

Construction WORLD

Report: Airport to end ST HELENA'S ISOLATION

The road rehabilitation project BETWEEN HARRISMITH AND KESTELL

CESA: Meeting socio-economic challenges through sustained INFRASTRUCTURE INVESTMENT



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The GSB 162-2 RE Professional from Bosch is a new powerful impact drill for demanding work with diamond core cutters. This powerful tool is ideal for impact drilling in concrete and masonry, screw driving and drilling with large diameters in wood, and stirring viscous materials.

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EDITOR'S COMMENT



Crown Publications recently launched its new website – each of the 11 magazines it publishes now has its own domain. The aim of this new improved website is to offer increased online content to regular readers of Crown Publications' magazines while at the same time being sensitive to the fact that, as a technical publisher, Crown Publications remains first and foremost a magazine publisher.



As such the website will still offer readers the opportunity to read a PDF replica of the magazine (with enhanced online features) while the website, being far more nimble than a monthly paper publication, will offer readers additional targeted up-to-date news, articles and an opportunity to interact with the content.

Our offering

With the enhanced online offering, *Construction World's* monthly magazine content is going to be complemented by a vastly improved online offering. The *Construction World* site will shortly have the same sections as the hard copy of the magazine. Many of these sections will be updated daily while news and announcements will be shared with our ever growing Twitter and LinkedIn following. This will be the beginning of what I call the

'*Construction World* 360-degree solution'. While still reaching a very targeted market with the magazine, our core business, the online offering will reach an equally targeted market – a new market that does not always have the time to read the magazine or who does not necessarily receive the magazine. This will be beneficial to both the members of the market that *Construction World* serves, but also to the advertisers who use the brand as a vehicle with which to reach this very market.

In addition we will also soon begin emailing newsletters to our current database – still business-to-business publishing, but using a different medium.

An exciting time in the history of *Construction World* lies ahead. The ultimate aim of all these extensions is to improve communication with South Africa's construction world:

simultaneously maintaining the respected trade journal with its 33 year history ... but also moving forward in the digital era.

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MAKING INROADS in Gauteng

Go for Gold', a non-profit education-to-employment organisation, aims to make inroads into the mining and construction industry in Gauteng after its successful debut in the construction industry in the Western Cape, Bridget-Ann Mullins, 'Go for Gold' co-director, says. "We are starting to make headway," she notes.

➤ "We have some good solid partners in both Cape Town and Johannesburg." Notable partners in the Western Cape include Murray & Roberts, Neil Muller Construction (NMC), Haw & Inglis, Martin & East, WBHO and the Power Group. This has allowed 'Go for Gold' to establish reciprocal links in both provinces.

"As we expand we need to get more companies on-board as we are a non-profit organisation focusing on education to employment. Companies can support us through their corporate social responsibility programmes, as well as their skills development initiatives as they stand to gain BBBEE points towards their scorecard," Mullins says.

The 'Go for Gold' initiative was established in 1999 in response to the high level of youth unemployment in South Africa. "One of the factors that make us unique is that we were actually started by a company in the construction industry seeking to transform the built environment and technical professions in South Africa," Mullins says.

'Go for Gold' has developed a four-phase model aimed at developing future skilled graduate professionals. Phase I consists of scholars being transported to a 'Go for Gold' campus to further their studies in mathematics and science in particular. They are also taught computer skills and life skills.

This training continues until the end of Grade 12 when all the candidates are interviewed for built environment internships, which comprises Phase II. Phase III involves attending a tertiary institution, with these studies sponsored by the relevant companies. The final phase is full-time employment in the construction industry. Each phase's successful candidates become involved in mentoring those candidates in lower phases.

Western Cape success

Mullins reveals that 'Go for Gold' in the Western Cape has already seen over 100 candidates successfully placed in employment. "These are our success stories. The candidates often talk about the opportunities provided to them by 'Go for Gold' – and which they grabbed, as obviously it is up to them to take the responsibility of utilising such opportunities to help them get to where they are today."

These ambassadors mentor younger phase candidates. "Peer education is very powerful, and they really take it to heart it when it comes from someone from the same circumstances as them, and yet who took the initiative to change their lives and really make great strides.

"Thus we always say that we do not have an exit point in 'Go for Gold'. In the 'Go for Gold' family you are with us for life."

Mullins explains that 'Go for Gold' is linked to the Bargaining Council for the Civil Engineering Industry (BCCEI). "We have had a few meetings with them and continue to utilise their endorsement and support. In terms of the Construction Education and Training Authority (CETA), we were a strong partner with them before they went under review, and are now engaging with them again as they emerge from this process. Our partner companies are working with us to help rebuild that relationship."

Gauteng presence

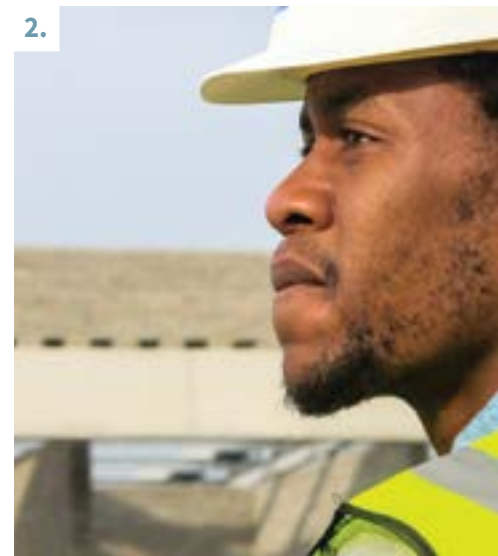
Looking at 2015, Mullins reveals that 'Go for Gold' aims to consolidate its presence in Gauteng with the establishment of its new branch in that province.

"We are piloting in Gauteng and we really want to ensure it works because

we believe that, due to its size, Gauteng can be three times as big and successful as the Western Cape."

'Go for Gold' is also working in partnership with another non-profit organisation in Port Elizabeth in order to set up a similar education-to-employment initiative in the Eastern Cape.

"This is really exciting as it is the first time we are collaborating in such a joint



venture, and if successful, it can be another form of growth.

"We have also started looking at consulting work to see how we can share our model and our expertise while still remaining true to our core purpose. We want to grow nationally, so that we are able to use this successful education to employment model to influence other industries. Thus it is a very exciting year ahead," Mullins concludes. ◀





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1. 'Go for Gold' Phase I learners in a science laboratory.
2. Visiting a construction site as part of 'Go for Gold's' Phase I programme.
3. 'Go for Gold' Phase II enables matriculants to experience the working world and make informed career choices.
4. Successful 'Go for Gold' students at the 2014 awards ceremony.
5. Successful 'Go for Gold' Phase II candidates sponsored by Murray & Roberts.

NEW ACQUISITION

EES Africa, an ISO 9001:2008 certified company which provides management, engineering and auditing services throughout Africa, has announced its acquisition of Rob Anderson & Associates cc (RAA). RAA is a Durban-based electrical and security engineering company.

The acquisition took effect on 1 March 2015. Founding CEO of EES Africa, Bradley Hemphill, says: "In addition to expanding within South Africa EES is also targeting further office expansion into selected African regions where we have already delivered projects. We strive to be Africa's technology professional service provider of choice."

Rob Anderson, the founder of RAA 18 years ago, says: "This is a perfect way to continue servicing our clients in the short and medium term whilst ensuring sustainability in the long term.

"We are excited about being able to

deliver more value to existing clients through EES's national footprint and the other complementary services EES offers."

Anderson will join the board as executive director on 1 March 2015.

Hemphill, who founded EES Africa 14 years ago, continues: "This acquisition fits our vision and long term strategy in more ways than we ever imagined. The main drivers for the deal were the geographic significance of an established Durban presence coupled with specific skills in heavy current electrical and physical security."

Hemphill emphasises: "We will now be able to offer the full experience from the electrical



Founding CEO of EES Africa, Bradley Hemphill.

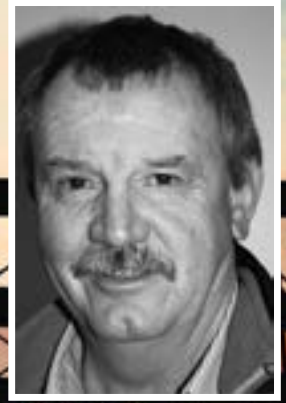


Rob Anderson, the founder of RAA.

transformer to the data point and everything in between.

"Very few private companies have the footprint and specific skills base EES now has. Our advantage is that we are still owner managed with personal involvement in projects. Customers have access to key experienced people, EES can adapt faster than the international competition, and it has as a well established national track record."

The company has carried out projects in 28 African countries to date, and its commitment to become the professional service provider of choice within Africa's technological industry has never been more clearly focused than now. ■



NEED TO ACCELERATE

The formal registration of Construction Health and Safety practitioners is being delayed by apathy, incorrect methods of application and non-payment, Doug Michell, Master Builders Association (MBA) North Construction Health & Safety Manager, has cautioned.

ABOVE: If the construction industry is to have sufficient numbers of registered H&S practitioners by August 2015, there would have to be a major upsurge in registrations.

INSET: Doug Michell, MBA North Construction Health & Safety manager.

tration are many and include the fact that clients would be able to select competent agents and have recourse if the agent proves incompetent. There will also be means of disciplining non-compliant professionals, and clients will have the assurance that their building work will be done to the best practices with the professionals' own reputation at stake in any given project.

"However, the number of applications for registration are not looking promising at the moment. In fact, if the construction industry is to have sufficient numbers of registered H&S practitioners by the date set for enforcement – August 2015 – there would have to be a major and dramatic upsurge in interest. The SA Council for Project and Construction Management Professionals (SACPCMP) has estimated that South Africa would need about 3 500 registered H&S practitioners by July 2015 – and we are nowhere near that total at present.

"In July 2014, as many as 63% of the application packs that had been received were incomplete, or had documentation outstanding, or had unpaid registration fees – often a combination of both. This brings the registration process to a complete standstill: an application cannot 'partially' be processed," Michell explained.

"Another factor that had disrupted the registration progress was that some potential applicants had hoped that 'exemption notices' published by the Department of Labour would not merely represent a 'roll-out period of grace' the Department had intended, but signified that the

entire registration exercise would probably just be scrapped."

Michell said that to ensure that as many of the 3 500 registrations have been completed – or are at least in progress – SACPCMP had, in consultation with the Department of Labour, drafted an implementation plan to assist applicants.

Elements of the implementation plan include:

- Increasing the pool of competent assessors to expedite the registration process for all categories in a professional manner;
- Increasing the number of competent examination invigilators/markers;
- Staging 'Routes to registration' workshops nationally with particular focus on the CHSO category;
- Targeting clients/developers to provide information-sharing workshops to promote the objectives of the CHS registration process; and
- Identifying suitable venues so that examination and interviews can be decentralised.

"There is no doubt that registration will raise the profile of the H&S profession, boost interest in it and attract better practitioners. Continuing Professional Development will ensure that professionals are kept up to date with the latest information pertaining to their scope of responsibilities. We can but hope that the registration process would have reached the required level by August this year," he added. <

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> The purposes of registration are focused on control and regulation and sets out:

- To establish a comprehensive mechanism for the evaluation and assessment of applicants;
- Draw up a Code of Conduct to regulate the behaviour of registered construction Health and Safety agents;
- Maintain a national register of such accredited agents;
- Provide Continuing Professional Development (CPD) in construction Health and Safety; and
- Measure and monitor the impact of Health and Safety in the construction industry.

A registered construction Health and Safety agent would be a person with at least five years' experience in the construction sector who has been assessed by the SACPCMP Council as competent to provide HSE services in accordance with the Occupational Health and Safety Act and applicable construction regulations.

Michell explains: "The benefits of regis-



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CREATING SOLUTIONS

BASF is turning 150 in 2015. The company began in Germany in 1865 with the development and production of dyes. The production of ammonia in order to make fertiliser followed a few years later and then plastics came along. Since then, the company's portfolio has continuously developed and evolved and today their product range covers a wide spectrum of industries from chemicals, plastics, performance products and crop protection to oil and gas.

> BASF has operated internationally since it began. It supplies customers in nearly every industry with products and solutions, and supports them with research and innovations.

It is an achievement for any company to remain successful for so many years. For BASF this number speaks to the creativity and determination of its employees – in the past and the present. For 150 years, they have managed to find the right balance between risk-taking and responsibility.

Since BASF is a science and research-based company, it strives to be more innovative and progressive in celebrating its global and local anniversaries. A prerequisite was that the anniversary concept had to be connected to the company strategy and corporate purpose: "We create chemistry for a sustainable future." This statement expresses what has made, and continues to make, BASF successful. It encompasses three key concepts: It develops innovations; it does this together with others; the solutions it develops help make the future more sustainable.

Over the years this winning recipe has not changed: BASF recognises societal trends and the needs of people; with research and development it finds new and innovative solutions to meet these challenges, again and again.

Laurent Tainturier, senior vice president for EUE region, including CIS-Middle East-Africa explains: "Today's requirements and the expectations of society are much more complex. But our focus is still on improving

people's quality of life. This, however, should not come at the expense of the next generations. When we conduct research today, we keep one guiding principle in mind: sustainability. We treat resources with care and respect and strive to strike a balance between all three dimensions: economy, environment and society."

