difficulty in incrementally lifting the sliding system."

As a solution, Brouard elected to use an admixture called CHRYSO®Quad 20. "This admixture was an ideal choice for the Kimberley project because we were working with a concrete which, comparatively speaking, lacked fines. CHRYSO®Quad 20 increases the cohesiveness of the concrete and prevents bleeding and segregation, improves the finishability of the concrete and assists construction by giving the concrete its sliding effect.

"We also used another admixture – CHRYSO®Omega 101. This product also facilitated the finishability of the concrete. Its air-entraining properties assisted by replacing the lack of fines in the mix and helped with greater workability," Brouard says. "By facilitating greater workability of the concrete, there was sufficient time created to allow concrete to be placed into the form around the entire circumference of the silo and vibrated and for the sliding process to proceed without interruptions.

"It was important to achieve the correct slump as, should the slump have been too high, the sliding process may have been delayed. In addition, it would have been very difficult to slide if the slump was too low. Since CHRYSO®Omega 101 is a multi-dose admixture it enabled the contractor to create concrete with the slump best suited for the project," notes Brouard.

"The sliding system had shutters 1.2 metres in height and tapered at both sides which meant that the silo narrowed with every lift. There were 24 jacks set 2.3 metres apart. Kamoo explains that the design of the structure determined the number of jacks.

"The wall thickness, the amount of steel used and the number of cast items also determine how far apart the jacks should be placed. If the jacks are too far apart there would have been a lot of friction between the concrete and the shutters causing damage to the concrete," he says.

Planning is of the utmost importance with concrete slides. Since slip-forming is a continuous process, teams have to work 12-hour shifts. "One has to have a reliable and consistent supply of cement, admixtures, sand and stone to site to facilitate this continuous operation. With Chryso we received good service and the mix design is always done professionally," Kamoo concludes. ■



CHRYSO®Quad 20 increases the cohesiveness of the concrete and prevents bleeding and segregation, improves the finishability of the concrete and assists construction by giving the concrete its sliding effect.

**More information from Kirsten Kelly,
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V & A Waterfront brings you the exclusive Silo Hotel

In 2013, the V&A Waterfront announced its R 500m philanthropic undertaking in the conversion of the historic Grain Silo complex into the Zeitz Museum of Contemporary Art Africa. More than a year into the ambitious redevelopment of this heritage landmark, an exclusive 5,500m², 28-key hotel, managed and operated by The Royal Portfolio, has been announced.

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J.C. van der Linde & Venter Projects had to contend with challenging 'green' demands in handling the refurbishment and redevelopment of Total House.

Stringent operational demands in Total House's Green Star quest

Pretoria building contractors, J.C. van der Linde & Venter Projects, successfully met the challenge of complying with the Green Building Council of South Africa's Green Star rating construction requirements for the refurbishment and redevelopment of Total House.

Total House in Rosebank was renovated and redesigned to comply with a GBCSA 4 Star Green Star rating. Application has been lodged for both the construction and design of the final building. The building demolition and upgrade had to meet the requirements of the stringent SA National Building Regulations, which place particular emphasis on safety. Total South Africa also required an additional 1 000 m² of office space to accommodate increasing staff numbers and to allow for growth in the future.

Arrie Venter, contracts director at J.C. van der Linde & Venter Projects, who was in charge of the R95-million contract, says the project is significant – being one of the first refurbishment projects to strive for a GBCSA 4 Star Green Star rating.

"This involves both demolition and rebuilding and from the outset posed unprecedented challenges for us, as contractors. Before we could start any demolition work on the building, constructed in 1998, a Hazardous Materials (Hazmat) survey had to be undertaken. Our company therefore appointed special environmental consultants to guide us through the project, for which we had to regularly report to the client's 'Green Star Consultants', P.J. Carew Consulting, specialists in evaluating and designing strategies for the improved environmental performance of buildings.

"A detailed report had to be filed to – and approved by – the Green Star Consultants before we could lift a brick from the old building," Venter explained.

"We followed Environmental Management (EMP) and Waste Management Plans (WMP) drawn up for J.C. van der Linde & Venter Projects by our own environmental consultants.

The EMP included commitments on a wide variety of building operations normally regarded as routine e.g. how and where contractors' paint brushes would be washed, and how the contractors would prevent oil leaks on site.

The WMP laid down strict requirements on how demolished components would be disposed of. "We had to create three waste skips: one for items that could be recycled, another for material that would be disposed of in landfill, and another for contaminated components. The old Total House had a sprawling glass façade and many square metres of glass could not be re-used because it was laminated: laminated glazing cannot be recycled," Venter observed.

"Paint and adhesives had to have low VOC levels and cementitious products also had to be approved on behalf of the client by P.J. Carew Consulting. For the concrete, the readymix supplier designed a 'project specific' concrete mix that would meet the Green Star requirements as well as the engineers' design criteria. The concrete reinforcement also had to be sourced from a supplier utilising reinforcing steel with a post-consumer recycled scrap metal content in excess of 90%."

Once work had shifted inside the building, the contractors faced new challenges. To demolish the existing lift shaft, only hand tools could be used as the shaft was virtually adjacent to the room that housed Total Africa's vital computer servers and sophisticated equipment. "Any damage to the operations of the server room would have had disastrous consequences for Total," Venter added.

Axient Architects' design for the new building comprised a new central core in the middle of the existing building, stretching from the lower basement to the mezzanine level, in which a new central staircase, lift and escalators had to be installed. Consequently, the contractors had to virtually carve a large-diameter hole through three floors of the existing building, utilising an intricate method of demolition. Piling for

the foundations for the new lift and staircase structures had to utilise a special piling rig due to the limited space available in the existing lower basement. Nick Mallandain, principal architect at Axient, explains: "For J.C. van der Linde & Venter Projects, this procedure was the main element from which the rest of the building work would follow, so the contractors' programming of construction was based from this point."

To create the additional 1,000 m² of office space as innovatively devised by the consulting structural engineers, BSM Baker, it was necessary for Axient to redesign the roof truss structure to add more height in a specific grid area. This meant J.C. van der Linde & Venter Projects had to remove 1,000 m² of the existing hollow tube trusses and replace it with castellated beams.

Mallandain adds: "Other challenges faced by the professional team in this extensive refurbishment contract included moving the building entrance from the east to the north side. A double-volume area existed already and, because it faced the sun, seating staff in this area was impractical. This gave us, as architects, the perfect opportunity to position the entrance here, creating the necessary additional parking around it. Paragon Interiors created an impressive new reception area – with seated waiting areas and green walls – to bring life into the building. For J.C. vd Linde & Venter Projects, however, there was a big task of excavating down to the lower basement to construct a new stairwell up to the newly positioned entrance as well as civil works for the new parking area and entrance.

"The two existing atrium areas were reduced from 12 x 24 m to 12 x 12 m. In these voids, Paragon Interiors created cantilevered meeting rooms. Working in close cooperation, the engineers, architects, interior designers, and main contractors, managed to successfully create these meeting pods.

"In fact, team work was important throughout. As part of Total South Africa's new corporate branding strategy, the entire professional team were called on to provide maximum skills and expertise. The new building provides an inspiring environment for its staff, emphasises the client's brand strength, and shows how an existing building can be refurbished and redesigned to high environmental standards through the combined input of dedicated professionals. The role that the main contractors played in ensuring that the client was ultimately able to apply for a 4 Star Green Star rating was important and praiseworthy," Mallandain adds.

Kim Hutchins, project manager from Capex Projects, says: "Any alteration or refurbishment project is a challenge. When you add the requirements to meet Green Building criteria, the task becomes even more daunting. A lot of these requirements covered new ground for both the professional team and building contractors, but Arrie Venter and the team from J.C. van der Linde & Venter Projects met the challenge and proved a highly efficient and cooperative company to work with. Much of the credit for the success of the project must definitely go to them."

J.C. van der Linde & Venter Projects handed over the site in May 2015. The prolonged strike in the steel industry – which had severely delayed the availability of building materials – coupled with alterations to the original design, and early summer rains that started just when the old roof had been opened, led to an extension of the original 12-month contract.

Assisting Arrie Venter on site for the contractors were J.J. Maree (site agent), Martin Naudé (general foreman), and Wim Wijenberg (supervisor: services coordination and finishing trades) ■

**More information from Charl Venter,
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BBG's new offices: an shining example of Image Construction



The curved wall behind the stairwell houses a photographic display of BBG projects.

Inhouse Brand Architects has constructed a sleek, masculine image for the corporate offices of the Berman Brothers Group (BBG) – a leading property development firm in Cape Town. The design concept sees raw construction materials transformed into signature elements that pay homage to BBG's very own building blocks.

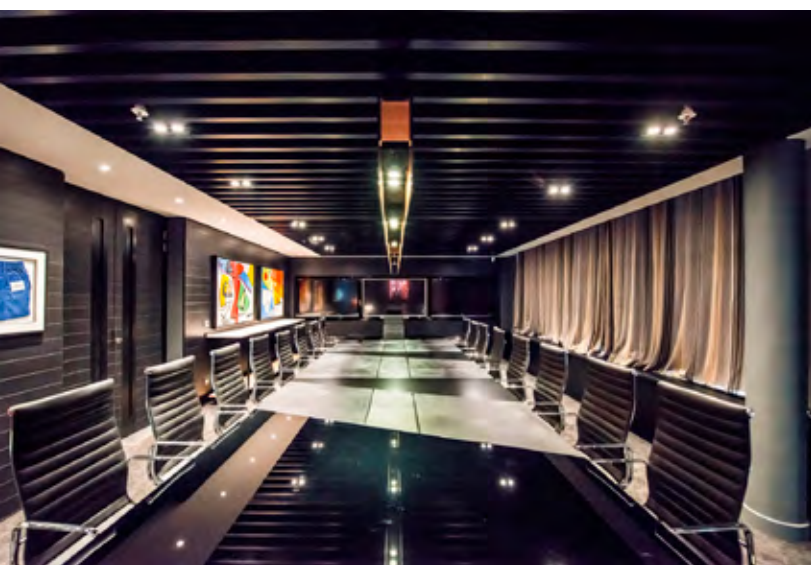
When asked to design the new Sea Point offices for BBG, Inhouse Brand Architects took the bulk of its design references from the origins of BBG's success in the building industry – its raw materials. Basic construction elements such as reinforcing steel and exposed concrete have all been reimagined into iconic statements in a decidedly masculine space. The overall effect is sophisticated and startling for its design ingenuity. Extremely high-end finishes serve to contrast with and elevate raw construction elements, creating a sense of cohesion.

The client's brief was to develop a world-class interior that both reflected the BBG brand and accommodated the company's various needs. The wishlist included well-appointed private offices for the owners, Paul and Saul Berman; a large, open-plan seating area for staff; informal meeting spaces; private meeting rooms; and business lounge arrangements.

For Inhouse creative director, Aidan Hart, the project was an exciting challenge not only because of the design input that could be provided, but also because the client was extremely discerning. "Paul and Saul Berman are very dynamic individuals and successful entrepreneurial businessmen who came with high expectations of both quality and style, having built their business in the building and property development realm."

For its new premises, BBG elected to occupy two floors in the same building linked by an internal stairwell. Inhouse's space planning for the project demarcated the upper floor as the client-facing area, with the working floor or boiler room below. It was important to Hart that there be visual connectivity between the two areas, despite their differing functions.

This visual connection was achieved by cutting several circular 'portholes' through the concrete floor slab to expose the reinforcing steel that supports the floor and also the lower level beneath. Toughened glass completed the openings.



The impressive boardroom light resembles an I-beam and furnishing creates a masculine ambience.



Common rebar has been used to create a screen and an innovative stair railing.

To further connect above and below, Inhouse has deconstructed the stairwell between the two floors. The cantilevered, floating staircase boasts an exposed reinforcement substructure that carries glass treads connecting two concrete spiral sections. The large curved wall behind the stairwell stretches between the two levels – again, reinforcing the connection between them – and houses a photographic display of BBG projects. Rebars were cleverly used as handrails for the spiral staircase.

Common rebar was welded into an arresting and unusual screen that greets guests as they come into the reception area. The reception desk itself is moulded from concrete, complemented by a raw marble-clad back wall featuring striking diagonal sections.

There are several custom-made furniture elements which are detailed around building equipment. Ryan Matchett has designed an impressive boardroom light resembling an I-beam and Dark Horse supplied furnishing which serves to complement the masculine interior and construction focus.

The high degree of customisation and bespoke design really distinguishes this project. According to the Inhouse designer Jenine Bruce, "Everything was custom-designed, right from the doors

to the boardroom table. And that's such a feature of the space." Even the door handles – large, vertical plates of steel with slots in them – were custom-made.