Addressing challenging issues

Laurent Tainturier adds: "It is critical that a company such as BASF addresses the challenges facing our planet, including those of energy and food resources, as well as urban living. In 2050, the world's population will reach nine billion with 70% of the people will living in cities. Resources are already scarce and we have only reached almost seven billion people. Everyone needs a roof over their head, clean water, and electricity. This poses a tremendous challenge, especially in Africa and the megacities of the developing world. To feed nine billion people in 2050, we will need twice as much food as today. How can that be accomplished if we can't double the amount of farmland?"

Collaboration to innovate

From its early beginnings, BASF has always had innovative and collaborative culture. BASF continues to work closely with university researchers, scientists and chemists who have provided the cornerstones for its research.

Compared with the past, today's joint

endeavours involve many more disciplines. The construction of a wind power turbine, for example, requires a team of researchers, developers and market experts. It is not only about improving material properties, but ensuring they fit and work together in the best possible way.

This means that a company like BASF needs to work across different divisions and combine the knowledge of many experts – solutions need to be considered with customers and scientists.

"When we conduct research today, we keep one guiding principle in mind: sustainability. We treat resources with care and respect and strive to strike a balance between all three dimensions: economy, environment and society."

Joan-Maria Garcia-Girona, vice president, and head of BASF in South Africa and sub-Saharan explains: "We see our anniversary as an opportunity to open up in ways that go beyond these proven collaborations. The way innovations arise has changed considerably compared to the past. This is because of new methods of communication as well as a different self-awareness and changed expectations of people. They want to solve societal problems and make their contribution. They discuss online, on blogs and social networks. We are convinced that when we add the expertise from chemistry and other industries to these ideas, we will be closer to finding answers for the challenges of today and tomorrow. We want to initiate something new with our anniversary and try out new ways of working together over the next year – both within BASF and with people outside the company. We see the Creator Space™ programme as a great opportunity to bring BASF closer to our target groups."

FROM LEFT: Petra Bezuidenhout, Joan Maria Garcia Girona, Mamokgheti Phakeng, Christo Marais, Laurent Tainturier, Hanli Prinsloo, and Horst Freitag.





Joan Maria Garcia Girona (BASF vice president & head of business centre South Africa & sub-Saharan).

Creator Space™ programme

BASF's global and local anniversary programme is envisaged as a virtual laboratory – the 'Creator Space™ programme', in which it will try out new ways of working together over the next year and beyond – within BASF and with other stakeholders i.e. customers, scientists, and other communities.

The three anniversary topics posted focus on urban living, energy, and food. These ideas and solutions from the virtual discussions are then fed back into other collaborative and co-creative anniversary activities such as Creator Space Tour, which

will take place in India, China, USA, South America, Spain and Germany.

The SA anniversary programme

The South African anniversary programme sees a number of highly interactive events being hosted throughout the region involving scientists, customers, business partners and employees. Again, the focus will be on the three strategic global topics of energy, food and urban living. Events will range from employee jamming sessions which will challenge staff across all levels to come up with innovative solutions to societal issues, to participation in leading national science festivals and competitions. <

Petra Bezuidenhout (BASF head of communications), Prof. Werner Olivier (NMMU) & Laurent Tainturier (BASF senior vice president EUE-CIS, Middle East & Africa).



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MEETING

socio-economic challenges

Consulting Engineers South Africa's (CESA) President, Abe Thela, recently delivered his presidential message and theme for the year, 'Meeting socio-economic challenges through sustained infrastructure investment'.



> Thela stated that this year CESA will be focusing on the role infrastructure plays in the socio-economic development of our country and how this role can be enhanced through an increase in infrastructure investment and skills development.

Social, political and economic realities

The National Planning Commission identified the two most pressing challenges facing the country as being the fact that too few South Africans are employed and that the quality of education for poor black South Africans is substandard. The unemployment rate is estimated at 25,4% and of great concern is the fact that 50% of unemployed South Africans are youth between the ages of 15 and 24 years. This figure escalates to 63% if the discouraged youth job-seekers are added to the statistics.

Thela states that, "These problems coupled with the rising youth population reflect a generation at risk, contribute to socio-political disorder, put heightened strain on the country's limited financial resources and arrest economic growth".

Increasing infrastructure investment

According to the NDP South Africa will need to spend at least 30% of its GDP on infrastruc-



Consulting Engineers South Africa's (CESA) President, Abe Thela.

ture development to allow infrastructure to have a meaningful contribution in eradicating poverty, halving the unemployment rate and contributing to economic growth to the desired level of between 5 and 7% per annum by 2030. Currently the country is only managing 22,9% of GDP on infrastructure spending with the public sector contributing 13,95% and the private sector 8,95%. The respective targets for the public and private sectors are 20% and 10%.

He contends that, "It is therefore clear that the starting point for addressing the country's socio-economic challenges is to increase investment in infrastructure development". In order for South Africa to address its socio economic challenges both public and private sectors will have to increase their spending on infrastructure with the public sector needing to increase more.

Private sector resources

The use of the Public-Private Partnerships (PPPs) in the financing, design, building and operation of infrastructure has emerged as the most important model employed by governments around the world to close the infrastructure gap. South Africa has not yet realised the full potential of this model of infrastructure delivery. Many opportunities exist in various economic sectors such as renewable energy, transportation, water, alternative energy sources, education, etc. where the PPP model can be used to maintain the momentum of infrastructure development in the country. However, the process must be transparent, the project pipeline clearly defined, regulatory red tape removed and the public must get better and more cost effective services.

Addressing inefficiencies in the procurement system

CESA has, for some time now, been aware that there are inefficiencies in the way public-sector infrastructure projects are implemented. These shortfalls include lack of planning, inappropriate procurement approaches, lack of project management capacity & capability, lack of other desired technical skills in the public sector, rampant corruption, etc. In addition these inefficien-

cies rob South Africa of multiple billions of rands annually, which could be effectively used to fund the much-needed increase in infrastructure investment.

Investment credit rating

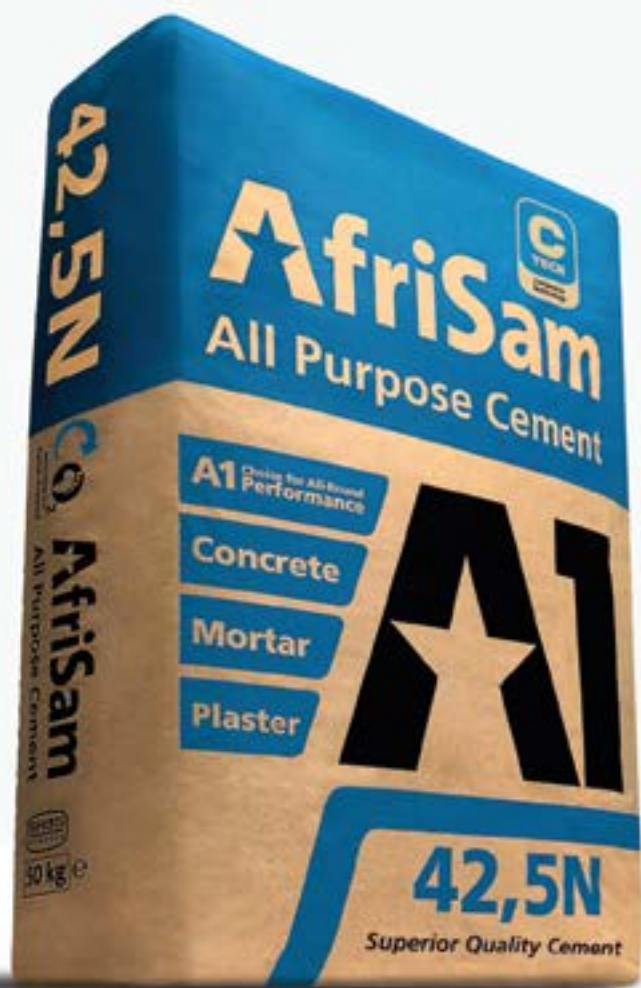
In November 2014 Moody's Rating Agency downgraded South Africa's 'investment grade' credit rating to Baa2 from Baa1 and adjusted the outlook to stable from negative. It is crucial for the country to improve its investment grade rating to continue to access credit from both local and foreign lenders at favourable interest-rates. Unfavourably high interest-rates on loans reduce the value of the loans and accordingly the amount spent on infrastructure.

Human capital development

The increase in infrastructure investment will require more engineers, technicians and artisans to implement new infrastructure projects and maintain the existing infrastructure. The availability of skills is one of the elements that investors wanting to invest in a country consider with the level of skills determining the country's productivity and competitiveness.

There are a number of concerns regarding human capital development in the country and these require unique programmes focused on addressing them. These concerns must be addressed as a minimum: Poor quality of basic education including maths and science; Youth unemployed and unemployable; Structure of the education system; Youth with qualifications but without experience.

Thela says, "Failure to tackle these challenges decisively with a systematic approach will deprive a whole generation of opportunities to develop their potential, escape poverty and support the country's trajectory toward inclusive growth and economic transformation. CESA with the backing of our over 500 strong member firms, recommit ourselves to partner with Government and other role players in finding lasting and practical solutions to these problems, especially in relation to infrastructure development." <



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POWERFUL

international investment deal

juwi, Germany's leading renewable energy specialist headquartered in Wörrstadt, has a new partner: in December 2014, Mannheim-based energy company MVV Energie AG acquired a 50,1% majority shareholding interest in juwi AG via a capital increase.

> According to juwi South Africa MD, Greg Austin, the new loan agreements have been signed by more than 40 financial institutions. The agreements have a volume of around €300-million and a four-year term. juwi can now draw on extensive credit lines through to December 2018 and can therefore continue to act as a reliable partner in the energy turnaround in Germany and abroad.

For juwi, the conclusion of this new strategic partnership is an important milestone that will strengthen and enhance its core business of project development, construction as well as operations and maintenance.

The German stock listed energy player MVV Energie AG, with an annual revenue of around four billion euro and 5 400 staff, plans to further expand its commitment in the renewable energy sector through this new investment.

Adding muscle

The transaction between the two successful companies marks a historic milestone in the German energy industry and adds muscle to juwi's position in South Africa.

Commenting on the successful transaction Austin says: "MVV Energie's investment

into juwi AG will have a positive impact on the bankability of juwi internationally as a leading integrator for solar PV EPC and project developer, and will enable juwi SA to expand its operations as a result of increased lines of guarantee for projects."

Austin adds that from an operational perspective juwi SA anticipates that MVV Energie's long energy industry experience will be reflected in improved business synergies, which will lead to increased efficiencies across the juwi group and of course in South Africa as well.

For the founders and acting chief executives of the juwi group, Fred Jung and Matthias Willenbacher, the transaction represents a major building block for sustainable growth in the juwi group.

For MVV Energie AG, the partnership with juwi represents the systematic evolution of its strategic orientation. "The ongoing transformation of energy supply structures in Germany centers on an efficient and environmentally-friendly combination of renewable and conventional energies as pillars in the energy system of the future," commented Dr Georg Müller, chief executive of MVV, adding that the strategic investment and co-operation offered juwi, its project part-



South Africa MD, Greg Austin.

ners and other interested parties necessary stability and complementary development perspectives. Under the new corporate structure, juwi will systematically continue realising its well-filled project pipeline and also moving forward with marketing its projects to interested investors.

Synergy

The executive boards of both companies see the new partnership as a historic milestone in the energy industry: "We have succeeded in bringing together the energy business know-how of an established energy group and the expertise of an experienced project developer in the field of renewable energies. This combination means we are prepared to face the upcoming challenges of the energy market and are well positioned to deal with issues relating to all aspects of clean energy generation including the engineering side of EPC projects as well as the integration and marketing of clean power.

"We are optimistic we will bring the remaining aspects of our restructuring and reorientation to a successful conclusion in the coming months," the two energy pioneers said. Jung and Willenbacher have been realigning and reorienting their company to the constantly changing political framework ever since the German market for large-scale solar plants slumped in 2012.

Further afield

In other international markets, juwi remains a highly sought-after project development, EPC and O&M partner. The group will continue to expand its project pipeline and internationally utility scale solar shows the strongest growth. "In a global context there is enormous potential for the efficient use of renewable energy, particularly wind and solar energy. In light of our outstanding accomplishments as a project development and EPC partner on almost every continent we want to harness these opportunities and continuously expand our international business," commented Stephan Hansen, juwi executive board member responsible for international business. **<**



The founders and acting chief executives of the juwi group, Matthias Willenbacher (left) and Fred Jung.

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NOT YOUR STANDARD

Our society has become increasingly aware of the earth's need for nurturing and many urban dwellers seeking a respite from the assaults of the city have turned to eco estates to fulfill both the need for space along with the need for a rapport with nature. Sadly, many eco estates have not lived up to expectations and only a few are truly deserving of the name in aesthetic and principle.

> The 1 260-acre Monaghan Farm is situated in Lanseria and offers an alternative to the norm in estate living and property development in Gauteng with its principles of sustainability. It embodies the freedom of farm living with all the trappings of a modern, connected and self-aware environment.

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Where it began

The ethos begins with the layout of the land and the architecture of the homes. Monaghan Farm has been designed with a density of one residential unit per five acres and the principle that the farm will only ever consist of 300 properties with an average size of 4 500 m². When the property is completely developed, the footprint of all the buildings combined will occupy only three percent of the farm. One thousand acres – which amounts to 78% of the property – will be common open space. A vast contrast to the current norm of high density and high volume 'packing' that is seen in most urban and even most other eco developments.

Monaghan is a working organic farm, built around principles of sustainability, which promises a better lifestyle – one cushioned by

space and nature. The entire farm belongs to the residents: the farming areas, the gardens, the trails, the tree houses and the outdoor decks along the riverbank. This community ownership extends to the facilities of the organic farm, the Montessori School and popular restaurant, along with the Curro School currently being developed. Plans for further facilities include a gym, stables and business centre.

Sustainability and architecture

Not only is Monaghan Farm a pristine haven of indigenous bush and beautiful agri-village land, but it is also one of 15 finalists in the 2014 AfriSam SAIA Award for Sustainable Architecture: a firm indicator that it is not merely giving lip service to a trendy organic lifestyle.

The awards recognise buildings that are the result of an integrated approach to architecture, natural systems and technology. The nominees have a positive influence on their communities and are environmentally friendly through strategies such as the reuse of existing structures, low-impact and regenerative site development, energy and water conservation and the use of sustainable or renewable construction materials and practices. Respect for the environment pervades all aspects of life at Monaghan. Rainwater harvesting, energy efficiency, recycling and positive relationships with surrounding communities all contribute to a responsible and informed way of living. These practices are part of Monaghan life along with the ten acres of organic gardens that grow cut flowers, vegetables, fruit and herbs to be delivered locally to residents, reinforced by Monaghan's BCS Certification. The large herd of Nguni cattle that wanders the hillside provides natural fertiliser and control of the long grasses.

At Monaghan, each residence is spaciouly set into the natural veld with pockets of indigenous bush hiding the residences from one another. Boundary walls are not permitted which adds to the free flowing layout of the land and houses are a mandated single storey so as not to impede views. The desired effect is of muted architecture that is one with the landscape with natural colours and materials being utilised. Solar, PV panels, geothermal, low voltage lighting and heat pumps are just a few of the energy saving initiatives that have been put in place in every home along with a rainwater harvesting system of a minimum of 20 000 litres per property.



ECO ESTATE

Green construction methods for a brighter future

Many of the houses at Monaghan have been constructed with rammed earth – a technique of building walls using natural raw materials. This is an age-old building method that has seen a revival in recent years as people seek more sustainable ways of building. Rammed-earth walls are easily built, noncombustible, thermally insulated (reducing the need for heating) and durable. Low carbon building techniques include light-steel-frame construction and bricks being manufactured on site. As air conditioning is not permitted, residences are built facing the North with passive solar design, natural light and cross aeration. Most homes have wood burning fire stoves or solar water-born under floor heating and photovoltaic panels create electricity for many houses on Monaghan. These remarkable features now mean that several homes are feeding electricity back into the national grid.

House Kavuma and Stand 47

Two noteworthy residences at Monaghan Farm are House Kavuma and Stand 47. Both of these homes are currently receiving much media attention and industry accolades.

House Kavuma was shortlisted for the 2013 AfriSam SAIA Award for Sustainable Architecture. Designed by Claude Bailey Architects and built by Style Projects, House Kavuma is a masterpiece of ecological measure and self-sustainability: employing the Rammed Earth technique and harvesting 40 000 litres of water for the low maintenance house and garden amongst many other features. Fixtures make use of recycled timber, sustainable bamboo, solar power and natural light. Heat exchange hot water pumps provide hot water with a low consumption wood stove heating the home interior.

Stand 47 is an architectural case study and collaborative build project between Saint-Goban Gyproc as materials partner, Style Projects and Thomashoff and Partner Architects. The team set out to create a modern, energy efficient home that is able to adapt to the changing needs of its owners. The concept home takes conventional materials and processes and then translates them into a modern upskilled version with contemporary design and state of the art technology. The materials utilised in its creation were nimble dry walling, timber and steel and along with insulation, solar power and rainwater harvesting, have produced a self-sustaining and beautiful 'smart' home. <



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Concrete Pipes

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ROCLA is a subsidiary of ISG, a leading supplier of innovative infrastructure products to the construction and mining markets in Southern Africa.

New Green Star SA Interiors TOOL LAUNCHED

Continuing its vision to lead the transformation of the South African property sector into an environmentally sustainable industry, the Green Building Council South Africa (GBCSA) has launched its new Green Star SA Interiors tool – taking green building into the heart of every South African business.

The new Interiors tool, sponsored by both Standard Bank as the main sponsor and Saint Gobain as supporting sponsor, encourages tenants to rate the interior fit-outs of their premises. The overall aim of this new rating tool is to encourage the reduced environmental impact of interior projects.

Brian Wilkinson, CEO of the GBCSA.



Brian Wilkinson, CEO of the GBCSA, comments: "Our current suite of rating tools focus largely on the design and construction applied to new buildings and major refurbishments. Until now, they've had very little consideration for interior fit-outs inside each premises. The new Green Star SA Interiors tool is a key rating tool that will make a significant impact, especially on multitenant retail and office space."

Wilkinson adds: "We are excited to launch this pioneering new tool for South Africa, and believe that it will help transform thousands of offices, shops, restaurants and many other places, in existing and new buildings across the country, into sustainable green spaces."

Nathi Manzana, Standard Bank's head of professional and technical services says: "Standard Bank is committed to sustainable business. This commitment is seen in the business practices we conduct, the facilities we manage, and the associations that we support. Working sustainably makes sound business sense, supports the environment and provides a productive space for our employees to serve our customers."

Manzana adds: "Standard Bank's new Rosebank office complex is an illustration of this. The building was completed in 2013 and accommodates around 4 500 employees in customer-facing operations. It has achieved a 5-star Green Star SA Design office v1 rating by the GBCSA and a 5-star Green Star SA As built office v1 rating."

Lisa Reynolds, sustainability director at Saint-Gobain Gyproc, comments: "Saint-Gobain Gyproc is mindful of the fact that developing green environments requires much more than just energy planning. The company's primary focus is the contribution our products make to the reduction of energy usage in both homes and workplaces."

"We have a number of products in our portfolio that have been designed and developed in-line with the company's commitment to moving towards a greener environment, ensuring our products are able to contribute to energy efficient buildings being awarded the highest Green Star certification."

The Green Star SA Interiors tool will reward high-performance tenant spaces that are healthy, productive places to work and incentivise best practice for sustainable and efficient interior fit-outs that are also less costly to maintain and operate.

It is designed to allow each tenancy to have unique environmental design initia-

The company's primary focus is the contribution our products make to the reduction of energy usage in both homes and workplaces.

tives, and to fairly and independently benchmark each one.

The benefits are far-reaching. Significantly lower building operation and management costs will provide cost savings for both tenants and landlords, and an energy-efficient premises would be less affected by soaring energy prices. In addition, with the national energy crises, lower energy consumption in green buildings reduces the strain on the power grid.

"A healthy building means happier employees and improved productivity. Businesses will be in a better position to retain talented staff and fast-track behavioural change," says Wilkinson.

He adds there are several knock-on advantages to using the Green Star SA Interiors tool. "It will definitely give businesses a competitive advantage. It signifies industry leaders who provide smart and healthy work, shopping and meeting places that are 'set apart' in the marketplace. It is not only a responsible investment, but serves to heighten a business's attractiveness as an investment, a partner and an employer."

The tool will also recognise and encourage collaboration between the building owner and tenants to manage and operate the building along environmentally sustainable principles.

The tool considers interior fit-outs from an all-round perspective, including the project scope and implementation. "It would, for example, identify and encourage management practises that minimise the amount of demolition and construction waste going to disposal," notes Wilkinson.

"It gives recognition to the design of workspaces that provide spatial efficiency and improve productivity and occupant performance. Credits targeted will include quality of internal air, thermal, lighting and visual comfort, acoustic quality, ergonomics, as well as energy monitoring and greenhouse gas emissions," Wilkinson says.

The Green Star SA Interiors pilot programme has already been a success. Various interior fit-out projects at retailers, gyms, offices as well as standalone fit-outs at branches are part of the pilot phase. Version one of the tool is now available for public use. <



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POWERFUL

– even when diamond dry drilling

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The GSB 162-2 RE Professional from Bosch is a new powerful impact drill for demanding work with diamond core cutters.

This powerful tool is ideal for impact drilling in concrete and masonry, screw driving and drilling with large diameters in wood, and stirring viscous materials.



Specifications Bosch GSB 162-2 Professional

Power input	1 500 W
No-load speed	0 to 750/2 550 rpm
Weight without cable	4,8 kg
Drill spindle connecting thread	5/8" to 16 UNF
Chuck capacity	3 to 16 mm
Impact rate at no-load speed	0 to 12 750/43 350 bpm
Soft torque	50/14,5 Nm

E

quipped with a 1500-watt high-performance motor, this impact drill effortlessly completes even tough jobs on the construction site due to its

high overload capability. The optimised speed ensures fast work progress when non-impact dry drilling with diamond core cutters up to 162 millimetres in diameter.

The two-speed gearbox is an advantage for working with various different materials. The large spread between first and second gear enables not only the use of diamond core cutters in the low speed range, but also impact drilling applications with high speed and impact rate. In addition, the Bosch GSB 162-2 RE Professional can be used for demanding stirring and screw driving applications, working with hole saws, and drilling in materials such as stone or wood. Precise work is supported by the adjustable speed pre-selection. The rotating brush plate provides equal power in forward and reverse rotation, which is especially an advantage when driving screws.

Safe handling, even when performing tough jobs

Increased work safety is provided by the 'Anti-Rotation' overload clutch. The radial and axial secured auxiliary handle and the main handle with soft grip coverings ensure a secure hold on the new impact drill, even in demanding applications. The restart protection prevents the Bosch GSB 162-2 RE Professional from automatically restarting after a power cut. The automatic locking of the 16-millimeter keyed chuck also contributes to safe and easy handling. A ball grommet provides more freedom of movement and prevents cable breaks. With these functions, the Bosch GSB 162-2 RE Professional is one of the optimum tools for versatile use by electricians, plumbers or carpenters. ◀

Fast facts

- The Bosch 1500-watt high-performance motor with high overload capability for particularly hard applications.
- Fast work progress when drilling with diamond core cutters due to optimised speed.
- 'Anti-Rotation' overload clutch for increased work safety.

The Bosch Group is a leading global supplier of technology and services. In the areas of automotive and industrial technology, consumer goods, and building technology, some 275 000 associates generated sales of €38,2-billion in fiscal 2009. The Bosch Group comprises Robert Bosch and its more than 300 subsidiaries and regional companies in over 60 countries. If its sales and service partners are included, then Bosch is represented in roughly 150 countries.

This worldwide development, manufacturing, and sales network is the foundation for growth. Each year, Bosch spends more than €3,5-billion for research and development, and applies for some 3 800 patents worldwide. With all its products and services, Bosch enhances the quality of life by providing solutions which are both innovative and beneficial.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861–1942) as 'Workshop for Precision Mechanics and Electrical Engineering'. The special ownership structure of Robert Bosch guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant up-front investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung, a charitable foundation.

The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch.



ENDING ST HELENA'S ISOLATION

The Basil Read St Helena Airport Project (BRSHAP) is a design, build, operate and hand back contract for an international airport in St Helena. Situated in the South Atlantic Ocean, St Helena is one of the most remote islands in the world – 2 000 km from the nearest mainland. It has with limited infrastructure, no major construction equipment, few construction materials, not even sufficient sand and no harbour – presenting a unique challenge for Basil Read.



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Logistics

The only way to travel to St Helena is by sea, and a round trip between Cape Town Harbour, or Walvis Bay and St Helena (weather permitting) is roughly 20 - 22 days. This makes logistics a key issue for BRSHAP.

Basil Read, the main contractor, set up bonded forwarding facilities in Walvis Bay and Cape Town to consolidate materials and plant from all around the world. A temporary jetty in Rupert's Bay was built to a depth of five metres with six mooring points to accommodate a modified ship that was sourced from Thailand – the NP Glory 4.

The 'roll on roll off' ship, was modified to carry 1 million litres of fuel below decks and was fitted with a 13 m high crane that can move 30 ton container loads of material anywhere on deck. With a carrying capacity of 2 400 tonnes, it has already completed 32 voyages from Walvis Bay to St Helena and transported over 50 000 tonnes of cargo, including 10 million litres (pumped ashore via a floating line), explosives, cement, fly ash, admixtures, sand, construction equipment, reinforcing steel and other materials needed for the project. The NP Glory 4 is the first ship to ever touch land and offload directly onto St Helena. Planning is vital due to the long logistical chain and is carried out well in advance.

Scope demands a variety of skills

The project required a diverse range of expertise in the different disciplines of project management, design, blasting, logistics, road and civil construction, open cast mining, steelwork, crushing, concrete technology and commercial building.