This level of detail was also extended to the witty, unusual signage for the bathrooms. Lettering has been etched into the granite floor, revealing the words 'Silk Stockings' that denote the women's bathroom, and 'Stitched Leather' to identify the men's section.

The boardroom table – also custom designed – was technically challenging to produce. It consists of glass, stretched leather and plate steel that has all been cut up at diagonals to reflect the style of the reception area.

In addition to customisation, another standout feature of the space is the disciplined execution of a very slick, crisp, linear aesthetic. This lends the space zen-like minimalism that contributes to a peaceful, quietly confident mood.

Furthermore, almost every room has maximum daylight exposure and fantastic views, which allowed Inhouse to use very bold, dark materials throughout, giving the space a strong, solidly masculine appeal that builds trust – like BBG itself. ■

More information at
<http://inhouse.ws>

About Inhouse Brand Architects:

Inhouse is a leading and comprehensive South African agency specialising in turnkey solutions for all sectors of design, with expertise in interior design and brand architecture. With offices in Cape Town, Johannesburg and London, Inhouse concentrates on innovative and appropriate ideas in response to the diverse needs of its clients.



The whimsical wooden umbrella rack contrasts with the slate and concrete that make up the interior.



L13, L18, L22



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Climbing to new heights in the Western Cape Construction Industry

Cape Construction Trade Expo, now in its fourth year, will be held at the Cape Town International Convention Centre from the 11-12 August 2016 and will once again provide the industry with the rare opportunity to engage with stakeholders across the entire construction value chain – all under one roof.

Whether you are an industry titan or a new entrant, the Cape Construction Trade Expo offers unparalleled access to over 100 suppliers and solution providers in the construction industry.

Alan Winde, Minister of Economic Opportunities, Western Cape Government, attended the 2015 event and had this to say: "Really what this event did for me is it showed me that key to every single space in our economy is the construction sector. While we choose various enablers or areas whether it be electricity, water, the IDZ in Saldanha Bay or new hotels in the tourism space – construction fits across all."



Errol Bryce (Commercial and Publishing Director) and Rashaad Essop (Portfolio Manager) in discussions with Alan Winde (Minister of Economic Opportunities) shortly after his interview.

There is little doubt about the cyclical nature of construction activity, and as the only event that prioritises the Western Cape construction industry, the Cape Construction Trade Expo provides the industry with a crucial platform for open engagement, discussing trends, opportunities and solutions for the entire construction value chain.

"The construction sector has a particular dynamic where you need large companies to deliver on the biggest projects. Only the biggest construction companies have the working capital and the financial clout to manage really large government projects but then at the same time you need to ensure that the industry is open to competition, to start ups and to small businesses and that is a challenge for the construction sector. Striking the balance, by maintaining the viability and profitability of large players, whilst still making sure that the market remains open to new entrants." Tim Harris, CEO Wesgro.

Neal Serrao, regional sales manager for TomTom Telematics had this to say about the trade expo, "Cape Construction has been great, it is a focused market space that we came to join and we have found it to be very lucrative. Overall it has been great, we have loved it." Sean Pienaar from Enderstein Van der Merwe shared the same sentiments, "Cape Construction is a great place to meet, up and coming contractors, whether it is from the subcontractors, suppliers to the main contractors, we have met everybody in this sphere."

Cape Construction Expo has truly become a must-attend event for the Western Cape construction industry, providing the industry with the unique opportunity for face-to-face interaction with the industry at large. ■

For further information, please visit www.cape-construction.co.za or contact Tracy-Lee Behr at tracylee.behr@hypo.com.



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Greening hospital grounds with permeable pavers

Since June 2015, residents of Strand and Somerset West can access a wide selection of health services, following the opening of a new private hospital in the region. The R400-m, 100-bed Busamed Paardevlei Private Hospital in Strand is the first of four hospitals to open in the country. Launched by the black-owned Busamed hospital group, it boasts state-of-the-art medical wards, including maternity and neonatal wards, high care, and an intensive care unit (ICU) among its specialist units. Says Dr Diliza Mji, whose company Goldenwood has a 60% stake in Busamed: "Even though there is a presence of some private hospitals in the area, these didn't cater for everyone.

"Patients who needed vascular surgery, rheumatology and orthopaedic oncology services, for instance, had to go out of Somerset and Strand and travel to Stellenbosch or Cape Town if they wanted access to these services.

"The new hospital is now bringing services to the people... right on their doorstep," comments Dr Mji.

To accommodate patients and staff on arrival, the parking area on hospital grounds needed structurally functional and aesthetically pleasing hard landscaped surfaces for parking, roads and various pedestrian areas. Based on a Council directive that the parking on Beach Road edges should be soft and green, this included creating parking areas paved with

permeable pavers that would allow groundwater to permeate through the paving and return to the aquifer in the area.

Both Jon Whiting, paving contractor and Tanya de Villiers, CNdV Africa, approved a locally designed hard lawn paver. Says Whiting: "We chose the Terracrete interlocking grass paver, designed by Terraforce and manufactured by Cape Retaining Systems, because of its unique aesthetics and its ability to return stormwater to the ground via its permeable characteristics and sand substrate. In total, we installed 1,700 m² of Terracrete blocks."

Richard Hartsuiker, of Vula Environmental Services, describes the final planting process of the pavers: "All the blocks were brush filled with a topsoil and organic fertiliser mix of a high compost fraction (40/60). The soil was then lightly compacted and watered, and finally seeded with 40 g/m² of warm season grass (Cynodon dactylon). Once the grass started germinating after five to ten days, the parking lots were transformed into attractive green zones along the length of the hospital's exterior grounds."

De Villiers is also very pleased with the appearance of the grassed Terracrete pavers: "I do think they worked out rather well," he said. ■

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



A Council directive required parking along Beach Road edges to be soft and green. Therefore Terracrete interlocking grass pavers were chosen.

Khato Civils' choice for their Hammanskraal pipe-jacking project

Khato Civils chose Rocla to partner them on what will become a historical event in South African pipe-jacking history when 370 cubic metres of rock will have been manually hand excavated with a minimal grade on the entire length of the 148,840 metres of jacked pipeline at a project in Hammanskraal, Extension Jubilee/Temba, due to be completed in October 2016.

Mornè Delport, the project manager for Khato Civils said: "This project, which commenced in May 2014, will benefit the community of Kanana and Temba/Rockville and was initiated by Tshwane

2 dam was located nearby making the monitoring of water pockets a crucial safety element," said Delport.

Rocla installed a HPDE lining on the inside of the 1473 ID jacking sleeves instead of the normal CIC lining, thereby extending the lifespan extensively beyond requirement. Brendon van Vuuren from Rocla commented: "This was an enormous project undertaken by Khato Civils and we were pleased to partner with them and put our expertise into practice. Huge challenges were successfully overcome and we supplied in total 150 metres of pipe jacking to this high-value project."



The 148,840 m of jacked Rocla pipeline required the manual excavation of 370 m³ of rock.

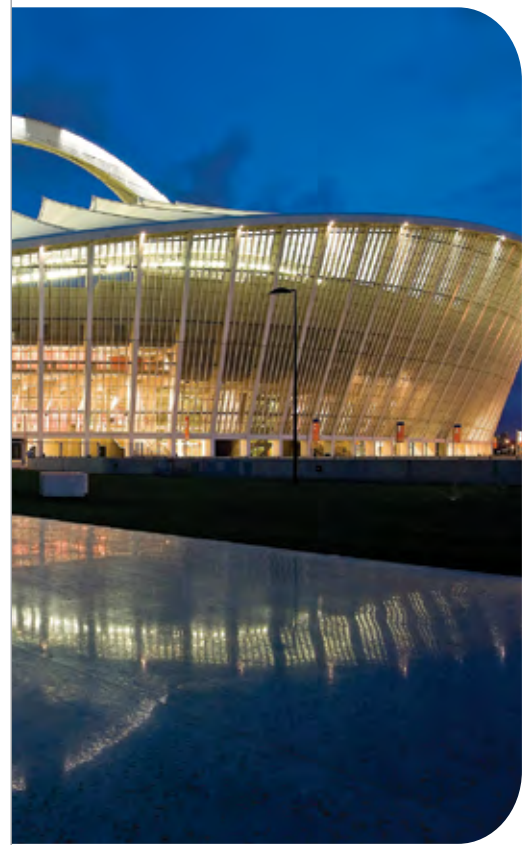
Department of Housing and Human Settlements. It was not without major challenges, which is why Rocla's pipe-jacking expertise, together with the durability and quality of their product, is what made Rocla a natural choice.

"One of the major challenges with the installation of the 1473 ID sleeves was the manual excavation process, coupled with possible exposure to natural gases such as methanol, and a restricted air supply due to an existing sewer system running parallel to the jacked pipeline to be installed. We installed additional air ventilation systems and gas monitoring equipment to ensure that all technicians and labour could be evacuated quickly in the event of gas leak detection. Additionally, a category

Pipe jacking is a technology in which specifically made pipes are tunneled through the ground by hydraulic jacks thereby eliminating the need to dig up the road infrastructure. It offers greater transparency in terms of time and costs and is an environmentally friendly process.

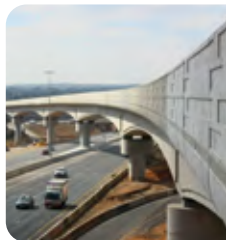
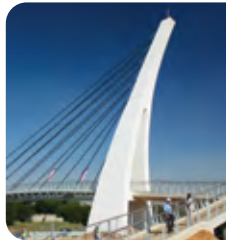
Rocla is one of South Africa's leading manufacturers of various precast concrete products for infrastructure projects. In addition to offering standard sizes, the company will manufacture to customer requirements. ■

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CMA Awards for Excellence entries rocket

The 2016 Concrete Manufacturers Association NPC, (CMA) Awards for Excellence competition has drawn 123 entries – almost doubling the submissions entered for the last competition. Images and entry details of the competition's six categories are shown in the Awards entry book on the CMA's website www.cma.org.za.

Chairperson of the Awards Committee, Monique Eggebeen, says that the standard of this year's submissions was extremely high. "It is quite clear that use of precast concrete is growing rapidly across diverse applications, offering ease of installation, as well as high standards of finish and durability."

Competition results will be announced at a gala dinner in Johannesburg, on 23 April 2016.

Eggebeen paid tribute to this year's sponsors without whom the awards could not have taken place. They are PPC (main sponsor); AfriSam; BASF; Chryso and Lafarge.

What follows are descriptions of three Awards entries.

Community Upliftment: Fleurhof Integrated Social Housing Development, Johannesburg

Prestressed hollow-core concrete floor slab technology, precast beams and precast staircases were used to accelerate the construction of three- and four-storey Human Settlement walkups at the Fleurhof Integrated Social Housing Development off Main Reef Road, northwest of the Johannesburg city centre.



The walk-ups have been painted in variety of bright colours to lend aesthetic appeal and to create individual building identities.

The use of Echo Prestress hollow-core slabs is enabling the contractors to build the apartment blocks three weeks faster than using in-situ concrete construction. Precast staircases enable immediate access to the floor slabs so that construction can continue safely and without delay. And the use of precast beams rather than steel beams not only offers huge cost savings but their superior off-shutter finish eliminates the need for additional finishing. Thus the time and money saved can be used on additional housing.

Aesthetics Residential: House Wylie, Northcliff Johannesburg

The owner-builder requested a design for the construction of land-sculpted retaining walls on steeply sloping land to create space for a driveway, parking area, swimming pool and cottage. The walls were to be the focal point of an attractive 'soft' landscaping feature and were to complement a house – also built by the owner.

Designed by Silvio Ferraris of ReMaCon, Terraforce L11 split rockface textured blocks were used to construct the walls which anchored a curved and colourfully landscaped garden. The walls had face angles varying between 60° and 80° and geofabric was used to reinforce the fill behind them.

Technical Excellence: Milkwood Primary School Seating Arena, Mossel Bay

This architect-designed arena can seat 600 pupils.

After an initial site survey it was decided to excavate a half-round shape from the existing embankment and to create the arena using Terraforce 4x4 multi-step concrete blocks, 200-mm concrete risers and concrete pavers.

The step block is perfectly suited for this application and the most challenging part of the project was creating a perfect semi-circle. This was achieved with the assistance of a surveyor who checked the construction work for accuracy every few metres.