The project design had to be practical, giving careful consideration to St Helena's unique geology, logistical challenges, limited specialists on the island, materials supply and was adapted to maximise flexibility of resources.

Dry Gut

St Helena's lack of flat land was a challenge. The airport is being built on Prosperous Bay Plain which is made up of ravines that the locals call 'guts'. In order to create a runway, these guts had to be filled. The

biggest gut – Dry Gut – spans over 400 m on the southern end of the runway and was filled with over 8-million m³ of blasted andesite and basaltic igneous rock and soil to the depth of over 100 m. This quantity would fill 20 Mbombela Stadiums to the roof. A total of 503 day shifts, 439 night shifts, six days a week, with 450 000 truckloads were used to fill Dry Gut.

In order to achieve compaction, 1,2 million litres of water was pumped daily from 16 boreholes into four storage dams. The boreholes were drilled to avoid interference with St Helena's water supply.

To minimise settlement with the variable quality of the material, materials management and rockfill processing had to be conducted with stringent controls. A settlement monitoring system was installed into Dry Gut fill at several levels to monitor the fill during and after construction.

A 260 m long and 120 m wide and 30 m deep open channel was excavated in the adjacent valley to deviate any rainfall water runoff. Initially, the design called for a 2 m diameter culvert to run through the fill but the channel required less maintenance and provided additional 620 000 m³ of quality fill material.

Haul road

A 14 km haul road with up to 15° gradients was constructed along the side of a mountain between Rupert's Bay and the airport site. The road is used to transport heavy equipment and construction materials from to the airport site. At the end of the contract, the road will be developed into a public road. This road winds, twists and rises over 500 metres in the first three kilometres, an engineering and construction challenge on its own

Airport runway

Cost effectiveness, the mountainous terrain of the island and the environment were key elements influencing the design of the airport runway. Concrete was chosen over asphalt in order to minimise future ongoing maintenance.

Manufactured from 27 000 m³ of concrete using a Wirtgen Paver, the runway is mostly unreinforced, measures 1 950 m long, 45 m wide



with a maximum thickness of 350 mm and reduced thickness to the 'off-keel' sections.

Basil Read took a number of measures to prevent the freshly paved runway from plastic shrinkage and cracking. Vinyl tarps were used to cover the pavements during initial curing – protecting the concrete from St Helena's sun and rain. In addition, CHRYSO Fibre Plus (micro fibres) were added to the concrete mix design and CHRYSO Cure WP (white pigmented curing compound) was applied to pavements.

Terminal building and combined building

Significant care was taken with the design of the buildings as they will be the first introduction to St Helena. They have been designed to blend in with their surroundings with a focus on functionality. They are energy efficient, with a sloped roof, clad in locally mined stone with concrete canopies and a glass façade. A brick making machine was installed on site to manufacture an estimated 250 000 bricks.

It was decided to use underground cabling to reduce the visual impact of power lines and achieve an obstacle limitation surface for the airport. The cabling follows the alignment of the runway, further reducing the construction footprint and avoiding environmentally sensitive areas.

Bulk Fuel Installation (BFI)

Basil Read are also responsible for the design, construction and commissioning of a 6 million litre BFI and an Airport Fuel facility.

Permanent wharf

The design and construction of a permanent wharf for ships up to 100 m long will be of great benefit to the island, as ships will be able to dock for the first time in the island's history.

Historical data on the wind and swell conditions of Rupert's Bay were used to carry out modelling tests at Stellenbosch University. Environmental studies and surveys of the sea bed and surrounds were taken to assess any environmental impact of the work.

The wharf comprises a rock breakwater using 1 600 concrete 7 t Core-loc® armour units and 400 concrete 27 t main block units, which

MAIN: The NP Glory 4 is the first ship to ever touch land and offload directly onto St Helena.

TOP: The BFI tanks fully painted.

ABOVE: The biggest gut – Dry Gut – spans over 400 m on the southern end of the runway and was filled with over 8-million m³ of blasted andesite and basaltic igneous rock and soil to the depth of over 100 m.

are being manufactured in a precast yard in Rupert's Valley. Two 200 tonne crawler cranes will place these precast units in position via GPS. The placing is tricky due to their weight and the sea conditions and currents.

As the units are exposed to sea water, the concrete had to be durable, and quality control is extremely tight. To obtain a quality product, the concrete had to have good workability. A CHRYSO plasticiser, Omega 101, also used on the runway, assisted in creating a good surface finish.

Risk management

Risk Management is absolutely crucial to the project. Risk registers have been created with over 200 identified and rated risks and specific mitigation measures allocated to each risk. These registers are vital in identifying, mitigating and avoiding risk and maintaining the project

Project information

- **Project start date:** December 2011
- **Project end date:** February 2026 (Phases I and II)
- **Main contractor:** Basil Read
- **Client:** St Helena Government and Department for International Development
- **Project value:** R4,6-billion



Design and advisory consultants

- **Worley Parsons** – Overall design responsibility
- **Delta BEC** – Airside design
- **KMH** – Architecture
- **LYT** – Architecture
- **Atkins** – Independent certifier: Airside
- **WSP** – Independent certifier: Landside
- **PRDW** Marine design
- **Trotech** – Bulk fuel installation (BFI) tanks
- **Cross PE** – BFI
- **Moody International** – BFI
- **Petrotech** – BFI
- **Lanseria International Airport** – Airside Operations
- **Chryso Concrete** – design and additives

TOP LEFT: The precast yard.

LEFT: The terminal and services buildings.

OPPOSITE: Concrete was chosen over asphalt in order to minimise future ongoing maintenance.

schedule. These registers are updated continually and reviewed in detail on a monthly basis with Basil Read teams that are working both on and off the island, the St Helena government and the Department for International Development.

The project is divided into two phases, namely: Phase I: design and construction of the airport (December 2011 – February 2016) while Phase II entails the operation of the airport (February 2016 – February 2026).

The value of the entire project is R4,6-billion and it is on schedule and on budget.

With two operating batch plants on the island, Basil Read set up a local laboratory to carry out standard testing on all structural concrete, and soils testing, to make sure it meets specifications. The lab is regularly audited by Soil Lab (an accredited laboratory) to ensure compliance is maintained. Beam and core crushing tests are done off the island by Concrete Testing Services.

Health and safety

The extreme mountainous and rocky terrain, fast changing adverse weather conditions, initially inexperienced and untrained local workforce and limited medical facilities presents high health and safety

risks. These risks are exasperated by the extended working hours and the diverse cultural workforce that can make communication difficult.

Major safety interventions and awareness campaigns, monthly rest periods, daily toolbox talks, weekly and daily rotation of plant operators, provision of safety incentive schemes and certified training initiatives – with zero tolerance to non-compliance – has been adopted to keep the workforce safe, motivated and focused.

Since the start of the project in 2011, more than 2,7 million man hours have been worked without a life threatening injury.

The environment

Small islands are extremely sensitive to outside influences. In planning, extensive consideration was given to environmental impacts. There is an environmental team that deals with noise pollution, air quality and dust, terrestrial ecology, heritage issues and nature conservation.

Basil Read also supports a four year programme on habitat restoration and landscaping called LEMP (Landscape and Ecology Mitigation Programme). This focuses on providing alternative, indigenous habitats and landscape treatments and aims to reduce and offset the possible loss of habitat and any negative impacts on the landscape



that may occur from construction works. LEMP will protect and relocate the Wire Bird, Mole spider habitat, clear invasive vegetation and predators and allow the rehabilitation of endemic fauna and flora.

A special effort is made to prevent soil loss by preserving soils and reducing footprint. All non-hazardous waste is collected and disposed of at a recognised waste receptor. Several hazardous waste treatment methods (bioremediation, decontamination and compaction) has been adopted including the procurement of an incinerator to reduce waste generated.

Design changes have also been made to protect heritage and archaeology sites such as the Boer Pipeline and African slave graves in Ruperts Valley.

Giving back

It was imperative that the project had the backing and support of the population (amounting to roughly 4 000 Saints). From the outset, it was decided that Basil Read staff would not live in an exclusive Basil Read compound but would be housed, where possible, in local accommodation amongst the Saints. This has resulted in excellent interaction between the Saints and the Basil Read expats and participation in the island's sporting and social activities.

There is a project complaints line, engagement forums and regular tours to the construction sites. Senior members of the project

team make themselves available to local Saints for any questions or concerns about the project.

Apart from injecting a considerable amount of money into the local economy (approximately £500 000 a month) Basil Read has provided employment for over 360 Saints – a number of whom have travelled to South Africa for additional training. Basil Read is currently the largest private employer on the island.

Before the project, many Saints were leaving the island to seek opportunities abroad – resulting in negative population growth. Since the project start, 71 saints have returned from abroad to work on the project.

The employment boom, together with the influx of 340 Basil Read expats to the island, has resulted in increased spending and economic optimism. Currently 47 private premises are leased to Basil Read to meet expatriate demands and many local St Helena businesses have been used on the project.

Another positive consequence of the project is that construction equipment, previously unavailable on the island, can be used for additional infrastructure development on St Helena.

Basil Read are proud to be involved in providing greater access to the island, bringing St Helena closer to the outside world, unlocking significant economic potential and reducing the island's reliance on UK funding in the long term. ◀



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STATE-OF-THE-ART ROOF



When the time came for Amalgamated Beverage Industries (ABI) to refurbish the roof of its bottling plant in Devland, it looked for a business that has earned a reputation in the industry for its expertise in dealing with unusual roof designs.

Since the ABI plant had been built using a very specific 'origami style' roof, a contractor with both this specific proficiency and an extensive track record in the commercial and industrial maintenance sector was required.

with any older facility, the plant's roof was reaching the end of its natural lifespan, having become victim to corrosion, caused by the harsh vagaries of South African weather. The engineers who originally built it adopted an 'origami style' for the roof, which utilises very specifically folded steel that is designed to be self-supporting.

When it came time to replace the roof, says David Williams, managing member and technical sales director at R&D Contracting, retaining the origami style was not cost-effective. Although self-supporting, it utilises large volumes of steel. "We decided to base the design of the new roof on a previous project we had completed for ABI at its Wadeville Coca Cola canning plant," he says.

Williams explains that the project currently sees R&D removing around six tons of steel from the roof every week. This is being replaced by a far lighter zinc aluminium composite – known as zinc alum – that is just 0,55 mm thick. He states that on average, the company is installing between 12 and 18 metres of the new roofing per day.

The galvanised support beams are specially designed for the project, and are certified by engineers, prior to implementation, he adds. Williams also points out that R&D is using sisalation underneath the zinc alum roofing for the purposes of insulation. This is also far thinner than the previous insulation used, but thanks to a reflective coating on the outside, is just as effective at keeping the factory cool.

"The sisalation is a key innovation here, as it improves vastly on the old roof, which utilised sponge, fitted between double steel, for insulation purposes. Sponge works fine in a new roof, but as the roof ages, it becomes easier for this sponge to get wet. I can tell you that vast tracts of wet sponge add an enormous additional weight load onto the roof. Fortunately, this is all negated now by the far lighter zinc alum roofing and the sisalation we are using instead."

Intense preparation

Williams explains that the project is expected to take approximately 10 months from site set-up to conclusion. This, he adds, does not include the additional time required for preparation and fabrication prior to starting.



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Based on previous experiences with the organisation, ABI turned to R&D Contracting to solve its roofing challenges.

The ABI bottling plant in Devland is a world-class manufacturing site, which has been producing cool drinks for the South African market for decades. However, as

FROM TOP TO BOTTOM:

The origami steel roof, showing signs of serious corrosion.

Opal White polycarbonate sheeting, with sisalation visible underneath.

Zinc alum 0,55 mm roof sheeting.



The new zinc alum roof.

The preparation included ensuring that the zinc alum roof sheets were rolled to the correct size, that the supporting beams were properly prepared and certified, and that everything was delivered to the site on schedule.

“In addition, there were aspects like health checks and safety lectures for the workers, ensuring that all the necessary tools are available on site and making sure that the site manager has access to an office with Internet connectivity, so he can stay in touch with the head office, so any potential challenges can quickly be dealt with.”

“Another feature of this project is that R&D is focused on improving skills. This means that we will bring in three or four new employees to gain experience here, over the course of the entire project. By allowing them to learn on the job, they are able to gain valuable experience that will stand them in good stead as they continue their career,” says Williams.

This high level of preparation is vital, continues Williams, because ABI needed the plant to remain fully functional during the re-roofing project. The nature of the plant is such that it would not be cost effective to ABI to shut it down for any extended period, which is yet another reason why the company turned to R&D in the first place – the company has a reputation for being able to undertake projects like this without impacting on the work done within the facility.

He points out that the intense preparation beforehand has so far meant that the project has remained on track and, when the new roof is fully installed, it will be both safer and more ergonomically friendly than the one it has replaced, meaning it should provide effective protection from the elements for several decades at least.

Better light and more ergonomically sound

Johny Kruger, site manager at ABI Devland,

points out that the ergonomics of the new roof can be found in how effectively it improves the natural light coming into the plant.

“The old roof had been designed with raised segments, which in turn had glass fibre sheeting on the sides. This was supposed to allow light in, but it is very old technology and was probably not really ideal even when it was implemented – let alone when one considers how little light was coming in after decades of weathering,” he says.