Trees will be planted to round off the appearance of the arena and a domed roof is planned which will turn the facility into a fully multi-functional assembly area. ■

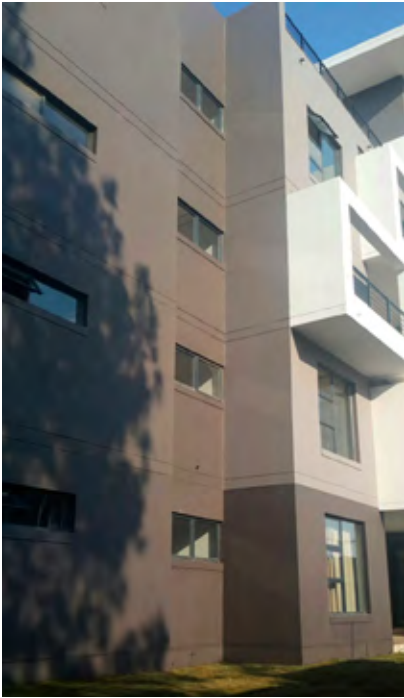
More information from

Monique Eggebeen, Tel: +27(0)11 589 8800

John Cairns, Tel: +27(0)11 431 0727

www.cma.org.za

Innovative façade created with hollow-core concrete slabs



Pre-cast hollow-core concrete slabs are not just ideal as a reliable and time-saving solution for building floor slabs, as a recent project shows. Slabs manufactured by Elematic South Africa (ESA) have been used in an innovative fashion to create a striking façade on The Odyssey, an upmarket apartment building in Morningside, Sandton.

Although the slabs supplied by ESA have also been used for all the suspended floor slabs on the approximately 3,000-m² project, they have also been applied on the balcony cantilevers. In creating a visually interesting three-dimensional form, the slabs were used in a rather unconventional but very effective way. The result is a play of rectilinear elements in different planes.

Creating this same effect with the alternative method – cast-in-situ concrete – would have been considerably more complicated and time consuming. Carl Eckert, a partner at Messaris Wapenaar Cole Architects (the firm responsible for the design) explains that even though there were some challenges associated with ensuring that every element worked together structurally as well as visually, ESA's in-house engineer and design team worked tirelessly with them to develop the most appropriate solution. ESA's director, Craig Webber, was also regularly on hand to address any queries.

The Odyssey project is being developed by Limestone Prop – a very well-known

residential property developer, and built by Dalmar Construction. Conrad Swart from Dalmar Construction comments that the company has worked with ESA since 2006, and has experienced consistently good service, delivery and product quality from the hollow-core slab manufacturer – so much so that it now works almost exclusively with ESA. The Odyssey is yet another in the long list of projects they have completed together.

The smooth collaboration between the various members of the professional and contracting teams has proven that unexpected and innovative solutions can be achieved when all parties commit to working collaboratively.

The resulting building is a strikingly modern, luxury apartment complex which will be an asset to its neighbourhood. Located almost opposite Morningside Shopping Centre on Rivonia Road, it has a prime address, its first phase is now complete and the second phase is due to commence shortly.

Phase One consists of 29 units, which range from approximately 100 m² for a standard unit to over 300 m² for a luxury penthouse unit. Phase Two will see the construction of a further 32 units. ■

More information from Craig Webber,
Tel: +27(0)11 423 2700
email: craig@elematicsa.co.za
www.elematic.co.za



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Precast concrete sector set for growth in 2016

The twin market drivers of expansion and improved quality and production are enabling PMSA to retain its position as the market leader in Africa in concrete machinery and equipment. Despite leading construction equipment manufacturers and suppliers reporting significant reductions in sales over the past



PMSA MD Walter Ebeling says the company has had a good 2015.

year, PMSA sales and marketing manager Quintin Booysen, is optimistic. "In the precast sector, we had a good 2015 and expect a positive start to 2016, with orders already placed for 2016 deliveries," says Booysen.

"Clients who have always done well are still investing, although looking for new technology and added features, especially for improving plant efficiency by increasing output with the same human resource complement."

PMSA MD Walter Ebeling notes that "2016 will no doubt have challenges. Companies will need to look at more efficient ways of doing business, from marketing to production methods.

Through innovative plant configurations and new engineering techniques and designs, PMSA can offer fully-automated, large-capacity plants that can compete with imported plants, and offer better technology and quality at a better price.

The company is celebrating its 40th anniversary in 2016. "We have spent the last five years consolidating our industry-leading position, and ensuring that we are able to offer the best value for money, customisation, full support, training, commissioning, back-up and spare parts across a range of concrete equipment and brick and block plants, from start-up to 190,000-bricks-per-shift, fully-automated plants," stresses Booysen. ■

More information from Quintin Booysen,
Tel: +27(0)11 578 8700 / www.pmsa.com

Paving enhances Polokwane motor dealership

The durability and finished appearance of forecourt paving for petrol stations is a key factor for petrol suppliers in creating an aesthetically pleasing environment for refueling and convenience shopping for their motor vehicle customers. Contractors for the Caltex garage project in Marshall Street, Polokwane, Legoya Development, chose Technicrete kerbing, Double Zig Zag (DZZ) paving as well as BondBrick pavers for this project.

Technicrete ISG Sales Consultant, Hendrik Steenkamp, said: "Technicrete has paved many fuel stations and car showrooms over the years. I believe that our DZZs offer the best in quality and the durability required by these high-volume traffic zones. Our BondBrick, in particular, offers a variety of thicknesses



that will ensure longevity to the commercial development requirement."

"Technicrete ISG supplied 800 Fig 7 semi mountable kerb blocks; 2,400 m² of 80-mm DZZs and 300 m² of bond brick pavers for the Caltex garage development. Legoya has partnered with Technicrete ISG on a number of projects and found their delivery reliable and their pricing competitive," said Wouter Chalmers, owner of Legoya Development.

The Technicrete BondBrick is suitable for the paving of petrol station forecourts, industrial and factory roads and municipal parking areas, and offers developers an economical and durable option. The Technicrete DZZ interlocking pavers form a hardwearing overlay surface which has proven longevity at many high-volume vehicle or foot traffic outlets. Not only suited to petrol station forecourts, they have been successfully installed at shopping malls, road extensions, industrial and commercial business parks, as well as in local government infrastructure upgrades such as pedestrian walkways in Polokwane. The paving has also been installed in sectional title complexes where it has been found to be a more affordable and longer-lasting option to re-tarring driveways.

Technicrete ISG is part of the IS Group which also comprises Rocla and Ocon Brick.

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

Fire-resistant concrete promises safer, cheaper and more efficient construction

By Nick Lavars



Researchers at EMPA tested walls with and without SAP using a radiant heater. Those without SAP exhibited much more severe cracking and flaking.

By cutting down construction time, requiring less equipment and also making less noise, self-compacting concrete has a number of benefits over conventional vibrated concrete. But where it falls down is resistance to fire which results in flaking and splitting.

Scientists have now found a way to overcome this, by doping the concrete mix with a special polymer that they say better equips it to withstand high temperatures and in turn, maintain the integrity of a structure.

While it doesn't burn in the conventional sense, concrete chips and flakes when exposed to fire, for the same reasons that firewood crackles. Water trapped inside the material vaporises when subjected to high temperatures, which builds pressure within and causes the material to degrade with splits, chips and flakes. This matters little when all you need is to keep warm, but is cause for concern when we're talking about ceilings, walls and load-bearing pillars.

This problem can be avoided with normal vibrated concrete by adding polypropylene (PP) fibre to the mix. When exposed to high temperatures, these fibres melt away and leave a network of canals for the water vapour to escape, a neat little trick that prevents pressure from building inside. But adding PP fibres to self-compacting concrete impacts its ability to self-compact, so the amount of PP fibres must therefore be kept low, leaving a wonder concrete that is both self-compacting and fire-resistant so far out of reach.

Now scientists at the Swiss Federal Laboratories for Materials Science and Technology (EMPA) say they have found a solution. They made a series of thin concrete walls, all of which were mixed with polypropylene fibre but only some of which contained a synthetic material called super absorbing polymer (SAP), which is able to absorb many times its own weight in water.

The idea is to soak the SAP in water beforehand and cause it to swell up to several times its dry volume. Then as the concrete sets, the water is drawn out of the SAP through the porous cement matrix which then causes the SAP to shrink, leaving behind hollow spaces inside. These spaces then link up with the other hollow spaces inside the concrete left behind by the few melted PP fibres that were in the mix, again creating a network of canals that enable it to withstand intense heat.

The team exposed all of its concrete walls to temperatures of up to 1,000°C by means of a radiant heater. Ninety minutes later they had found that while the concrete dosed with SAP exhibited some minor cracking, severe chipping and flaking only occurred in the concrete that was SAP-free.

It has applied for a patent for its new technology, anticipating that adding fire resistance to self-compacting concrete's list of characteristics will afford it a whole new level of versatility. ■

Source: EMPA
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Appropriate curing agents improve final concrete finish quality

Concrete structures are expected to last a certain number of years and, in order to meet the expected lifespan, the concrete must be able to withstand structural loading, fatigue, weathering, abrasion and chemical attack.

Eddie Correia, the executive vice president of Chryso Southern Africa, says that the duration and type of curing applied during the setting process will play a determinant role in enabling the concrete to achieve the strength and durability that is required to meet the design parameters of the specific structure.

Correia explains that curing is the process in which the concrete is protected from loss of moisture and is kept within what we know to be an acceptable temperature range.

"This process is key to producing a final product which has increased strength and decreased permeability, and it is very important in mitigating cracks which allow open access for harmful materials to bypass the low permeability concrete near the surface and this can adversely affect durability," he continues.

"When effective curing of concrete is applied, the amount of cement required to achieve the specified strength or durability is reduced, or in some instances, can be replaced with some supplementary cementitious materials," Correia continues.

With cement being the most energy-intensive portion of a concrete mix, this reduction leads to a cost reduction as well as a lower carbon footprint. In addition, sound curing methods using quality products can enhance sustainability by eliminating the need for resource-intensive conditioning treatments, particularly those that are not compatible with the environment.

Curing methods are divided into two phases; one prior to the initial set and these are applied continuously during the bleeding of the concrete. The other is after the initial set and final surface finishing and is generally applied before the final set.

Temperature can be an important factor as the rate of hydration and therefore strength development is faster at higher temperatures. Correia says the temperature of placed and compacted concrete should not be



Eddie Correia, executive vice president of Chryso Southern Africa.



Use of Chryso® Curing Agents enables contractors to achieve a perfect finish on concrete.



The duration and type of curing applied during the setting process will play a determinant role in enabling the concrete to achieve the strength and durability that is required to meet the design parameters of the structure.

allowed to fall below 5°C because this will result in the slowing down or even halting of the hydration process with the result that the concrete will take longer to gain strength, delaying form or mould removal and subsequent construction. Concrete will freeze at temperatures below 2°C.

In situations where the concrete temperature can be expected to drop below 2°C, an air-entraining agent from the CHRYSO® Air range can be added to protect it from freezing or thawing conditions. Air bubbles act as a pressure relief valve allowing moisture within the concrete to freeze and expand into the bubbles, thereby preventing cracking and spalling damage to the concrete.

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

Protection from moisture loss due to evaporation is easily achieved using Chryso® ProFilm 19. Correia says this is an evaporation reducer that offers contractors a reliable controlled way of preventing the rapid evaporation of water from the concrete.

Suitable for use on fresh concrete prior to the initial set, Chryso Profilm 19 produces an effective and continuous barrier film over the concrete surface. It can be applied after compaction and initial striking of concrete.

A range of other Chryso® Curing Agents is available to use after the initial set and final surface finishing. These include Chryso® Cure Acrylic, Chryso® Cure WB (wax based), Chryso® Cure WP (pigmented) and Chryso® Cure HPS – all are suitable for use on pavements and slabs.

The first three of the products are used on columns beams and walls, while Chryso® Cure Acrylic is most appropriate for application to the top of columns, beams and walls. ■

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First trial of self-healing concrete under way



The Materials for Life project is piloting the real-world tests of three self-healing concrete technologies. Led by Cardiff University School of Engineering, M4L is supported by Costain and other industrial partners. Photo: Cardiff University UK.

The first major trial of self-healing concrete in the UK, led by a team of researchers from the School of Engineering, Cardiff University, is being undertaken at a site in the South Wales Valleys.

The project, entitled Materials for Life (M4L), is piloting three separate concrete-healing technologies for the first time in real-world settings, with a view to incorporating them into a single system that could be used to automatically repair concrete in the built environment.

***“It is estimated that around £40 billion a year is spent in the UK on the repair and maintenance of structures, the majority of which are made from concrete.*”**

At present, billions of pounds are spent every year in maintaining, fixing and restoring structures such as bridges, buildings, tunnels and roads.

It is estimated that around £40 billion a year is spent in the UK on the repair and maintenance of structures, the majority of which are made from concrete.