Kruger indicates that in order to increase the natural light coming in, R&D utilised polycarbonate sheeting to allow sunlight into the building. He says that one in every five roofing sheets was made of this polycarbonate material, which diffuses the light and ensures that there are no bright pinpoints of light at certain times of the day. These, after all, can be blinding and thus create a safety hazard.

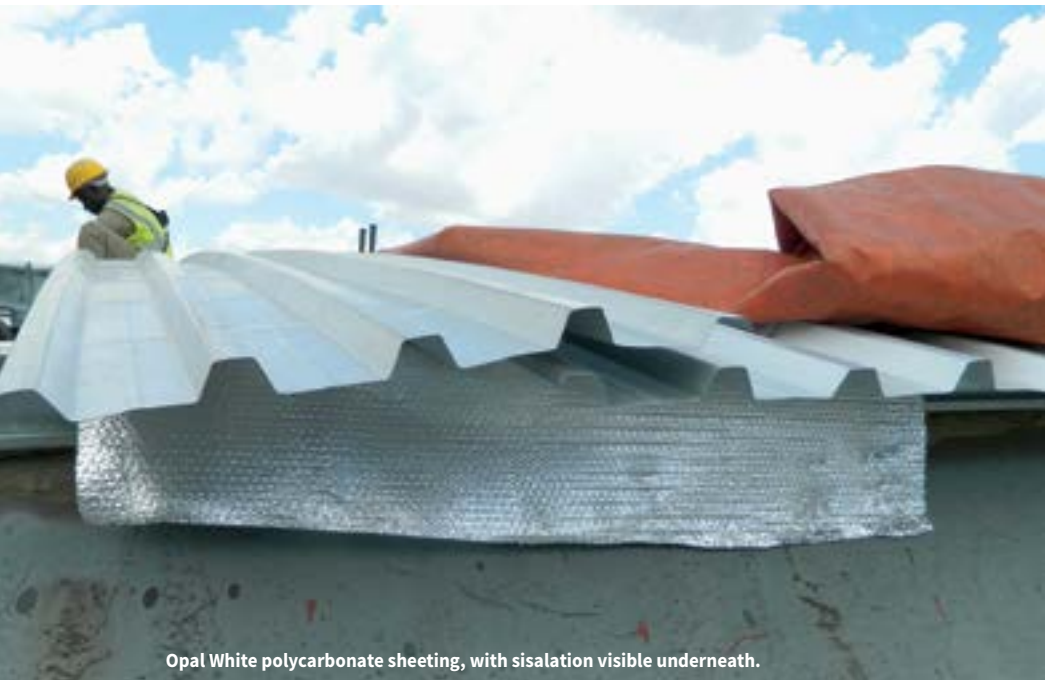
“We are utilising a colour known as Opal White, which offered the best diffusion of light when we tested different colour sheets. Even though only 20% of the roof is composed of these sheets, we expect it to increase the amount of available light entering the building from under 400 lux to upwards of 1 300 lux.”

This, continues Kruger, not only improves working conditions within the plant, but also reduces ABI’s electricity costs. In fact, he says, R&D estimates that within a decade years, the electricity savings alone will enable ABI to recoup the cost of the entire roofing project.

“Safety laws around lighting inside a plant of this nature are quite strict and as I understand it, the minimum lux that is acceptable is around 500 lux. With the new roof, the plant achieves over 1 000 lux, even



Inside view of the zinc alum and polycarbonate roof panels. Natural light comparison – the new roof (left) versus the old one (right).



Opal White polycarbonate sheeting, with sisalation visible underneath.



Workers busy on the roof. The safety netting can clearly be seen.

“Sisalation is a key innovation here, as it improves vastly on the old roof, which utilised sponge for insulation purposes. Vast tracts of wet sponge add an enormous additional weight load onto the roof. This is negated by the far lighter zinc alum roofing and the sisalation we are using instead.”

undergone their first medical check-up, this is used as a baseline against which all subsequent tests can be measured and compared, in order to check for deviations from the norm.

“As for our employees on site at ABI, the company also takes it upon itself to conduct regular ‘toolbox talks’ with employees. These meetings revolve around site-specific SHE issues and involve basic explanations of what to do and what not to do,” says Williams.

Furthermore, he indicates that R&D also conducts a site-specific risk assessment every week at the facility. Workers operating on the roof are also fitted with redundant safety lines – in fact everything up there is double secured – to ensure that risk is minimised, both for R&D’s workers and the ABI employees inside the plant.

“It is particularly important from an ABI perspective to know that its plant can continue functioning normally and ensure that the integrity of its bottling lines is not compromised, even as R&D goes about replacing the roofing. To this end, safety nets that can hold up to 400 kg per square metre are placed underneath the working environment. These provide additional protection for our staff – should they accidentally slip and fall – and also added protection for employees in the factory from any accidents occurring that involve large items of equipment. This net is an additional safety measure, above and beyond the double-securing that is undertaken on all our equipment.”

“It is always satisfying to be involved in a project of this nature. Not only are we able to radically improve ergonomic conditions within the plant, we are able to bring our technical skills and expertise to bear in a way that will provide ABI with a new roof that will withstand the elements for decades to come. Furthermore, a project like this enables R&D to further hone both its skills set and its development of better roofing techniques. At the end of the day, R&D Contracting is a solutions-oriented company and we are always eager to find new and better ways to do things,” concludes Williams. <

☛ on cloudy days – and this is from natural light alone, it doesn’t take into account the electrical lighting that is also present.”

The other important benefit of this sheeting is that it improves the ergonomics within the plant as well. For example, says Kruger, better lighting helps to keep employees more awake and thus less likely to make errors; it reduces eye strain; and it generally improves the working conditions for employees. This has additional tangible benefits, since happier employees are more productive employees.

“In addition, we will also be installing extractor fans in the roof, which will help to remove fumes from the from the exhausts of the ever-present forklifts. This will also help to improve the general well-being of employees in the plant and the

overall working environment,” states Kruger.

Safety is critical

According to Williams, the company has approximately 15 staff on site at any given time, which makes the issue of safety, health and environment (SHE) a critical one.

“SHE is very important to R&D and ABI, and is a vital component of a project of this nature. Quite aside from the obviously crucial safety measures taken while working on the roof itself, we also take the health and welfare of employees a step further. There are regular medical check-ups scheduled for all our employees. These focus specifically on hearing, eyesight and respiratory-related matters.

He adds that after each employee has

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Werner Venter, contracts engineer from the DMV/AECOM JV.



Edgar Dube, project manager from SANRAL.

CHALLENGING ASPECTS

of N5 rehabilitation

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The detail design for the rehabilitation and re-alignment of the road, including upgrades on 11 culverts, one river bridge and one road-over rail bridge, as well as the new in-situ culvert with a fill height of 9,7 m and wall thickness of 700 mm and the new Elands River bridge was done by the SANRAL appointed AECOM/DMV Baeletsi joint venture.

The construction works were scheduled to start in November 2012, but were delayed by environmental issues until April 2013. The construction time allowed for completion of the project is 30 months. Currently, after 24 months into the project, work is well underway and the initial backlog is slowly but surely diminishing every month.

Construction challenges

The road rehabilitation specification has an embargo on the use of stop/go systems. The challenge, therefore, is to keep the traffic flowing in both directions while the opposite side of the road is being constructed. The available road widths at certain places were such that the traffic had to be accommodated on freshly built bypasses in the middle of the rainy season.

This, at times, led to crisis management solutions to enable the free-flow of traffic. A rapid increase in heavy vehicles contributed to the traffic accommodation challenge on this project. The speed limit was reduced to 60 km/h at work zones assisted by the placing of removable speed humps. The absolute minimum road width to use

was found to be 3,3 m and a working space of 1,6 m was required for the adjacent construction activities, road signs and flag people.

There were, however, instances along the route where the road had to be constructed in third-width sections. Fortunately these were only applicable for about 8 km of the road. Traffic in these sections were separated during phase two to run both sides of the work zone, a situation which required extra care and effort from the contractor's personnel.

Another aspect that had to be introduced was the construction of temporary seals during the winter period to allow for the traffic to be transferred to the newly rehabilitated road, as existing old road sections were deteriorating very quickly and became unsafe and uneconomical to repair.

Winter seals have been an aspect of investigation and research by SANRAL and other entities like the bitumen manufacturers and consultant/contractor companies to try and overcome the big loss in production during the embargo period for sealwork in South Africa (May to September). On the basis of these research findings, temporary sealwork was allowed with the use of a specified bitumen emulsion [SC E1(t)] with 9,5 mm pre-coated stone, covered by a well designed slurry mix. Using this design the safe flow of the traffic as well as the construction production could be successfully maintained.

The cuttings in the new alignment section were done by blasting up to the required levels. Traffic along the N5 was

re-routed through QwaQwa and for the remaining traffic on the N5 the time lost due to waiting for the blasting and clearance of debris was never more than one hour.

Some sub-surface drainage challenges were encountered between km 20 and 25. After an on-site investigation, it was found that due to the high water table in this area, several natural springs existed in the road prism. This problem was solved using a herringbone system of sub-soil drains.

The Elands River tributary culvert was done in 11 stages. The floor of the culvert was completed in total to allow for the collapsible internal shutter to be pushed along rails to the adjacent section. The shutter was then erected again only once the previous section had been cured.

A total of 120 cub.m of concrete was cast for the walls and deck of each of the 11 sections. Proper care had to be taken with the fill adjacent and on top of the culvert. The final fill reached a height of 9,7 m above the top of the deck of the culvert. This implies a static load of 20 ton/m² of the culvert deck slab. The total static weight of material on the deck slab range in the order of 17 600 t.

The new main Elands River Bridge has five spans, each consisting of 10 precast concrete beams. These beams are covered by an in-situ deck slab of 250 mm, with permanent precast shutters between all beams. The two abutments are supported by 4 piles each, which on average have been founded to a depth of 19 m, while piers 1 and 4 each have five piles in the order of 9 m deep. Piers

PROJECT TEAM

- Client: SANRAL
- Consultant: AECOM/DMV Baeletsi JV
- Contractor: Raubex Construction



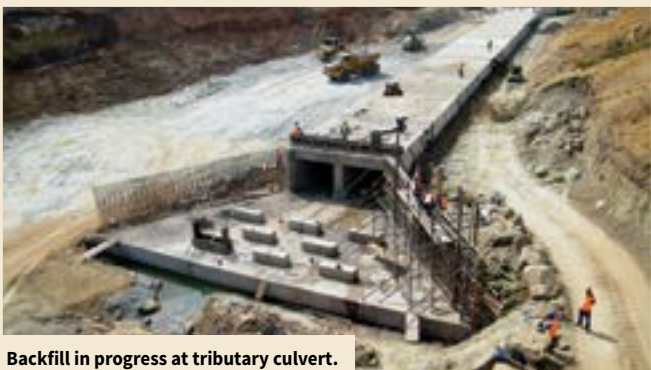
MAIN, LEFT: Base construction in progress & RIGHT: Sub-base stabilisation in progress.



Deck slab reinforcing in progress.



Deck slab reinforcing in progress.



Backfill in progress at tributary culvert.



Fill completed over tributary culvert area.

2 and 3, either side of the river, were founded on insitu rock.

One interesting fact about the beams is that no curvature or pre-stressing was designed for, but rather reinforcing steel in tension and compression. The lifting of the beams was approached with some apprehension by the contractor, but no sagging or positioning problems were encountered.

Some challenges were encountered with the quality assurance testing on the piles. One instance was discovered where an anomaly was found on the outside of the pile. This problem was not initially identified

by the cross-hole sonic logging test between two opposite tubes, which are situated inside the rebar cage. This anomaly was discovered when the pile was opened up prior to the construction of the pile cap.

Conclusion

This project is one of the first of this magnitude whereby no stop/gos were allowed, unless where existing structures prohibits the adding of road width to sustain two way traffic.

The design and construction supervision by the joint venture of AECOM/DMV

Baeletsi (the latter company has offices in Harrismith) submitted a comprehensive design and supervision strategy and have an equal number of personnel on site during the supervision phase. The site supervision team has also been assisted by a learner liaison officer seconded to the project by SANRAL as well as four students in training.

The project engineer during the design phase was Gert Fourie of AECOM, while Werner Venter of DMV Baeletsi is the project engineer for the construction phase of the project. The project should be completed by August 2015. ◀

STEEP SLOPE UPGRADES

Situated in the picturesque Valley of a Thousand Hills in KwaZulu-Natal is the community of KwaNyuswa. As its Zulu name suggests, the region is dominated by some extremely steep roads, which have deteriorated over the years.

It was here that Kaytech's innovative Multi-Cell saved the day for engineers tasked with the challenge of rehabilitating these roads. Kaytech would like to congratulate the KwaZulu-Natal Department of Transport on winning the Community Based Projects section for this KwaNyuswa project at the South African Institution of Civil Engineering (SAICE) awards, held recently in Durban.

The main access road to KwaNyuswa, off the R103, is 'black top' but the rest are gravel roads. Due to a combination of a lack of maintenance, steep gradients with poor drainage and heavy rainfall, the gravel surface had been completely removed, exposing the in-situ, loose and slippery residual decomposed granite. Access was very difficult for private vehicles, buses, taxis and pedestrians, which make up the bulk of the traffic within the local community.

The KwaZulu-Natal Department of Transport (DOT) determined that asphaltting of these severely damaged sections of road would be impossible, due to the steep gradients and the prohibitive costs involved. It was therefore decided to carry out the design for an upgraded surface for the extremely steep section of District Road 1506 (D1506) as a pilot project for other similar roads and Kaytech's Multi-Cell 100mm was specified. In certain sections along the resurfaced

1,6 km road, guardrails had to be installed due to the steep gradients and sharp corners. The 100 mm thick Multi-Cell was specified for this road as it is traversed mainly by small vehicles and pedestrians, although thicker cells are available for heavier traffic loading.

Cost-effective Multi-Cell is used as an in-situ shuttering to cast interlocking concrete paving and is particularly suitable for use on steep gradients. It is manufactured by Kaytech from coated woven slit film tape strips stitched together to form a honeycomb structure of three-dimensional square cells. For this particular project, the cells were filled with ready-mix concrete, although for a vegetated embankment, the cells may be filled with topsoil.

With the help of local labour who were trained on-site by a foreman, Phambili Construction installed 9 000 m² of Multi-Cell 100 mm. This was not the first Multi-Cell project undertaken by the contractor and he already had at his disposal steel frames, similar to the patented Tension Frames which Kaytech make available to contractors to ensure that they are laid to the correct line and level. On occasions, the ready-mix concrete was manufactured a little too wet, resulting in slight ridges being formed at the lower end of each cell on the steeper sections. This was not a problem however, since it significantly improved traction and skid resistance. On a few of the panels, livestock left behind their footprints, which merely added interest to the texture.

All in all, a highly successful project with many benefits that included significant savings to the Department of Transport and creating much needed work opportunities for some of the unemployed local community. Multi-cell roads are all-weather roads, easily maintained and serviceable for many years, which will help the local inhabitants to take pride in their area. As the breath-taking Valley of a Thousand Hills is profuse with other communities like KwaNyuswa, it is highly probable that Multi-Cell will come to the rescue of similar road projects.





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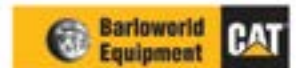
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DATA CENTRES

– the world's greatest energy guzzlers

Data centres have for years been known to be excessive consumers of power, consuming up to 3% of all global electricity production, and roughly 10 times more per square metre than the average office. Previously, energy efficiency wouldn't necessarily be at the top of an information technology (IT) organisation's priority list, but rising power costs, and an ongoing need for more hardware and equipment as well as booming data consumption is changing the way data centre operators are planning and running their facilities.



> This interview with Peter Greaves – Aurecon's expertise leader, data & ICT Facilities, explores why data centres consume so much energy; how design principles can help minimise a data centre's energy needs; dealing with load-shedding; and possible future trends that may help reduce energy consumption.

As the uptake of data centres increases globally, there are rising concerns around the availability of electricity to support this trend. Why do data centres consume so much energy?

Data centres are complex environments that have been created to house IT equipment. Within these, the primary driver of energy consumption is the IT equipment itself. The IT equipment that supports a data centre includes communication systems, storage systems and other IT systems such as processors, server power supplies, network infrastructure and hardware, computers, Uninterrupted Power Supply and connectivity systems.

Most of the energy that is consumed within a data centre needs to pass through various stages of distribution before it can be used by IT systems. This energy is converted to heat, which is why these facilities require a significant amount of cooling.

As server densities continue to rise, cooling systems are under increased pressure in order to keep IT equipment and servers cool enough for them to operate efficiently. If temperatures or the humidity is too high, IT equipment can be damaged and tape media errors can occur.

There are a number of opportunities available that can help IT organisations and data centre developers optimise their energy consumption. What do these include?

Examples of these opportunities are the virtualisation and the use of ARM-based processors, which are designed to perform a smaller number of types of computer instructions so that they can operate at a higher speed. This provides outstanding performance at a fraction of the power. The technological development of both these options is making them a viable solution, but they are still outside of the remit of most data centre developers.

Good practical management of data centre space is still a suitable, basic way of reducing energy consumption. Making use of aisle containment systems, installing blanking panels into unused rack

slots and providing brushed grommets into raised floor penetrations are all simple, yet effective energy saving methods that can be implemented but they are still forgotten in many smaller facilities.

Implementing aggressive power usage effectiveness (PUE) targets will also drive more energy saving initiatives and improvements within data centres. New facilities will find it easier to implement PUE targets as high efficiency equipment can be selected to reduce parasitic load requirements.

Cooling systems in data centres seem to be the largest power guzzler. Do you believe that more data centres could be using natural cooling and night cooling opportunities to save energy?

Free cooling opportunities are possible in many locations, including in South Africa, especially if the air temperature that is supplied is in line with the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) guidelines (18 °C-27 °C).

With supply air temperatures of up to 27 °C, we need outside air temperatures at 25 °C or less in order to get significant benefits from free cooling. Data centre managers then need to decide whether they are going to use direct or indirect free-cooling. I tend to prefer indirect free-cooling via a heat wheel or heat exchanger as outside air contaminants or humidity levels do not restrict the use of free-cooling.

There's definitely more opportunities to use this type of indirect free-cooling in certain areas of South Africa, particularly where the temperature falls below 19 °C and the humidity is below 60 RH (relative humidity) for more than 2 500 hours per year.

Is running a data centre at a higher ambient temperature (than has been the norm to date) a practical option to reduce energy consumption that is needed for cooling?

Operators are still concerned about the efficiency of their data centres when they walk into a hot aisle. This perception, however, is gradually changing and people are becoming used to the idea that a hot aisle isn't necessarily a problem.

Warmer data centres do pose a health and safety concern because anyone working in elevated temperatures cannot work for extended periods. Health and safety in warmer data centres can be managed by limiting the need to access the hot aisle, either through use of specific chimney type racks, or arranging all connections and operator works to be located in the cold aisle.

Fast facts

- Data centres consume up to 3% of all global energy production
- There are several options to save energy in data centres: virtualisation, ARM based processors, good practical management of facilities and implementing power usage effectiveness (PUE) targets
- Cooling systems in data centres are large power guzzlers. Free cooling opportunities exist in many locations
- Data centre managers need to decide whether they are going to use direct or indirect free-cooling
- Load shedding will drive a greater level of reliance on backup generator systems. Data centre operators will need to manage fuel demands of generators
- Key processing tasks can be scheduled to take place after peak hours to save energy
- While solar energy could supply data centres with energy, it would need to be ramped up to be usable by Uninterrupted Power Supply systems
- Future trends in data centre design and development include integrating cost-effective, sustainable energy solutions



Elevated temperatures need some form of aisle containment in order to achieve optimal efficiency and this can cause problems for code compliances. Installing a sprinkler and gas suppression system can be problematic because enclosed aisles can create an extra layer of infrastructure with the associated costs.

How will load shedding – if it is implemented on an ongoing basis – affect data centres?

Load shedding will drive a greater level of reliance on the backup generator systems that are installed in data centres.

Facility operators will need to carefully manage fuel delivery protocols and facilities that have better supply chain management systems will run less risk once fuel demand ramps up. On-site fuel quantities will be a key asset with longer storage requirements becoming commonplace to deal with any local disruptions.

If load shedding is generally implemented, facilities with cogeneration energy systems will become more viable as they will be able to reduce their cost base substantially in comparison to operators that are running exclusively on diesel supplies.

Older facilities that have standby rated generator systems will need to consider downgrading their generator capacity as they will effectively be running in prime or continuous operational modes, favouring facilities rated to the Uptime Institute (a standardised methodology used by data centres as a way to measure their performance and return on investment) as they will have been designed to cater for this requirement.

Continued on page 35 ➔



Peter Greaves – Aurecon's expertise leader, data & ICT Facilities.



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14 km SECTION of the WESTERN AQUEDUCT commissioned

A 14 km stretch of pipeline from Inchanga Station to Ashley Drive in Kloof, which makes up the first two contracts of the R1,8-billion second phase of the Western Aqueduct, is currently being commissioned and tested and should be fully operational by mid-year.

Head of eThekweni Water and Sanitation (EWS), Ednick Msweli, said recently that the city's biggest ever bulk water pipeline project was proceeding in accordance with the project plan. He said he was confident that all of the contracts that make up the full 39 km second phase of the pipeline as well as its branch pipelines would be completed on time.

The soon-to-be-completed portion of the pipeline comprises two

7 km segments and are being completed by Cycad Pipelines and WK SA Construction respectively.

The largest segment of the Western Aqueduct, which is being constructed by Esor Construction, measures 25 km and stretches from the Ashley Drive break pressure tank to the NR5 Reservoir at Ntuzuma. It is scheduled to be complete and fully operational with all construction and road reinstatement finalised by mid-2017.

As this contract gathers momentum, extensive work is scheduled to begin shortly along the railway line servitude from Alverston to Kloof Station.

"Because construction will take place along the servitude, the impact will be peripheral and won't affect traffic unduly," said Martin Bright, project manager for the Western Aqueduct.

He added that work on the Ashley Drive break pressure tank was progressing well. On completion during the third quarter of 2015, it is expected to hold 20 mega litres of water.

EWS wished to thank residents along the pipeline route for their patience and understanding during construction and apologised for major disruptions to Cadmore and Lello Roads in Kloof and added that the extensive Cadmore Road upgrade was expected to be complete by the middle of this year.

Bright explained that, because Durban's new Bus Rapid Transport (BRT) system was under construction, it had been decided to escalate work on the 1 km long segment of the Western Aqueduct where the BRT is expected to run in order to minimise disruptions and ensure that restricted access to businesses was minimised wherever possible.

EWS appeals to the public to bear with them, as it tackled construction along this densely populated and complicated route that experiences high volumes of traffic.

Construction began in January and will be finished by the third quarter. Contracts for two further sections of the Western Aqueduct – the Wyebank Break Pressure tank and the pipeline that will link the Western Aqueduct to Mt. Moriah – are expected to be awarded during the third quarter of 2015. These will run for 15 months.

The main truck pipeline running from Inchanga to Ntuzuma is under construction and, in April 2015, the Kloof line along Haygarth Road, running under the N3 to Tshelimnyama will begin.

All branch pipelines are expected to be completed by the third quarter of 2017.

Msweli said that EWS was extremely proud of the progress made on the second phase of the Western Aqueduct. He pointed out that the eThekweni Municipality had recognised a need to be proactive and put in place critical infrastructure that would have a major impact on the future of one of South Africa's most rapidly growing cities.

The first phase of the Western Aqueduct, which measures 20km and stretches from the Umlaas Road Reservoir to Inchanga was commissioned at the end of 2012.

Combined, these two phases of the Western Aqueduct are intended to both replace and augment existing infrastructure that brings water into Durban from the Midmar and recently constructed Springrove Dams.

The Western Aqueduct is expected to significantly strengthen the capacity of bulk water supply and meet the needs of the greater eThekweni region for the next 30 years.

The Western Aqueduct project has been designed and is being monitored by the Knight Piésold/Naidu Consulting/Royal HaskoningDHV Joint Venture. <

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The Ashley Drive break pressure tank is under construction, when complete it will hold 20 mega litres of water.





As data centres are largely run off UPSs, to what extent could solar power be used to keep the UPSs charged?

A lot of solar panels would be needed to reduce the amount of electricity from the grid that most data centres would need. The most likely application is to reduce the demand on the grid by a percentage.

Although solar energy could supply a data centre with energy, it would need to be ramped up to be usable by the UPS. At this time, I would be very hesitant to suggest that this is a potential solution due to the inherent unreliability of solar energy.

Big operators like Google, however, are making use of solar energy by establishing solar generation plants that offset their data centre usage on the grid. The use of small

panel arrays coupled with battery storage could be used to reduce the parasitic loads on site that are non-critical such as fuel polishing, engine heaters, office air conditioning and lighting.

How do you think data centre design and development in South Africa will change in the future?

Data centres in South Africa are in the early, exciting stages of development. As such, owners and operators are in an advantageous position to integrate sustainable, and, importantly, cost-effective energy solutions such as wind energy to significantly drive energy costs down.

If we look at what big operators are achieving overseas, then we are in the ideal

position to start designing and developing more sustainable facilities. For example, Google's data centre in Hamina, Finland, is aiming to reach its goal of becoming carbon neutral and it recently signed a deal with a wind farm operator in Sweden to power its Finnish facility with wind turbines.

Companies like Google are always looking for a competitive edge. They are looking for smarter solutions in their engineering for a variety of things including data centres, corporate headquarters and research and development facilities. Wind investment is just another competitive solution, but there are many more.

As South African data centres continue to develop, I predict that a growing number of operators will be more willing to tackle sustainability challenges head-on and incorporate more progressive solutions into their data centre designs and development. ◀

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Chronolia™ ready mixed concrete is another technological breakthrough from the Lafarge Group, a world leader in building materials. It is the fruit of five years of extremely advanced research in nanotechnologies, focused on understanding the clear need from customers to control their construction schedules and to be able to work as rapidly as possible.