The overall aim of the Cardiff-led project is to develop a single system that can be embedded into concrete when it is initially set, and then automatically sense when damage occurs. Once damage is detected, the system will be able to repair itself autonomously without the need for human intervention.

The trial is being undertaken in collaboration with one of the major industrial partners on the project, Costain, and is taking

place at one of their construction sites on the Heads of the Valleys road improvement scheme in South Wales – the A465.

The research team, which also includes academics from the University of Bath as well as the University of Cambridge, is trialling three separate technologies at the site.

The first technique uses shape-shifting materials, known as shape-memory polymers, to repair large cracks in concrete. When these materials are heated with a small current, they can transform into a different shape that the material has ‘memorised’. The researchers believe that these materials can be embedded into concrete and used to close cracks or make them smaller.

In the second technique, researchers will pump both organic and inorganic healing agents through a network of thin tunnels in the concrete to help repair the damage.

In the third technique, the team will embed tiny capsules, or lightweight aggregates, containing both bacteria and healing agents into the concrete. It is anticipated that once cracks occur, these capsules will release their cargos and, in the case of the bacteria, the nutrients that will enable them to function and produce calcium carbonate, which the researchers envisage will heal the cracks in the concrete.

The researchers have cast six concrete walls at the test site, each containing the different technologies. Over time the team will load the concrete at specific angles to induce cracks, and then monitor how effective each of the self-healing techniques has been.

“Our vision is to create sustainable and resilient systems that continually monitor, regulate, adapt and repair themselves without the need for human intervention,” said Bob Lark, the principal investigator on the project from Cardiff University’s School of Engineering.

“These self-healing materials and intelligent structures will significantly enhance durability, improve safety and reduce the extremely high maintenance costs that are spent each year. This major trial, the first of its kind in the UK, will provide us with important insights to help transfer the technologies from the lab into real-world settings,” explains Lark.

“We are supporting this innovative research to unlock the many potential benefits of self-healing concrete for use within infrastructure. From this trial we should gain an insight into the feasibility of constructing a full-scale structure using these techniques and their early-stage effects on structural properties,” said Oliver Teall, a civil engineer at Costain. “We will be monitoring properties such as stiffness, permeability and the mechanical damage recovery of the trial walls in comparison with conventional reinforced concrete walls.” ■

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Retro-Dowel™: retro-fitted plate dowels for concrete floors, hardstandings and roadways

Retro-dowel™ is an innovative solution to the problem of how to transfer loads between adjacent previously cast concrete panels and new concrete panels added for extensions or full-depth repairs. A Retro-dowel™ can be compared to a carpenter's biscuit joint.

The conventional solution to this problem is to drill into the edges of adjacent slabs for the installation of round dowels. This is easier said than done.

To be effective, holes for round dowels must be drilled horizontal, at right angles to the joint face and perfectly parallel to one another. The round dowels must be smooth, straight



- Its compact dimensions enable full-depth repairs on very narrow strips (widths as little as 600 mm – about half the width needed for the drilling machine and bit for full-depth repair using round dowels). This saves time, minimises the rubble generated and saves on the volume of replacement concrete.
- Blades can be fully consumed – the Retro-dowel™ machine cuts slots of precise width with a double diamond-tipped blade. As most of the cutting pressure is on the front face of the blades, the blades reduce in diameter faster than they reduce in kerf width. Notwithstanding



The optimised shape Retro-dowel™ is simply inserted into the slot and ready for casting of concrete.

and their ends sawn (not cropped) with no burr that might hinder the dowel sliding within the concrete as the joints open.

One half of the round bar also needs to be debonded – preferably with a precisely fitting sleeve of plastic material so that the joint will open freely but preclude relative vertical movement across the joint. Round dowels also offer lateral as well as vertical restraint.

This precludes round dowels being used in both longitudinal joints as well as transverse joints – an unwelcome limitation when effecting large-panel full-depth repairs in concrete floors. This rigid lateral restraint is also a problem when extending onto a long edge of an existing slab – cracks tend to mirror the round bars as new concrete cannot shrink laterally.

Retro-dowel™ combines the benefits and convenience of plate dowels with the ability to add dowels as required retrospectively without the disadvantages and inconvenience of round dowels.

Additional benefits of Retro-dowels™ include:

- Fast slot cutting time – the water-cooled double diamond blade can cut a slot in under 30 seconds.
- The Retro-dowel™ machine is as easy to use as a carpenter's biscuit jointer. The slab is marked at the desired centres, the fence and plunge depth stop set to the desired depths and slots cut parallel to the top surface of the slab.
- Since the Retro-dowel™ machine cuts slots relative, and parallel, to the top of the slab, it is suitable for both level and inclined paved areas.

kerf width reduction is simply compensated for by sandwiching a 0.4 mm plastic disc/shim between the two diamond blades.

- Concrete can be cast immediately the dowel has been inserted: no need to clean slots, no waiting for concrete to dry, no epoxy resin to mix, no waiting for epoxy to cure
- Retro-dowels™ unique shape offers even lower lateral restraint than conventional plate dowels, making the system suitable for extending long lengths of paving as well as fitting dowels in both longitudinal as well as transverse joints.
- Retro-dowels™ are cut from Grade S355JR steel and have an optimal shape for load-transfer (better than any round dowel and almost 20% wider than equivalent commercial plate dowels) and a large surface area. Therefore, they are stronger in shear and can be inserted at wider centres (up to 500 mm) whereas round dowels must be placed at maximum centres of about 300 mm.
- Safety – the blade guard ensures that operator and bystanders are isolated from flying debris and that water spray is directed downward and away from the electrical parts of the machine at all times. The switch, stator and armature of the air-cooled electric motor have been treated with Nano Protech® Protective Coating for enhanced operator safety and resistance to moisture.■

**More information from Rod Rankine
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S.A. not using concrete strip roads to full advantage

South Africa has yet to fully discover and utilise the benefits of concrete strip roads, says Bryan Perrie, MD of The Concrete Institute.

Perrie says concrete strip roads, laid as wheel tracks, are economical and durable and are particularly suitable as farm roads or roads in rural areas. "They can, therefore, be of invaluable use to the agricultural sector as well as to communities living in outlying rural areas," Perrie states.

He says that although concrete strip roads have proved themselves in many countries, the South African governmental road building sector as well as private land-owners have not yet fully appreciated the advantages of, or fully utilised, concrete strip roads. Such roads are a particularly useful means of making steep rural farm roads passable in all weathers.

"In the wet summer months, many potential visitors to inland private game reserves avoid visiting the reserves and lodges with sedan vehicles for fear of getting stuck in the mud.

Concrete strip roads, particularly in very muddy areas, could therefore boost tourism numbers. Strip roads are widely used in, for example, SANParks resorts like the Mountain Zebra National Park near Cradock, KZN Wildlife Ezemvelo resorts such as in the Drakensberg and at the iSimangaliso Wetland Park at St Lucia. They have also been used at the upmarket Pezula Private Estate near Knysna on the Garden Route,"

Perrie, who acted as consultant for the construction of the strip roads throughout Pezula, adds.

"Strip roads can be built without expensive or sophisticated equipment and by comparatively unskilled labourers who have received only basic instruction. No reinforcement of the concrete is necessary. Furthermore, laying the strip roads can be done in short lengths, so their construction can be slotted in whenever labour and time are available.

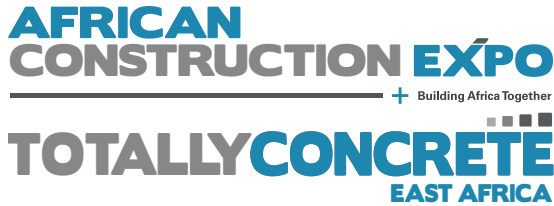
"The strip roads can be made relatively skid-resistant simply by wood-floating the concrete as a final operation. For a strong skid-resistant finish, the concrete can be broomed transversely to the direction of traffic to produce a multitude of fine grooves across it. Light cars and LDVs can, under normal circumstances, use new concrete strip roads after three days of curing, and trucks of 1,5-ton capacity after seven days of curing."

The Concrete Institute has in its collection of free advisory brochures, one title 'Concrete Strip Roads for the Farm' which is dedicated entirely to building these roadways. Call the Info Centre on +27(0)11 315 0300 or email info@theconcreteinstitute.org.za for a free copy, or download it free of charge from the website www.theconcreteinstitute.org.za ■

**More information from Bryan Perrie,
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Concrete strip roads can make steep roads in rural settings passable in all weathers, as illustrated here at the Pezula Private Estate.

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From quarries to roads – quality is paramount

Roads are almost entirely made from materials that are quarried from beneath the earth and further processed to become the staple ingredient on modern-day paved road networks.

Although the exact percentage of quarried materials in each paved road varies, it is safe to say that more than two-thirds of the bulk of materials used to construct these roads is usually derived from sand and stone quarries where graded materials lend certain qualities to a road that are desirable in certain climatic and geological conditions.

It is therefore vital that modern and sophisticated societies such as South Africa, foster and uphold professional standards within the building materials quarrying industry. It is also pivotal that role players in the roads industry work together to ensure the industry remains sustainable and that legitimate quarry owners are supported in order to ensure their viability in future.

Realising roads' importance

According to Nico Pienaar, director of the Aggregate and Sand Producers Association of Southern Africa (ASPASA) road building is an important part of every Government's focus, as roads have the ability to join communities, uplift people and enable access to economic opportunities wherever they have been constructed.

"We therefore want to promote the importance of roads and want everybody to grasp the role they play in this country. In that way we are hoping that we can all concentrate on building better roads and ensuring that those roads we already have are better looked after, especially considering their importance to each and every one of us.

"We need to remember that successful nations have had proper roads since approximately 600BC when the Romans felt threatened by emerging economies (and militaries) across the Mediterranean and subsequently built about 87,000 km of roads throughout their empire to defend their territory and strengthen their economy," comments Pienaar.



Nico Pienaar director of the Aggregate and Sand Producers Association.

Quality is critical

He explains that politicians and the public need to be aware of the importance of roads in all communities and therefore direct more investment into roads and transport infrastructure. When investing, they also need to be made aware of the fact that quality is of the utmost importance as a road needs to be built to last – with a minimal need for maintenance – for the duration of its lifespan.

"When one considers that the type of sand or stone used and the size and shape of each particle can play an important role in the longevity of a road, then it is clear to see that we need professional quarry operators to give road builders what they want. That is why ASPASA members undergo annual audits for quality, safety,

health and road transport compliance. In addition they have to undergo environmental compliance audits every 18 months and this ensures they not only produce the right products, but do so in a safe and sustainable manner.

"Considering that every level of a road comprises sand and aggregates – from its foundation, through various levels and surfaces to the top running course that binds aggregates together with either bitumen or concrete – then it is clear to see why ASPASA plays such an important role in providing quality materials to build our nation's roads," Pienaar says.

Promoting maintenance

He adds: "We need to build and maintain roads because they are a vital part of our socio-economic system and are drivers for economic growth and job creation. But at the end of the day we must always ensure we build roads with quality materials that can bring road users home safely. Not only motorways or highways should receive attention, but rural and local roads as well," Pienaar concludes. ■

More information from Nico Pienaar,

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France to pave 1,000 km of road with solar panels

By David Rogers

Ségolène Royal, France's minister of ecology and energy, has said that the government intends to pave 1,000 km of road with photovoltaic panels in the next five years, supplying power to millions of people.

"The maximum effect of the programme, if successful, could be to furnish five million people with electricity, or about 8% of the French population"

The minister told a conference of transport authorities recently that the tenders for the 'Positive Energy' initiative had already been issued and the tests on the panels would begin in the spring.

According to France's Agency of Environment and Energy Management, four metres of solarised road is enough to supply one household's electricity needs, apart from heating, and one kilometre will light a settlement with 5,000 inhabitants.

So the maximum effect of the programme, if successful, could be to furnish five million people with electricity, or about 8% of the French population.

The solarising of France's roads involves gluing 7-mm-thick strips to the surface of the carriageway. The basic technology for this has already been developed by Bouygues subsidiary Colas.

The company's Wattway panels, which took five years to develop, were unveiled in October.

Wattway cells collect solar energy using a thin film of polycrystalline silicon, but are resistant to the passage of heavy goods vehicles and offer sufficient traction to prevent skids.



A trial stretch of road being laid with Colas' Wattway. The photovoltaic surface can bear the weight of six-axle trucks (Courtesy of Colas).

Ms Royal has proposed to pay for improvements in France's transport infrastructure by raising taxes on petrol, which she said was "natural" given the falling cost of oil.

She estimates that this could contribute between €200 and €300 million to the cost of improvements such as road solarising.