Saving time for contractors: the innovative Lafarge Chronolia™ concrete has been achieving considerable success internationally and is increasingly in demand in South Africa.

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Chronolia™ has already achieved considerable success on various construction projects in the USA, Canada, Europe and, more recently, South Africa. The local presence of the Group, Lafarge South Africa, and established leader in readymix innovation, recently introduced Chronolia™ technology to the local construction market.

As its name suggests, Chronolia™ is about time: about saving a remarkable amount of time for contractors. The product's ability to quickly develop high strength means that formwork can be removed considerably faster than for standard concrete, allowing twice as many daily formwork cycles.

Chronolia™ is an example of Lafarge's commitment to use its unparalleled technical strength to contribute products and

solutions for *Building better cities*: cities that are more compact, have more housing, are more durable and better connected, while being more beautiful and desirable places for everyone to live in.

"We believe that the performance of our concrete should add value to a customer's contract, rather than the traditional situation of their work schedule being limited by a concrete's characteristics," says Lafarge South Africa's Dave Miles, national performance and technical manager – readymix.

"There was a need to have a concrete that could be transported and handled in the same way as conventional readymix but, once placed, would enable the formwork to be removed when it optimally suited the customer's programme: this normally means far quicker than with a normal concrete mix. In Chronolia™, Lafarge has developed the solution to these seemingly contradictory requirements and we are adapting it to our climate and regionally available concrete materials. Trials have shown that, with certain grades of Chronolia™, formwork can be removed in as little as two hours after casting has been completed."


The versatility of Chronolia™ allows a new approach to work scheduling. Whereas it takes between 12 and 20 hours from batching before formwork can be removed using conventional concrete for general applications, the range of Chronolia™ grades guarantees concrete performance at the required early age. The range of grades embraces 4 hours, 6 hours and 15 hours after batching, as well as 24 hours or 48 hours for higher strength applications. Chronolia™ has the same workability as conventional

readymixed concrete and can be used on all construction site applications.

The formulation of the grades gives 2 hours of slump retention followed by the selected rapid strength gain. For example, the 4-hour grade gives a minimum compressive strength of 1 MPa, 4 hours after batching, while the 15-hour grade achieves a minimum compressive strength of 15 MPa, 15 hours after batching. The 48-hour grade guarantees a minimum compressive strength of 25 MPa, 48 hours after batching.

"As with any concrete, the performance characteristics are influenced by the quality of the available local concrete constituents and the prevailing weather conditions," comments Sivuyile Ngobazana, national product manager of Lafarge South Africa's Readymix business line. "The rapid setting time of Chronolia™ combined with exceptionally high early strength, backed by the Lafarge South Africa guarantee, makes it an ideal solution for repairing road surfaces and civil engineering structures, enabling them to be brought back into service with minimal disruption to users."

The key advantage of Chronolia™ is that it allows much more flexibility in construction planning because the schedule is no longer governed by the formwork. Its use can double the daily rotation of formwork for walls, precast elements, columns and beams, while accelerating the loading of load-bearing concrete elements. It enables a fresh approach to the traditional organisation of a building site to achieve a more efficient work flow.

"We appreciate that in today's competitive construction market, saving time can be a profit or loss decider. By factoring in the potential for cost saving in time and equipment offered by Chronolia™, our customers' tendering becomes more competitive," adds Ngobazana. "Chronolia™ has aroused tremendous interest in the market and is set to further enhance Lafarge Readymix's reputation as innovators and the leading readymix concrete solution provider." 

PREDICTIVE PRODUCTION SOFTWARE


In partnership with energy service company HVAC, South Africa's leading cement manufacturer, PPC has been doing its part to take the stresses off the national energy grid through predictive production software.

HVAC, in line with Eskom, has been providing technology to sites, such as PPC's Hercules plant in Pretoria that helps monitor electricity consumption and production levels, in order to plan production around peak times.

PPC Group energy manager, Egmont Ottermann says, "We have been working with HVAC since 2006, constantly trying to optimise the performance of our equipment so we can minimise electrical costs. Essentially, this software

helps us monitor factory production and silo levels to ensure stock levels are high enough for us to switch off a unit during peak times."

This energy saving initiative has already been rolled out to five PPC plants, including Hercules, and plugs directly into PPC's control systems. According to Ottermann, the Hercules plant alone, can consume up to 10 megawatts depending on which equipment is being used.

Continued on page 39 

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SLABS and cell phone technology connect

The 21st century has seen South African construction professionals making increasing use of precast hollow-core slabs for the construction of multi-storey buildings and for the extension of existing structures.

The MTN Data Centre, Phase II, which necessitated the addition of a second floor to MTN's Data Centre in Louwlandia Centurion using Echo prestressed slabs, is an example of the latter.

Completed in February 2012, Phase I comprised a $\pm 3\,000\text{ m}^2$ single-storey structure which was roofed with Echo prestressed slabs. Phase II, begun in January 2014, entails the construction of a second storey which is being built on the prestressed slab roof of Phase I. Once again prestressed hollow-core slabs, in this instance covering an area $\pm 2\,600\text{ m}^2$, was used for the roofing.

The main contractor on both phases was Grinaker-LTA while DSM Consulting Engineers was the engineering consultancy on the second phase.

Morten Jerg, contracts director of Grinaker-LTA, says that the benefit of using precast slabs as opposed to in-situ concrete is that it speeds up construction times and causes minimal disruption.

"We have used Echo slabs on many occasions. They enable us to do away with formwork and propping, not to mention long curing times, and in some instances, having to pour concrete in wet weather. We also like their smooth soffits."

The prestressed roof slabs used on both phases were 250 mm deep and varied between spans of 2,2 m and 11,5 m. They were designed to carry live loads of 10 kN/m^2 and dead loads of $2,5\text{ kN/m}^2$ and were mounted on precast inverted T-Beams measuring 420 mm deep and 630 mm wide. The design and manufacture of the beams were outsourced by Echo. Andreas Rehwinkel of ENCON did the design and Civilcon handled the manufacturing.

The beams and the slabs were installed by Echo using 80 and 200 ton cranes. The former were placed on 6,5 m high reinforced cast-in-situ concrete columns. Most of the columns were cast with additional rebar which protrudes $\pm 1,5\text{ m}$ through the Echo's prestressed slab roof. These may be used at

a later stage as stub columns for supporting solar panels or other plant on a suspended steel grid.

After all the slabs had been placed, a lightweight politerm screed-to-falls, ranging between 75-400 mm, was installed. It was covered by a second 40 mm screed to take a dual layer of water proofing. Once the new roof was semi-sealed, Grinaker-LTA was able to remove the screed on the roof of Phase I.

DSM consulting engineer, Mike Silberman, commented that the new roof had been designed in close collaboration with Echo Group engineer, Daniel Petrov, who he said was extremely helpful in ensuring the success of the project.

"Due to the amount of services and penetrations through the new roof, an in-situ concrete slab had been investigated as an alternative to the prestressed slab solution.

"However, the amount of propping required for an in-situ slab and the high loading on the existing slab precluded this choice and this is why we opted for prestressed concrete slabs," says Silberman.

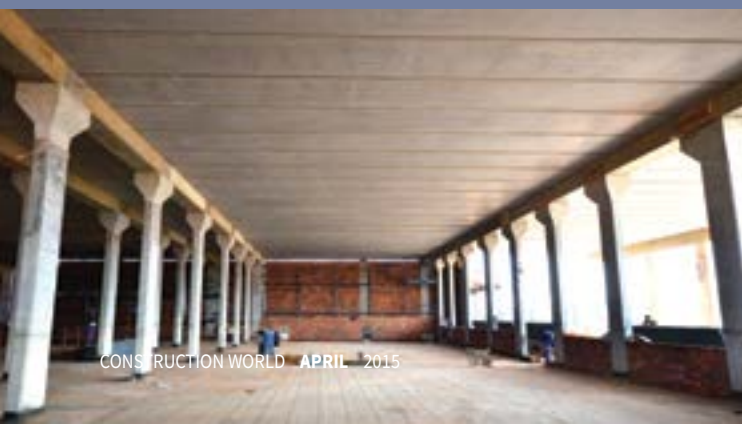
Echo Group marketing director, Melinda Esterhuizen, says precast hollow-core slabs are to the construction industry what cell phones are to modern communications – fast, flexible, multi-functional and cost-effective. <



ABOVE: Echo's prestressed slabs are supported by concrete columns and precast beams. BELOW: Some of the installed Echo prestressed slabs of Phase II of the MTN data centre switch roof project.



ABOVE: A workman finishes off one of the column/beam joints at MNT's data centre. BELOW: Phase II of MTN's Centurion data centre takes shape using Echo prestressed slabs.



PENALTIES FOR POOR CURING

The South African building and civil engineering industries have for years not employed correct or adequate methods of curing concrete – sacrificing strength, permeability and durability in the process, says Bryan Perrie, managing director of The Concrete Institute.

➤ Perrie says the fact that curing is important is well-known in the construction sector, yet current curing practice still remains generally inadequate. "Perhaps the time has come to consider introducing penalties for incorrect curing to change the apathy that prevails in the building and civil engineering sectors," he suggests.

"Correct curing means maintenance of adequate moisture and temperature conditions to encourage cement hydration. This is of fundamental importance in the development of the physical properties of concrete necessary to ensure its performance in service. Properties such as strength and durability, as well as permeability, depend on the extent and quality of curing of concrete during the first few days after casting. Curing, in fact, is the final – and vital – step in the production of good quality concrete," Perrie states.

He says some of the major factors that contribute to the poor state of curing in South Africa, include:

- National specifications and codes of practice contain only vague stipulations regarding the curing methods required for the different applications of

concrete in various environments;

- Project specifications do not clearly state the specific curing action required for concrete on a given project;
- The cost of curing is not billed separately in most tender documents;
- Insufficient support at all personnel levels for training and education, such as offered by The Concrete Institute's School of Concrete Technology, exacerbates the situation. "This training is vital for all employees involved in the design, construction, and management of concrete projects," Perrie stresses;
- The misconception that cube compressive strength sufficiently indicates the durability of concrete in a structure; and
- The increasing emphasis on 'fast track' construction methods in which concrete is enclosed in shutters for very short periods of time, followed by exposure to drying conditions.

Perrie says the need to develop a more "responsible" approach to concrete curing cannot be over-emphasised. "A pro-active approach is essential to address the present lack of education and control of concrete curing, particularly in the South African environment with its excessive heat, dry climates, considerable



Incorrect curing methods still prevail in the South African construction industry, says The Concrete Institute.

wind speeds, all of which lead to a rapid loss of moisture from freshly cast concrete, often resulting in plastic cracking on the exposed concrete surfaces."

He also believes that curing should be listed as separate cost in the Bill of Quantities or be listed as a fixed, prime cost in the tender documents, with penalties imposed for inadequate curing. "It is also necessary for national Codes of Practice and specifications to provide more details and guidance on concrete curing," Perrie adds. ❏

SHAKING UP THE CRACK FILLING

RhinoLite EasyFill™ Crack Filler is an easy to use all purpose interior crack filler that offers trade professionals a crack filler packaged in a revolutionary resealable 500 g pack. Further the pack is sealed using the innovative RhinoLite EasyFill™ Multi-tool that comes free with the purchase of every pack.

➤ The RhinoLite EasyFill™ Multi-tool not only reseals an opened pack of crack filler, but is also used to scoop the product out of the pack with an exact measure for the ideal 3 to 1 product to water mix ratio. Turn the tool and use the scrape tool to apply the product onto the wall and then turn it again and sand the product once dry to a smooth finish with the handy sanding tool. Once the job is complete, use the handy Multi-tool to seal the pack to prevent any spilling or waste until you next need to use RhinoLite EasyFill™ Crack Filler.

RhinoLite EasyFill™ Crack Filler, brought to you by Saint-Gobain Gyproc on the back of the success of their leading wall rendering brand "RhinoLite", offers a quick, easy and effective way to renovate any indoor cracks and blemishes, providing a smooth, high-quality finish. The product formula is designed to remain pliable for a time prior to hardening. Once dry, RhinoLite EasyFill™ can be painted with any high quality water-based or enamel paint and blends in seamlessly with the existing room finish.

The complimentary RhinoLite EasyFill™

multi-tool designed in South Africa from Saint-Gobain Gyproc means that the application of the product requires no additional tools and offers consumers a range of no mess, no waste, no fuss benefits. The tool measure offers the perfect mix ratio of product to water, giving an ideal product consistency for best results with every application, every time. ❏



➤ Ottermann believes this project has been resoundingly successful and has saved PPC a lot of money.

"Load shifting is an important part of reducing the likelihood of load shedding and, although each single contribution seems as if it is just a drop in the ocean, everyone needs to do their part. I encourage everyone to participate and shift as much load as possible," implores Ottermann.

"By doing so, it is only going to make us all more resilient once we come out of this crisis. If this power crisis is going to last five years, then we all need to do as much as we possibly can to become as efficient as we can. This will help reduce the occurrences of load shedding tremendously because Eskom's systems are under immense strain in peak times. By cutting our peak time use, we can allow that electricity to be distributed elsewhere."