A number of countries are pursuing the energising of roads. Last year a Dutch consortium built a 100-m-stretch of power generating road in the Dutch town of Krommenie, and in the US a husband and wife team is pursuing the idea after a successful crowdfunding campaign. ■

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Loeriesfontein Wind Farm turbine foundations amongst the world's greenest

Loeriesfontein Wind Farm has announced that its wind turbine foundations are utilising one of the world's lowest quantities of portland cement in the concrete mix. "The foundations are designed using an 89% replacement of cement, resulting in, what we believe to be, one of the world's lowest carbon footprints for any wind farm foundation," states Cyril Attwell, research scientist, and head of Murray & Roberts' Concrete Centre for Excellence.

The first two bases, which were completed on 13 October, utilised an 80% replacement of portland cement, while the remaining foundations use a unique design that comprises 35 kgs of high-grade portland cement per cubic metre, an 89% reduction from a standard concrete mix. This composition has resulted in the wind farm's carbon footprint being 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 highly energy-intensive process. By substituting the cement with a by-product such as GGCS, we are able to reduce our carbon footprint considerably," said Leo Quinn, project manager for Loeriesfontein Wind Farm.

A 28-day compressive strength test has been completed, which indicated that the 80% replacement ratio achieved an impressive strength of 55 MPa, and an expected ultimate strength of 100 MPa, within a 56-day period. "The strength of concrete is measured in megapascals; theoretically a cubic metre of 30-MPa concrete can 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!" explained Attwell.

A carbon footprint is the total amount of greenhouse gases produced to directly and indirectly support human activities, expressed in equivalent tons of carbon dioxide (CO₂). "The achieved reduction in our carbon footprint is phenomenal, especially considering that a standard 30-MPa concrete as supplied by the readymix industry equates to a carbon footprint of 300 to 350 kgs of CO₂ per cubic metre," explained Quinn.

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 an amazing 0 kg of portland cement per cubic metre.

Loeriesfontein Wind Farm is situated within the Hantam Municipality and 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 to traditional fossil fuel power plants and generate enough to power around 120,000 average South African households.

The site, which spans a total of 3,453 hectares, 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 99-m turbine towers will be manufactured by GRI, in Atlantis, in the Western Cape. Civil and electrical works are to be completed by a consortium comprising Murray and Roberts Construction and Consolidated Power Projects.

The Loeriesfontein Wind Farm, 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.

Loeriesfontein Wind Farm is owned by a consortium dedicated to providing clean, renewable energy to the people of South Africa. The members are:

Lekela Power: a pan-African renewable energy platform which aims to provide 1,000 MW of wind and solar power by 2018. It is a 60:40 JV between Actis, a global pan-emerging market private equity firm, and Mainstream Renewable Power, a global wind and solar company.

Khobab Community Trust and Loeriesfontein Community Trust: Established by the project company to undertake public benefit activities to benefit the local community in the areas of enterprise development, education and health.

Thebe Investment Corporation: one of South Africa's most established broad-based BEE investment management companies and leading investor in the energy and resources sectors (advised by Bridge Capital).

The IDEAS Managed Fund: managed by Old Mutual Alternative Investments, a subsidiary of Old Mutual Investment Group one of Africa's largest independent investment managers.

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More information at www.louriesfonteinwind.co.za or from Cyril Attwell, email: cyril.attwell@murrob.com

NNRGY crops to 3D print houses with bio-concrete made from grass

With the kilos of failed plastic projects the 3D printing community produces every week, it is always important to think about environmentally friendly options as well – and there are plenty of bio 3D-printable materials out there. Even, it turns out, for those initiatives that are trying to 3D print entire homes.

The Dutch bio-business, NNRGY Crops, is developing a 3D-printable concrete based on *Miscanthus Giganteus*, a grass species found in East Asia sometimes called giant Chinese silver grass, and will be using it to build various structures and objects in Zwolle, the Netherlands, over the next two years.

This interesting company is the brainchild of bio-entrepreneur Jan-Govert van Gilst, who was inspired to start NNRGY Crops when visiting Borneo in 2009. Why, he wondered, destroy rainforests to transport high-energy plants halfway across the world, if you can just grow them elsewhere? Back in the Netherlands, he began to cultivate high-energy *Miscanthus Giganteus*, in part for use in bio initiatives and in part to produce CO₂.

Now, together with partners TU Eindhoven, Cybe and Concrete Valley, NNRGY Crops will be building a Living Lab to develop lightweight, environmentally friendly objects and structures with this *Miscanthus Giganteus*. With this plant, bio-concrete will be mixed and 3D printed for a variety of applications. The eventual goal? To use the same materials in the construction industry for the building of homes.

This sustainable mortar that is being developed is good for the people, the planet, and the profits, the developers say. Essentially, it's a mixture of components with a very small environmental footprint that is also easily useable. The grass itself adds valuable fibres and cellulose. The mortar needs to be fire resistant, isolating, energy saving and not (much) more expensive than existing alternatives. 3D printing also plays a role in that process, as it reduces waste and makes small-scale manufacturing possible. It will even make it possible to produce constructions that were either unobtainable or too expensive to make.

The grass at the centre of this process is currently being used by NNRGY Crops to make bio-paper and bio-plastic, and is being cultivated in Rotterdam, Lansingerland and Zutphen – all on ground that was previously intended for unfunded building projects. A further ten acres in Zwolle has recently been added to the crop area.

"How sustainable do you like it? Its materials are grown locally and processed locally by local entrepreneurs, with the products being developed locally and the concrete being locally 3D printed for local homes," Van Gilst says. The project itself is expected to last two years. ■

<http://goo.gl/Xtfk6t>



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Flooring part of Total S.A.'s quest for green star building rating



Three views of the sustainable flooring supplied by KBAC Flooring for the new Total House, which has applied for a GBCSA Level 4 Green Star rating.

All the flooring for the extensive 'green' refurbishment of the Total South Africa head office building situated in Rosebank, Johannesburg was supplied and installed by Kevin Bates Albert Carpets (KBAC).

As part of Total SA's quest for a Level 4 Green Star rating from the Green Building Council of South Africa for the refurbished building, nearly 7,500 m² of sustainable Interface flooring was specified for the project by Paragon Interiors.

Imported from Europe and distributed in South Africa by KBAC, Interface is an environmental pioneer in modular flooring, and has reached major sustainability production milestones since it embarked on 'Mission Zero' in 1996, an initiative to become the world's first sustainable, restorative carpet manufacturer by the year 2020.

Lesley Fidrmuc, Interface consultant for KBAC, says 6,950 m² of the Interface Monochrome carpet tile range, and 500 m² of Interface's Urban Retreat carpet tiles, were specified by Paragon Interiors, and installed by KBAC in the Total SA building in Biermann Avenue.

"Interface Monochrome range comprises 500 x 500 mm highly textured loop-pile tiles, made from 100% recycled fibre. Available in 48 colours, designers can create seamless wall-to-wall flooring or use different-coloured tiles to create zones or special patterns. Using Monochrome, designers can differentiate spaces and working areas without relying on partition walls," Fidrmuc explained. "The wide array of colours also simplifies matching the flooring to other interior products and furnishings."

Interface's Urban Retreat is part of the company's ongoing Biophilic ranges, brainchild of internationally-renowned pioneer of flooring bio-mimicry, David Oakey. He found inspiration in the visual, tactile features of forest floors, grassy fields and pebbled garden paths in creating the Urban Retreat range employed by Paragon Interiors to bring nature indoors for the 550 staff members based at the Total SA head office.

"Urban Retreat is a dynamic collection of 11 carpet tile products, also 500 mm x 500 mm in size, sorted into pattern studies that range from refined textures to broad organic forms. With its natural, neutral colour palette, Urban Retreat mimics forest floors, or moss or lichen-covered stone – all accomplished with an exceptionally high recycled content. For the Total head office, KBAC supplied three Urban Retreat tiles to form Paragon Interiors' overall pattern. One was a 'transition

tile', UR 101, with each half of the tile a different colour, along with UR 102 and UR 103, both plain-coloured carpet tiles.

"Urban Retreat is a tufted, patterned loop carpet tile, produced from 100% recycled yarn with a high proportion of recycled content in its backing. The ranges installed in the Total offices are produced on a special computer-driven Interface tapestry machine, which produces a very heavily textured finish with high and low loops.

"The Interface flooring supplied for the refurbishment project, replaced Interface carpet tiles installed in the Total head offices by KBAC about a decade ago," Fidrmuc added.

Lisa Young, account manager at Paragon Interiors, who specified the flooring for Total House, says with the Level 4 Green Star GBCSA rating in mind, Paragon Interiors had no hesitation in selecting Interface flooring because of the company's prioritised focus on sustainability. "However, the focus on sustainability was a constant thread throughout the installation and not only relative to the Green Star requirement. The quest for sustainability is also pertinent to Total's brand drive regarding environmental preservation," Young said.

"Interface offers a 100% recycled yarn and KBAC used a 'green' method of installation to all the floor plates, applying the tiles with an adhesive with zero Volatile Organic Compound (VOC) content.

"Paragon Interiors specified Interface Urban Retreat for the client meeting suites, as well as Total House's executive wing. We used a combination of the Interface Monochrome colours that related to Total's brand to yield an uplifting and playful design to the collaboration destinations and communal hubs; and a grey palette pattern mix to the balance of the floor plates," she added.

KBAC senior contracts manager, Werner Gouws, who was in charge of the installation, said the adhesive used for the Interface flooring had a zero total VOC content. "Installation posed no major challenges. Thanks to excellent logistical control by the main contractor, JC van der Linde & Venter Projects, the KBAC team simply had to focus on achieving top quality installation," Gouws recalled. ■

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Low-cost concrete wind foundation developed

By MarEx

Researchers from Spain's Universitat Politècnica de Catalunya (UPC) have designed and patented a floating platform for offshore wind turbines that they claim significantly reduces the cost of offshore installations.

Researchers Climent Molins and Alexis Campos, of UPC's Department of Civil and Environmental Engineering, say the design can reduce energy costs to 12 euro cents per kilowatt hour (kWh) through a more efficient design and cheaper building materials.

The prototype, WindCrete, is a cylindrical structure with a large float and a ballast base that makes it self-stabilising. According to the researchers, the main innovations of the model compared to similar ones on the market are the seamless, monolithic structure as well as the use of concrete for its construction.

By using concrete instead of the more expensive steel that has been used previously, the construction cost is reduced by 60%. In addition, concrete is more resistant in the marine environment, so the structure will have fewer maintenance requirements and a life of about 50 years. The absence of joints in the platform increases its durability against the effects of wind and sea and avoids the damage that normally appears in transition areas.

The WindCrete includes a five-megawatt (MW) wind turbine that can carry rotors of up to 15 MW with a minimum increase in the cost, making it far more economical, claim the researchers. Given the long useful life of this prototype, the



possibility of replacing the turbine with a more powerful and more profitable one has also been considered in the design.

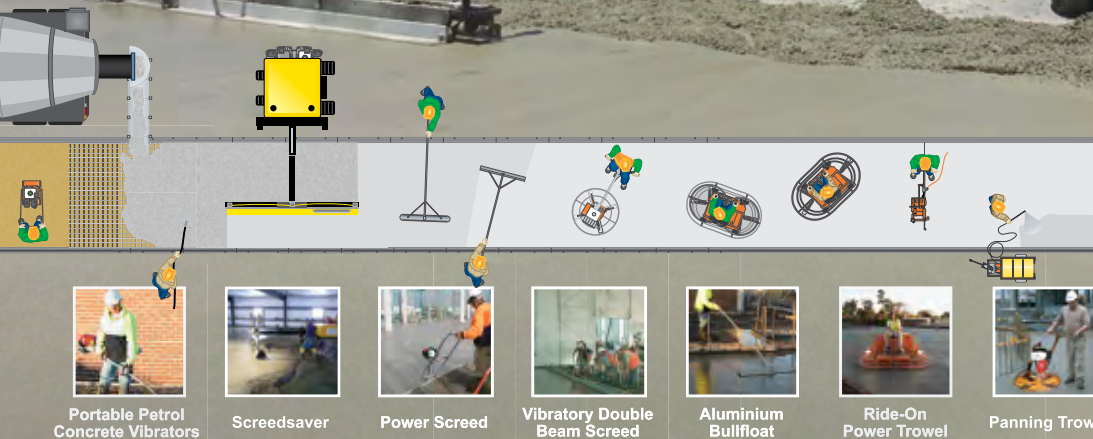
WindCrete requires a minimum water depth of 90 metres. However, there is no technical maximum depth at which they can be installed. In the Gulf of Mexico, for example, there are oil platforms of this type anchored at depths of up to 2,300 m.

In order to check the behaviour of the platform and its anchoring system in an environment that simulates the sea, trials were also carried out in a wave flume using a WindCrete prototype with a scale of 1:100.

The prototype was developed within the framework of the European Alternative Floating Offshore Substructure Project for offshore wind farms (AFOSP). ■

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Portside Place, Cape Town achieved a 5 star Green Star rating.

In pursuit of sustainable infrastructure development

Concrete continues to play a pivotal role in economic growth both locally and globally. As infrastructure investment and development across Africa take on a new sense of urgency, the construction industry is recognising that a different approach is required on and for the continent, and that we can't simply take textbook economic models and apply them across this diverse space if we're committed to taking a long term view of sustainability.

Africa's context demands that we innovate across the full value chain – from planning right through to design, construction and building management. As such, much of this sustainable innovation will have to do with the use of concrete as a building material.

To improve the sustainability of concrete structures, one has to understand the interdependencies from 'cradle to grave' in the design phase, during construction and at end-of-life and, most importantly, how these influence the eco-impact and the carbon footprint of structure during its life cycle.

"While the industry has worked to quantify the 'embodied-energy' impact of materials used in infrastructure development, effectively measuring the 'whole-life' impact and full effects of the infrastructure's existence during its usage phase continues to challenge the industry," notes Daniel van der Merwe, architect: PPC Ltd. "This type of measurement is however critical if we're to meet future targets of 'zero net-energy' buildings. Understanding the life-cycle impact of concrete is therefore central to this equation."

Due to its flexibility and durability concrete is the most widely consumed substance on earth after water, with approximately 12 billion tons per annum being created globally. Cement is a constituent of concrete (approximately 10 – 15% by volume). "The energy used in cement production is a key component of its environmental impact due to the high kiln temperature involved in production," explains Alta Schoultz, head of innovation: PPC Ltd. "This must be viewed in context."

Globally, cement manufacture accounts for approximately 5% of greenhouse gas emissions. "The industry has already reduced its carbon footprint by reducing use of non-renewable

fossil fuels and introducing more modern technology and equipment," says Schoultz. "This includes using alternative fuels in kilns, including burning waste tyres."

"To effectively reduce the carbon impact of the built environment at the lowest cost, the industry must innovate together," says Schoultz. "It is important for each user group to understand the concrete benefits specific to them."

For owners, concrete offers technical advantages, aesthetic appeal and cost effectiveness. Its strength, durability and natural thermal mass can assist in developing buildings that are low maintenance, durable and have high operating energy efficiency. "Developers can make use of concrete as a competitive building solution. This is based on first cost, long-term economic benefits, energy efficiency, lower maintenance, and overall operating costs, as well as opportunities for future reuse should the occupancy of the building change," comments Van der Merwe.

"Concrete is an ideal medium for designers – offering a range of colours, finishes and unlimited design possibilities, difficult to match in other materials. "The resultant structure also provides superior environmental and energy performance. The benefits of designing with concrete to leverage its thermal mass and structural integrity can be seen in many award-winning projects all over the world."

Connecting user groups to leverage technical expertise and insights can however prove a challenge, explains Schoultz. "This is why PPC has developed an industry collaboration platform, The Cement and Concrete Cube or C3, the first non-commercial, open, information sharing platform in the cement and concrete industry in South Africa. It facilitates communication among industry players, including industry news and trends, research, studies and findings, and sources of inspiration. In this way, it enables more effective collaboration across the value chain." ■

**More information from Daniel van der Merwe,
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Why use readymix concrete?

Ready-mix concrete is economical

Local Materials: Readymix concrete is made from local raw materials. In addition, most worksites are within a few kilometres of a readymix plant.

Lower Maintenance Costs: The longevity of the material allows it to withstand very extreme temperatures and degrees of humidity. Consequently, structures or buildings made of concrete are the best long-term investments.

Readymix concrete features

Compressive strength (crush resistance): It can reach very high figures, which allows people to build structures that are both slender and very strong.

Fire resistance: Readymix concrete is naturally fire-resistant, which slows the spread of fire (flame propagation)

Thermal insulation: The ability of readymix concrete to absorb heat during the day and to return it in the cool of the night makes it the ideal material for building comfortable homes.

Sound Insulation: Well-built readymix concrete structures allow very good sound insulation levels to be achieved.

Easy and safe use and assembly

Speed: Many new techniques allow construction lead-time to be reduced (self-placing readymix concrete, etc)

Workability: Readymix concrete can be pumped over long distances, horizontally and vertically, to its place of use. It can be fluidised (plasticised) sufficiently to make it flow easily. Conversely, it can be made sufficiently compact, dense and thick to protect a radioactive area completely.

Safety: Readymix concrete provides excellent conditions of sterility and hygiene.

Concrete is versatile

Plasticity of shapes: Readymix concrete enables the creation of complex and curved shapes more effectively than any other construction material.

Flexibility: Readymix concrete is highly adaptable to the specific needs of different worksites.

Design and beautification: Readymix concrete can be used with a wide range of colours, patterns and textures. Different combinations of these can produce spectacular effects.

Readymix concrete provides customers with unique service quality thanks to:

A network of readymix plants that is so dense that there is always a Readymix plant within a near radius of worksites. The availability of a large fleet of concrete mixer trucks that allow delivery rates to be kept under control and optimised. A whole range of special services for difficult worksites: pumps, conveyors, night deliveries, etc.

Readymix concrete guarantees quality, because:

The materials of which it is made are themselves subject to stringent quality requirements. Rigorous quality control is carried out throughout the manufacturing and delivery process. The formulation and manufacturing of the concrete are covered by the South African Bureau of Standards. Sarma has a Quality Audit, read more about it under Quality Standards.

Diversity of Solutions

Readymix concrete meets a great variety of needs in terms of technical sophistication, ease of use/assembly and design, thanks to the use of multiple combinations of the cement aggregates and admixtures stored on production plant sites.

Convenience

Deliveries of readymix concrete can be taken directly from the readymix plants or the concrete can be delivered to worksites by concrete mixer trucks.

The pace of deliveries can be adapted to the customer's needs and can change from one hour or day to the next. The use of readymix concrete reduces worksite nuisance (dirt, congestion, noise, etc) to minimum levels. ■

Source: <http://www.sarma.co.za/whyusereadymix.asp>





Some of the women who are becoming increasingly involved in the readymix concrete industry.

Adding women to the mix

Women may be the key ingredient that the readymix concrete industry needs to make better concrete more consistently.

“Women have inherent skills that are highly sought after by readymix and batching plants, yet only a handful of women ever make it into this industry because of the ill-conceived idea that the work is too hard or too dirty for women, says to Karen Stanford, an independent auditor who undertakes compliance audits for members of the Southern Africa Readymix Association (SARMA).

She said that it was time for the industry to embrace the different skills-sets of women and encourage them to join the ranks of readymix workers.

From experience

Stanford was one of the first females in the South African concrete industry, having worked her way through different roles in cement and concrete manufacture. This included heavy



Women are becoming active in all areas of the construction industry.

work with duties that ranged from work in quarries (where she became the first qualified female surface blaster), to batching plants and beyond.

“The industry tends believe that the work is too tough for girls. Yet in arguably tougher jobs in the construction and mining industries they are thriving. In the Far East women are traditionally trusted with getting concrete ingredients right and are responsible for manually carrying and laying millions of tons of concrete every year.

“Globally, women are much more involved. Even through wars and other hardships they were relied on to mix and make concrete. So, if ever we needed proof that woman can make concrete there it is,” Stanford noted.

Make change happen

The following traits of women make them ideal industry employees:

- Women have the mental strength and staying power to work hard for long hours
- They are calmer
- Are less prone to take short cuts
- They have all the right characteristics to make them good truck mixer operators
- Typically women wishing to enter the industry have strong characters, are prepared to work long hours and do whatever is required to get the job done

Although some allowances need to be made, like separate showers, family commitments (as mothers) and maternity leave, women’s skills and dedication would make them ideal candidates for many jobs on concrete readymix plants. ■

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New crushing and screening equipment launched



Powerscreen crusher and screen in combination

The mobile crushing and screening equipment manufacturer, Powerscreen, recently celebrated 20 years in the southern African industry in partnership with its long-time local distributor ELB Equipment.

During the launch at ELB Equipment's East Rand head office, the company also took the time to showcase its new range of ultra-efficient crushers and screens designed to maximise output within tight confines. The Trakpactor 260 impact crusher in combination with Warrior 600 screen is able to punch well above its weight despite the system's small footprint.

According to Gemma McCallan, marketing executive of Powerscreen, the relationship between the two companies

has been successful and mutually beneficial throughout the 20-year partnership. "With an ever growing range to service a number of new markets we believe that we have a stronger proposition for the southern African market than ever before.

"Equipment like the new Trakpactor 260 and Warrior 600 has the potential to open up the market for smaller operations such as small-scale quarries, recyclers, demolitions, composters etc who will have the benefit of higher-output mobile equipment without the need for much space.

"For example, the Warrior 600 is the most compact mobile screen on the market and can easily be shipped in a single 20-ft container. In combination with the Trakpactor 260, the duo have an aggressive action and fast throughput of over 200 tons per hour (tph) that enables it to compete with much bigger and bulkier machines.

"On the other hand, our full range provides options for all other industries with large-scale screens capable of outputs of over 800 tph and jaw, cone and impact crushers for large-scale mining operations. Whatever the requirement, ELB Equipment will have the right solutions for any application at hand," says McCallan. ■

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Flextool Australia: specialists serving the 'flat floor' market



The Ligchine screed machine in action on a building site.

Flextool Australia Pty Ltd was founded in 1951 and is a specialist in design, manufacture and distribution as well as offering what is the most complete range of concrete equipment designed for the Flat Floor market. The company's products line represents a complete system for site preparation, which includes the innovative concrete screeding machines from sourced by Ligchine USA which Flextool distributes all across Australasia and also to other select markets.

The Ligchine screed machines can travel through difficult job sites via remote control, ensuring operator control with concrete placement – control specifically designed to help improve the tolerances of concrete flat floors (as measured by F-Numbers) and increase daily production. This, of course, translates into better profit numbers. Further to laser screeds, Flextool offers a full complementary range of associated products and accessories including ride on and walk behind trowels to assist in the finishing process. All these products are available from and are backed up by the Flextool Australia sales network across Australia and Asia. ■

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Sika strengthens Mercedes Advanced Driving Centre

Sika came to the rescue recently when structural strengthening was required at the Mercedes Benz Advanced Driving Centre at Zwartkops Raceway in Centurion, Pretoria. As alterations and upgrades were planned for the building, it was discovered that an existing concrete slab was structurally sub-standard.

To rectify the problem, Delta Built Environment Consultants (Delta BEC) had no hesitation in specifying Sika's internationally approved high-strength adhesive, Sikadur-30 to bond steel reinforced plates onto the concrete slab.

Sikadur-30 is a thixotropic, structural two-part adhesive based on a combination of epoxy resins and special filler. Designed specifically for bonding external structural reinforcement onto concrete, masonry, steel, cast iron, aluminium or timber, Sikadur-30 provides high creep resistance under permanent load, and hardens without shrinkage. It is easy to mix and apply and requires no primer.



The Mercedes Advanced Driving Centre with alterations in progress.

With a strict time schedule in place, the 1200 m² project was awarded to JC van der Linde & Venter Construction who not only bonded the steel plates onto the concrete using Sikadur-30 (45 kits), but also bolted them down from the top and bottom of the concrete slab.

Since necessary structural changes made by the engineers during the project were threatening the planned time frame, weekend work ensued, made all the more challenging by the noise of cars and motorbikes racing around the track.

Sikadur-30 provides high initial and ultimate mechanical strength as well as high abrasion and shock resistance. It is supplied in different coloured components for mixing control and is impermeable to liquids and water vapour.

With the many advantages in using Sikadur-30, the project was completed on schedule and successfully met the high standards required by Mercedes SA. ■

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



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Fibre-reinforced one-component cementitious mortar and adhesive primer

Mapei South Africa focuses on developing industry-leading solutions in concrete waterproofing and protection with highly specialised products suited to demanding environments. Sewament 3 Primer and Sewament 10 are two such products, delivering the complete restoration of damaged concrete in sewer trunk lines and sewerage systems, both internally and externally, with superlative ease of use and application variety.

Sewament 10 is the ideal choice for the restoration of deteriorated concrete in effluent and sewage and in water purification plants for effluent urban water. It can be applied to the interior corrosion-inhibiting lining of concrete tanks that have been damaged by the chemical aggression of effluent from urban or mixed urban and industrial waters. In addition, applications include anti-acid and wear-proof lining on reinforced concrete manifolds, construction or reconstruction of impervious coverings, the filling of joints and precast concrete sewerage elements and filling of joints of poured concrete for tanks and purification manifolds.

"The applications for Sewament 10 are extensive and the product is extremely versatile thanks to the research and development that has gone into its creation at the Mapei Research and Development Laboratory," says Paul Nieuwoudt, Mapei South Africa's product manager for Building Systems. "It has an exceptionally high level of resistance to the chemical aggression that comes about as a result of the anaerobic fermentation of civil and industrial sewage, which is unusual

for a cementitious mortar. This has even been verified by the Department of Microbiology at the Botanic Institute of the University of Hamburg."

The university subjected Sewament 10 to conditions that were eight times higher than those found in standard sewerage systems. The accelerated tests ran for a period of nine months in biological chambers and the results confirmed the product's capability in repairing damaged sewerage systems.

Sewament 10 comes as a powdered mortar with special hydraulic binders, selected graded aggregates, additives and synthetic fibres prepared to a specific formula. When blended with water, the consistency is easily workable and can be applied manually or by spray at a maximum thickness of 20 mm per layer. When using Sewament 10 manually it is recommended to use Sewament 3 Primer, a one-component cementitious mortar that improves the adhesion of Sewament 10.

"Sewament 3 must be used as a bonding bridge for manual application in concrete and masonry vaults, walls and beds in sewer trunk lines," adds Nieuwoudt. "Water deputation plans and canals for the collection of black water of zootechny industries also require its use when manually applying Sewament 10."

The one-component prepacked mortar is crafted from selected graded aggregates and special additives prepared according to Mapei research laboratory formulae. It provides superb adhesion for Sewament 10 and can be applied using a brush once mixed with the requisite amount of water.

Sewament 3 Primer must be applied to a substrate without loose parts and preferably after hydroscarifying to remove dirt, contaminated concrete and rust. Sewament 10 must be used within ten minutes and prepared in accordance with its given instructions. Both products require that blending and application guidelines are followed closely to ensure achieving the right end results.

"Sewament 10 can be applied with a spray and without the use of the Sewament 3 Primer, but the substrate must be prepared carefully prior to use," concludes Nieuwoudt. "These products have been designed to handle demanding environments and therefore must be managed precisely. Mapei South Africa is on hand to provide expert guidance and support to assure of seamless application and superb quality to any of our clients looking to invest in the long-term protection of their sewerage systems." ■

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www.mapei.co.za



Sewament 10 being spray-applied.

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.

Tile Africa Commercial supplies Maliba Lodge

Tile Africa Commercial supplied a natural look and feel with 400 m² of Urbis Genova porcelain floor tile to Lesotho-based Maliba Lodge.

The new building came about as a result of a distribution fire in 2013 which almost destroyed the original lodge.

“It was very important for us to retain as many of the elements of the original building and keep the same footprint. We wanted a hardwearing, large and natural looking stone tile that matched the natural organic feel of the lodge”, says Dwain Elliott, director of Maliba Lodge.

“Tile Africa Commercial specifiers match the product with the specification while keeping the technical aspects in mind, ensuring that the tiles supplied are suited in terms of traffic and durability,” explains Vaughn Dyssel, Tile Africa Commercial sales manager.

The Urbis Genova Porcelain tiles that were supplied provided not only a cost effective and sustainable design, but also blended in with the remaining infrastructure on site. Natural building materials of stone and thatch were also used to recreate the original look.

“The new building design allows a lot more light and flexible spaces and is a lot easier to heat in winter. The new floor surface not only looks good, but is safe, durable and easy to maintain,” adds Elliot.



Tile Africa Commercial offers an extensive range of technical and aesthetic products that cover every requirement and application. Due to its strategic distribution centres, centralised co-ordination for national projects as well as specialised advice from its experienced consultants and specifiers, Tile Africa Commercial provides customers with a professional service and peace of mind from concept to completion. ■

**For more information on Tile Africa Commercial,
Tel: +27(0)11 979 0327 / www.tileafrica.co.za**

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It will provide a unique digital construction summit for construction executives and professionals to benchmark and improve their business processes and understand its impact on effective strategies for improved information technology processes to promote the Building Information Modelling environment. The IT Summit will form the centre-piece of the Digital Expo and will showcase how digital and advanced construction together with BIM and new technologies are changing the face of the construction industry.

Summit speakers are top technical executives from companies that include Canadian BIM Council, Autodesk, Graphisoft, Oracle, Asite, Mott MacDonald and Group Five. Top international technology experts will also feature in the programme.

The Construction IT Summit & Expo is THE ONLY practical platform offering vendors and solution providers access to the entire construction information technology lifecycle.

The potential audience includes public and private sector participants such as architects, estimators, planners, project owners, engineers, IT professionals, facility managers, and government representatives, who are the key drivers in the regions' built environment. This unique event allows for visibility, interactive networking in exploring the latest trends and technology

available to assist delegates in making sense of the potential impact, the improved efficiency and how technology will influence a project on a day-to-day basis.

Join delegates in understanding the fundamental disruptions currently faced due to the lack of digital technology and how design, construction and facility operations must change accordingly in both the private and government sectors.

Attendees will also be exposed to the new frontier of digital visualisation and be able to experience gadgets with high-tech headsets such as Oculus Rift – into which a client or project worker can step and visualise his or her project surroundings virtually.

There will be a key focus on collaboration and understanding the BIM Institute's roadmap to tailoring BIM standards for South Africa in conjunction with its partners. It will also assert the education and training

required and proposes a context in which efforts have begun on internationally recognised BIM courses for the future academia.

Key features include: 22 hours of live talks, in-depth guidance and support on how BIM, digital and new technologies are transforming our industry.■

More information from Vaughan Harris on:

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email: Vaughan.harris@biminstitute.org.za



Identifying alcohol or drug abuse in the workplace benefits employers and employees

By: Rhys Evans, Director at ALCO-Safe

Alcohol or substance dependence always has a significant effect on an employee's ability to contribute to the company's success. Economically speaking, an addiction can increase absenteeism, reduce productivity and escalate accident rates. However, addiction doesn't just affect an individual in the workplace. It filters through on a personal level; an addiction can result in divorce, broken homes, severe emotional problems and even death. In light of the fact that addiction permeates every aspect of an individual's life, it is a crisis that must be addressed at many levels, including in the workplace.

Know the signs of addiction: It is beneficial to both employees and employers to be able to identify substance and alcohol abuse in the workplace, as once the problem is identified it can be addressed. The affected person can seek treatment, counselling and support before it is too late.

In order to determine if an employee is having a problem with alcohol or drugs, it's important to be educated about the symptoms of addiction. This awareness of what to look out for, coupled with the appropriate substance detection technology, is an employer's best weapon in the fight to eliminate chemical abuse from the workplace.

Early-phase addiction problem: Here, the individual drinks to relieve tension. As alcohol tolerance increases, the individual might experience memory blackouts. Drinking results in arriving late for work, and leaving early, as the individual feels unwell frequently. Thus starts a pattern of absenteeism and the person is by now missing deadlines and is the subject of complaints from fellow workers. Mistakes are more likely to be made due to inattention, poor judgment and decreased efficiency.

Middle Phase: At this point of the addiction, the affected individual is likely to engage in surreptitious drinking. While it is likely they feel guilty about drinking, they're unlikely to give up unassisted, as by now they will be experiencing tremors during their hangovers.

Absenteeism increases and reliability is reduced as he or she takes more time off for vague ailments or implausible reasons. The individual experiences a deterioration in job performance, hindered by a lack of concentration and minor injuries on and off the job become more frequent as a result.

Late Middle Phase: The affected individual has reached a point where discussion of problems is avoided entirely. Unable to control his or her impulses, the individual might neglect

food in favour of drinking alone. Work attendance drops off even further, as the employee fails to return from lunch or takes several days off at a time.

By now it is impossible for the individual to keep work and personal life separate, as the alcohol is affecting both and is now interfering visibly with work. Trouble with the law is a possibility and the chances of hospitalisation increase, as job performance falls far below expected levels.

Late Phase: Once this phase is reached, the individual believes that all other activities, including work, interfere with drinking. Attendance is characterised by prolonged and unpredictable absences, exacerbated by worsening financial and family problems. Performance is uneven and the individual is rendered incompetent due to drinking on the job.

Dealing with the problem: It is important for an organisation to address the problem of alcohol and substance abuse clearly at a policy level to provide a foundation on which to base workplace detection, intervention measures and employee assistance programmes. It is also important to ensure that managers and supervisors in the workplace know their role in dealing with alcohol problems.

While it is their daily responsibility to monitor the work and conduct of employees, it is not a supervisor's task to diagnose alcoholism; rather to exercise responsibility in dealing with performance problems attributable to alcohol, by holding the employee accountable, recommending help and taking appropriate disciplinary action.

To prevent the use of drugs or alcohol from slipping below the radar, companies should ensure their policy covers how drug and alcohol abuse in the workplace will be identified and dealt with formally. This includes testing, on either a random or compulsory basis, in accordance with the procedural requirements of the Occupational Health and Safety Act (OHSA).

Proactively working to eliminate alcohol and substance abuse in the workplace fosters a safer and more productive workplace which adds up to higher safety levels and better productivity. This in turn will boost company morale to the benefit of both the employer and employee. ■

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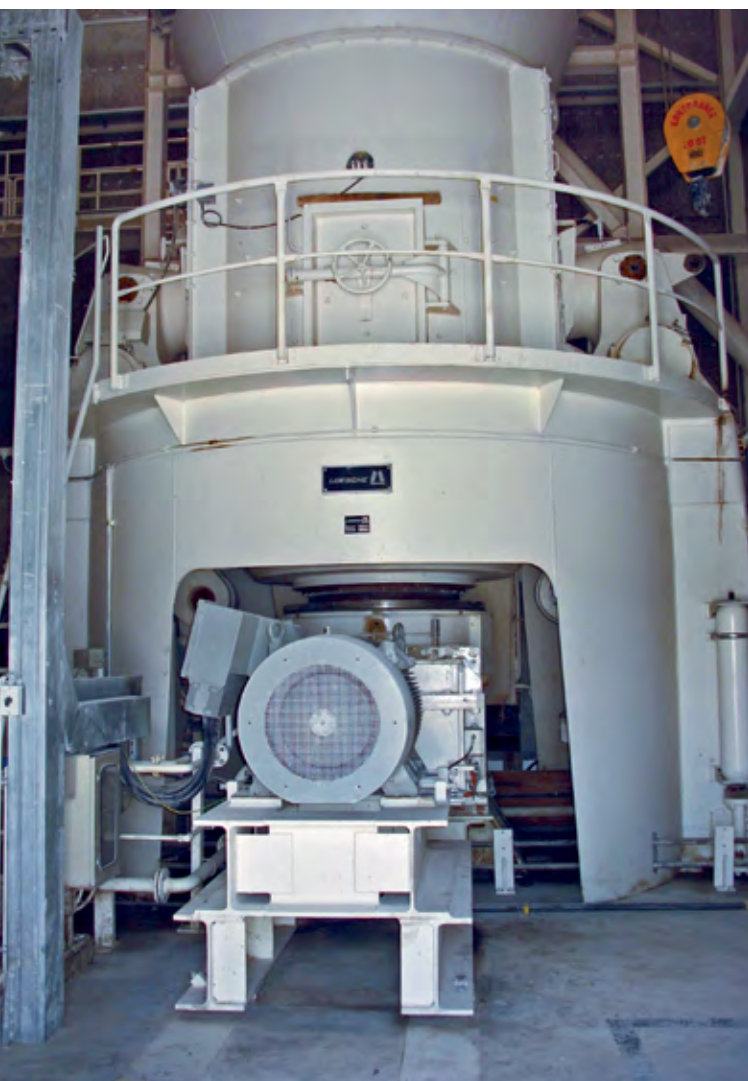
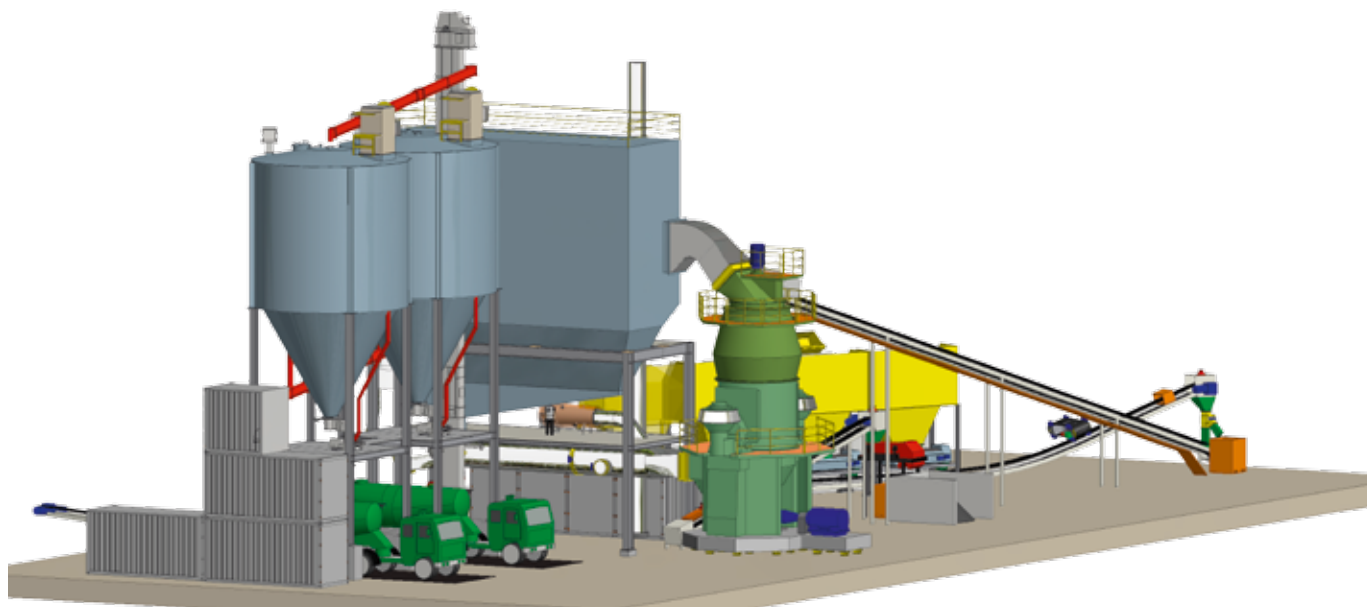


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Small-scale cement production with Loesche's new CCG plant



Since 1906, Loesche has consistently introduced new grinding technologies to meet its customers' needs.

Building on this tradition, the company has designed its new Compact Cement Grinding plant (CCG) specifically for markets which have only limited cement production capacity, but which also need a highly flexible system capable of producing a whole range of cements.

With the CCG, Loesche has identified the need for a plant that can support start-up operations as well as conventional cement producers in small but growing markets, in regions without any cement plants but where there is a demand for freshly ground cement.

The CCG is a small-scale grinding plant designed to produce different types of cement. Here the material is conveyed from a series of feed hoppers into Loesche's proven, state-of-the-art LM 24.2 CS vertical mill.

The finished product is separated in a high-efficiency classifier and is collected in the baghouse system filter. Either a silo system with a bulk loading or packing plant can be added to meet individual customers' specific needs. A combination of both offers another option if this is more suitable for the local market.

Loesche supplies all the plant equipment, including the structural steel and the electrical, control and instrumentation (EC&I) systems, as a turnkey or semi-turnkey package.

Input required from the customer is to provide the civil works and to construct a simple concrete foundation that complies with Loesche's engineering specification as well as site organisation and installation of the plant.

Power Supply

Since the CCG has been designed for use in remote areas without a stable power grid, Loesche's scope of supply can be extended to include a diesel generator system.

The hot gases from the generator can be used for drying inside the CCG.

Customer benefits

- Easy to calculate the investment needed;
- Reliable, proven equipment;
- Fast delivery time and quick commissioning;
- Loesche can undertake the plant's operation and maintenance;
- The CCG is easy to transport, install and take down again;
- Fast market entry / establishment of cement brands on new markets;
- Testing markets with low investment.

Installation

Loesche will supply the CCG preassembled to the greatest possible extent, dependent on local conditions.

For logistical reasons however, the customer must provide the civil works for the plant, to meet Loesche's design requirements.

Installation can be included in Loesche's scope or alternatively left to the customer – whichever is preferable.

Operation and Maintenance

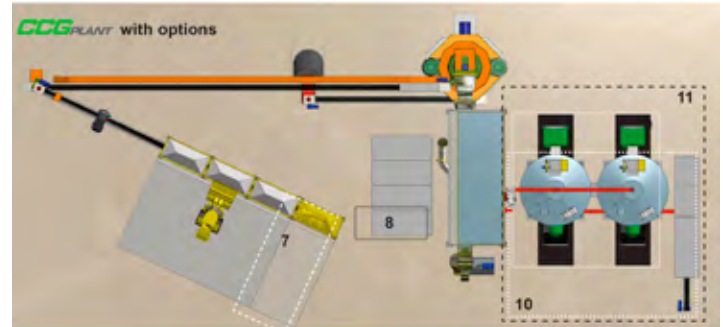
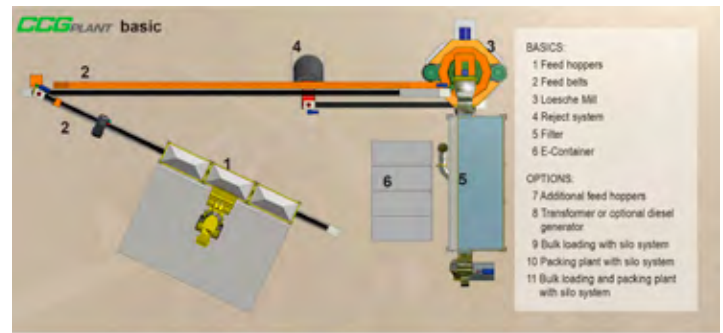
Loesche can offer a tailor-made operation and maintenance package that has been specially designed for customers who do not already have experience with cement grinding and packing plants.

On request, this concept can be adapted to reflect specific local conditions.

Advantages

Loesche's CCG offers major advantages over other technologies:

- 100% slag grinding is easily achieved;
- High output rates for blended cement production;
- Lower power consumption per ton;
- Lower total installed power;
- Quick product change; and
- Higher output.



Loesche is an export-oriented company run by the owner, which was established in Berlin in 1906. Today the company is internationally active with subsidiaries, representatives and agencies worldwide.

Loesche engineers are constantly developing new ideas and individual concepts for grinding technologies and preparation processes for the benefit of our customers. Their competence is mainly due to our worldwide information management systems.

This ensures that current knowledge and developments can also be used immediately for our own projects.

The services of our subsidiaries and agencies are of key importance for analysis, processing and solving specific project problems for our customers. ■

Up-to-date information on our overseas companies at
www.loesche.com / Tel: +49 211 5353 0
 email: loesch@loesch.de

Technical data

	OPC	PPC, PLC, PSC	GGBFS
Blaine	3,200 – 4,000	3,500 – 5,000	4,500
Clinker/Slag grindability at mill	18 – 24 kWh/t	16 – 22 kWh/t	25 kWh/t
Total specific power consumption at shaft	27 – 36 kWh/t	23 – 33 kWh/t	36 kWh/t
Grain size	30 mm		
Maximum throughput	29 – 39 tph	31 – 40 tph	28 tph
Loesche Vertical Mill	LM 24.2 CS		
Installed motor	980 kW		
Total installed power	< 1,400 kW		
Feed moisture limit	0 – 12 %*		
Delivery time FOB	9 months		

* affects the throughput

Make a contribution to women in Africa's construction industry

The 4th annual Women in Construction Awards are set to take place on 10 May 2016 at the Gallagher Estate and will be collocated with the African Construction and Totally Concrete Expos. This prime platform is to identify, showcase and celebrate the increasingly vital role women play in the cement, concrete and construction industries.

The Women in Construction Awards programme not only honours women who have pioneered the development of the African built environment but also serve to recognise the emerging leaders of the industry.

The awards, which include individual and organisational categories, acknowledge the increasingly important role played by women in the industry.

The individual categories recognise 'Pioneers in Innovation' and 'New Starters' – women under 30 who, through their ef-

forts, have been identified as 'women to watch' as they establish their foothold within the sector.

The organisational awards acknowledged organisations which have developed women's roles through innovative training programmes as well showing their commitment to developing the careers of women in the industry.

The 2016 judging panel comprises 17 renowned industry leaders from across the continent who will be assessing nominations in the following categories:

Individual categories:

- Pioneer in Innovation Award
- New Starter of the Year – Under 30 Award

Organisational categories

- Most Innovative Women Training Programme Award
- Excellence in Career Development Award

This is your chance to nominate an individual or organisation that has exemplified inspiration, vision, innovation and leadership for women in construction.

Make a contribution to women in Africa's construction industry and submit your nomination today! Interested individuals or organisations can view the criteria and submission requirements for each category on www.womeninconstruction.co.za. Anyone can nominate a candidate organisation and self-nomination is also allowed.

Nominations close by close of business, Monday, 29 February 2016. ■



Lentsu Mmako, Quality Surveyor in Training, VSB Quantity Surveyors, South Africa - New Starter of the Year (Under 30).

**For more information contact Athi Myoli
+27 21 700 5506 / email: athi.myoli@hypenica.com**



Manana Khotseng, Director, Rehauwe Construction and Development, South Africa - Pioneer of Innovation Award.

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Concrete's new cultural role: making music!

You can now listen to the sea's original compositions or play a concrete record, writes Jan de Beer.

Concrete, as all the readers of *Concrete Trends* will know by now, is one of the world's most versatile materials, having been used to make some of the world's most impressive and durable structures. But the fact that concrete can now also make music might well be a revelation to many. Let's look at two examples.

Firstly, in the coastal city of Zadar in Croatia there is a concrete Sea Organ. Yes, you read it correctly: a pipe organ – the kind you find in churches, with towering pipes looming over the pastor. The world's first musical pipe organ played by the sea was created by the Croatian architect, Nikola Basic, as part of a project to repair and upgrade the devastation Zadar suffered in the World War II bombings.

Nikola Basic's unique concrete Sea Organ consists of some simple and elegant white steps created on the quayside. Under the steps are 35 musically-tuned polyethylene tubes with whistle openings of different diameters. The waves push air through the varying resonating cavities and, depending on the size and velocity of a particular wave, different musical notes emanate from the tubes. As sea forces and energies are unpredictable in terms of tides and wind, the Sea Organ plays a never-ending number of musical strains – all composed by nature. If you listen to the organ on YouTube, it sounds rather like the panpipe maestro, Zamfir, accessing notes lower than he could have ever imagined were possible to achieve.

The 70-m long Sea Organ – which won the European Prize for Urban Public Space – is regularly visited by tourists and locals who, on hot summer days, simply chill out on the steps, reading a book or gazing wistfully at the ocean, while a remarkable union between architecture and the environment provides endless background music from below.

They say experiencing the sounds of the Sea Organ at sunset is a truly memorable experience. The famous film director, Alfred Hitchcock, would never miss the opportunity to visit the site and called it "the most beautiful sunset in the world". For a man whose mission in life was to create tension on the screen, the gentle notes of the Sea Organ must have brought

moments of rare relaxation and tranquility. Perhaps Andrew Lloyd-Webber should spend a few hours on the Sea Organ steps, picking up inspiration for the score of his next West End musical. There is, after all, no copyright attached to the music composed by the Zadar organ.

For another novel way concrete is now used to make music, we have ...records.

A year or two ago, one would have had to explain to anyone under 30, born into a world of CDs and high-tech digital equipment, that there once was a form of storing music on

vinyl records, usually packaged in eye-catching covers. Now, as retro becomes the 'in thing', LPs are back on music store shelves and turntables are back not only as a practical, arguably elitist, means of playing music, but also as an interior décor component to trump the Joneses.

So, what's concrete got to do with all of this? Well, the German

engineer, Ricardo Kocadag, has developed what he claims to be the world's first 'concrete record'. The idea, as an internet reporter so aptly put it, was not to add weight to your music collection, but rather to show that concrete is not only suitable for the creation of enormous buildings and bridges, but can also handle the fine finishing and detailed grooving required for the storage of music as found on vinyl records.

Kocadag, perhaps out of frustration with his prolonged efforts and setbacks before he refined the revolutionary concrete recording technique, decided to use the Rolling Stones' hit, 'I Can't Get No Satisfaction', to cut into the 6-mm-thick ultra-high-performance concrete slab which apparently is playable on standard turntables. Noteworthy, of course, is that the disc contains only a single track: one supposes trying to cut the traditional six tracks on such a relatively heavy record might still need a little bit more research.

As one old enough to have owned hundreds of vinyl discs, I can see a couple of immediate advantages of the new Kocadag recording technique. For a start, thieves will need a truck to steal your collection and a major breakthrough: concrete discs won't warp in the sun. ■



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