Being well versed in matters of energy consumption around the world, Egmont firmly believes that industry in South Africa is actually on the leading edge of the energy fight – more out of necessity than anything else. ❏



VITAL ROLE

in Durban interchange upgrade

The massive R352-million Umgeni interchange upgrade currently in progress along one of Durban's arterial routes will be a feat of engineering skill when completed. Sika was proud to supply a varied selection of their internationally renowned products for this multi-bridge construction project.

40

➤ Having successfully designed the bridges for the Gillooly's Interchange in Gauteng, one of the busiest interchanges in the southern hemisphere, consulting engineers, Hatch Goba were commissioned by SANRAL in 2009 to design an upgrade for the old split-diamond, signalised intersection between the N2 (National Road) and the M19. The new design was for a free-flow directional four-level systems interchange; involving the construction of five new bridges and two pedestrian bridges, with two incremental launch bridges as prominent features. The project was awarded to main contractors Rumdel Cape and Mascon.

As both highways comprise major traffic

routes, the emphasis on this project was to keep traffic disruption to an absolute minimum. Additional challenges were space constraints caused by the nearby Umgeni River and the adjacent residential and commercial developments. The standard segmental method of bridge building for two directional ramps at the intersection was therefore scrapped in favour of the innovative method known as incremental launch. This method entails building the entire bridge deck from one end of the structure and eliminating the need for formwork, thereby allowing traffic flow to continue uninterrupted.

The incremental launch technology involves sliding sections of bridge deck over special bearings, which are concrete blocks covered with stainless steel and reinforced elastomeric pads. The first such bridge constructed was 232 m long, from Umgeni Road onto the N2 Northbound while the second one measured 205 m long from the N2 Northbound onto Umgeni Road.

Metier Mixed Concrete supplied shotcrete for rock stabilisation of the Umgeni on-ramp to the N2 Southbound. Two Sika products were added to the shotcrete:

SikaPlast V210, an aqueous polymer solution that is a multi-purpose water reducer and superplasticiser, and SikaTard-930, a retarding concrete admixture developed for the control of cement hydration. It can be used in wet or dry spray shotcrete where cement hydration of the concrete mix is prevented (for up to three days, if required).

Other Sika products supplied were: Sikadur-31 CF Normal was used on the base plates of the columns supporting the incremental launch to be used for the launch bridges. As a concrete curing compound, Sika Antisol-E was sprayed onto all bridge decks and columns to prevent premature water loss. Rugasol-2-Liquid was applied on all concrete pours to prevent cold joints and to allow a keyed surface for new concrete. Exposed rebars were protected by SikaTop-Armatec 110 EpoCem, an anti-corrosion coating and bonding agent that provides excellent adhesion to steel and concrete. Sika AnchorFix-3+ was used for bonding the rebars. SikaGrout-212 and Sika Rep LW were used for concrete repairs.

When construction on the R352-million project commenced in March 2011, three of the neighboring communities benefitted greatly as local labour was used to fill 150 newly created jobs. The Umgeni Interchange upgrade, which is nearing completion, will significantly alleviate traffic congestion by allowing the free flow of approximately 14 000 vehicles during morning peak hour and approximately 16 000 vehicles during afternoon peak hour.

By supplying numerous dependable, innovative products, Sika has played a vital role in this project. As one of the largest undertakings of its kind in South Africa, Hatch Goba believes it will set an international benchmark for any similar projects in the future. <



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OPTIMISING

cement and raw material production

Construction chemicals specialist Chryso Southern Africa offers a full range of cement additives to optimise cement or raw materials production at different stages of the cement manufacturing process, explains Trevor Smith, general manager: cement. Cement additives comprise grinding aids, activators and products combining technologies.

➤ Smith says that Chryso Southern Africa has developed grinding aids specifically for raw meal production as well as for the cement grinding process itself. The productivity of a raw mill can be increased by 6% to 12% by the use of such grinding aids. The raw meal is milled more consistently and to a finer particle size as a result. This improves the granulometry (the measurement of the size distribution in a collection of grains) and reduces the quantity of coarse silica which in turn results in improved and more consistent burnability of the raw meal.

Grinding aids

“Chryso® grinding aids can decrease agglomeration significantly, which is a major cause of grinding inefficiency,” Smith says. When clinker is ground into smaller particles by means of grinding balls, it generates electrostatic forces on the new surface areas, known as Van Der Waals forces of attraction, which hold the cement particles together. This process is referred to as agglomeration.

This phenomenon increases the energy consumption and carbon emissions as only 5% of the total energy spent in a ball mill is transformed into creating additional surface area, with 95% of the total energy dissipated through heat. Chryso® grinding aids can offset Van Der Waals forces as they are organic polar products producing the so-called Fehbinder Effect, whereby the grinding aid molecules absorb onto the surface of cement particles. They also assist in crack propagation of the largest particles.

Chryso® grinding aids form a mono-molecular film around the charged particles, thereby reducing or neutralising the electrostatic charge. As a result, separator return and blockages are reduced significantly, while cement fluidity also increases. Additional benefits include improved cement handling and particle size distribution. This reduces the energy consumption of the cement plant, leading to consistent quality and quantity of cement produced.

Products for vertical roller mills

“Chryso Southern Africa has also developed a range of products specifically for vertical roller mills to enhance stability, which leads to reduced vibration and improved output,” Smith adds. Traditional milling circuits comprise ball mills in close circuit with separators that classify the milled product to produce a cementitious product. However, vertical roller mills with internal classification and lower specific energy consumption are becoming increasingly common as cement producers seek to optimise their manufacturing process.

Chryso® activators on the other hand allow for increased use of supplementary cementitious materials (SCMs), which assists in reducing the percentage of clinker in the cement. Clinker production is the most energy-intensive part of the cement making process. Reducing clinker content decreases carbon emissions as well as the cost associated with carbon tax. The most common SCMs are slag, pozzolan, fly ash and limestone. Most Chryso® activators are designed to work with specific SCMs, contributing to significant savings associated with lower cement production costs

“We formulate these products with a combination of activators and grinding aids. The activators effectively react with the clinker material and/or SCMs to improve the hydration reaction of the cement in the concrete. This results in the formation of calcium silicate hydrates and other crystalline structures that give concrete its strength. Some activators provide for early strength enhancement, some for late strength enhancement, while some do both,” Smith says.

“We have a range of formulations that allows us to select a specific product for a customer’s application.” The process begins with understanding a customer’s cement manufacturing operation and the chemistry of his clinker and cement and what



A tanker loading cement. Chryso Southern Africa supplies its products to the mining, precast, readymix, construction and general industrial sectors.

he wants to achieve in terms of cement quality and performance. For example, does he want early or late strength? Does he want improved output, which will result in improved efficiency? Or does he require a special product for a specific application? Or a combination of all three?

“We have the capability to formulate products for a specific application. Initially we will look at our broad range and then make some suggestions and follow that up with a few laboratory and plant trials. In some cases, a customer might be importing clinker from different sources where he operates a grinding facility only. He really does not want to use a different product for each type, so we will look to supply him with a more robust, broader spectrum product to cover all his requirements.”

Chryso Southern Africa supplies its products to the mining, precast, readymix, construction and general industrial sectors. “We have the logistics and three manufacturing facilities to be able to export to most countries in Africa at present,” Smith says.

“We have also developed innovative stock management systems to ensure that our clients do not run out of product. Initially developed in South Africa, we have now rolled this out into a number of Africa export countries due to the long lead times.” Smith says Africa remains an important focus. “The growth and development on the continent is being led by a requirement for cement at all levels, from bricks and blocks to roads, to major mining and oil and gas projects and to water and power infrastructure.”

Challenges

In terms of challenges, Smith notes that there is always price pressure. “It is a balancing act between the unit cost of our products, which is typically measured in rands per ton of cement produced, versus the benefits. We always strive to provide our customers with a net positive saving, and we achieve that by using our cement additives to lower the cost per ton of cement produced.”

This not only refers to the milling circuit, but even has implications for ancillary equipment and materials handling downstream. “Improved flowability of cement means reduced potential for pack set in cement silos, improving the efficiency of extracting product from the silo, which increases the throughput in the packing plant.”

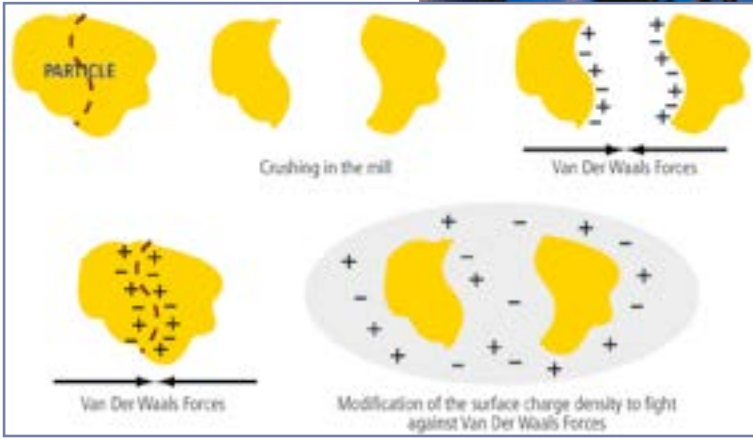


Trevor Smith is newly-appointed general manager: Cement at Chryso Southern Africa.

Chryso Southern Africa has developed a range of cement additives specifically for vertical roller mills to enhance stability, which leads to reduced vibration and improved output.



A diagram illustrating cement agglomeration (Van Der Waals forces).



Smith concludes that a critical priority for Chryso Southern Africa is health and safety. "Safety is the number one priority. From our operations to the delivery, distribution and supply of our products, we conform to all our customers' health and safety requirements. Adherence to environmental regulations is also important, as we have to ensure that any potential spillage is contained, removed and disposed of in a responsible manner." <



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UNLOCKING VALUE

AfriSam is unlocking value for its customers by partnering with innovative companies that specialise in the application of its products and service. Through its partnership with Concrete Laser Flooring (CLF), AfriSam is pioneering some of the latest trends and developments in concrete technology in the South African construction industry.

➤ These include the development of an environmentally friendly concrete flooring solution, low-shrinkage floors and tilt-up construction methods. In addition to its own research and development initiatives, the latest innovations have also been made possible by AfriSam's recent acquisition of an equity stake in CLF.

"AfriSam and CLF have collaborated successfully in introducing an industry first environmentally friendly floor concrete. The environmentally friendly concrete for floors is achieved by replacing cement in the mix design with using more fly-ash, activated slag and admixtures. In typical concrete mix designs, 20% to 30% of the cement is replaced with extenders. In this new concrete, up to 70% can be replaced with the activated slag and fly ash with the addition of admixtures to achieve superior quality and strength.

"This development process is put through a rigorous research, design and testing process to ensure that our customers can have the benefit of a superior performing concrete that are also kinder to the environment, Amit Dawneerangen, national multi-product solutions manager at AfriSam, says.

"A larger trend within the industry is the move towards 'greener' concrete, based on the understanding that cement is a finite resource and that we need to make concrete that uses less cement.

"There is a growing demand for this from environmentally aware property developers that are driving the trend for 'green' buildings. Some of the work we are conducting with AfriSam in this regard relates to activated slag mixes, and how we can extrapolate more value out

of concrete but using less finite resources," Peter Norton, managing director of CLF, says.

With its main focus on new solutions and innovation, AfriSam is also joining forces with CLF in producing low-shrinkage concretes for floors. "Through this speciality design mix, less shrinkage occurs which significantly reduces cracking in floors. We are currently in the process of researching, designing and testing this product.

"The goal is to get the best performing product, with the lowest shrinkage at the best value for our customers," says Dawneerangen.

Tilt-up construction is another method the two companies have successfully collaborated on in projects such as a 10 000 m² building in Pomona. The method utilises the floor of a building as a casting bed for wall panels, which are then simply lifted into position by a crane. Another option is for the wall panels to be cast at a precast yard and then transported to site.

According to Norton, this was a very successful project. "After we cast the floor, we were then requested to cast the walls as well. Such a project would traditionally have used 2 000 m³ of concrete only, but in this instance that figure doubled to 4 000 m³." The cost of the additional concrete used is offset by not only the speed of building, but by a marked improvement in the quality of the finished structure and a dramatic decrease in construction time, which results in significant labour savings and other input costs.

CLF has successfully used the tilt-up method on 42 t columns, a record in South Africa, while wall panels can be as large as 50 m². The entire sides of buildings can be cast and lifted in this manner, with the only constraints being having sufficient cranes and good spatial planning. Tilt-up construction is equally applicable to the residential sector. "The application here is not so much for once-off, large-sized homes, but rather for townhouse complexes and multi-storey buildings, as tilt-up construction is based on panel repetition. It can definitely be applied to low-cost housing as well," Norton says. ◀



OPPOSITE, TOP TO BOTTOM:

With its main focus on the industrial and commercial market, CLF has introduced new technology such as a patented seamless concrete flooring system.

Another concrete trend is thermal concrete, which comprises cement infused with expanded polystyrene (EPS) balls. Thermal concrete is lightweight, with a high insulation factor, and is therefore ideal for roofs.

AfriSam is a total solutions provider for its customers. The partnership with CLF is a perfect example of this, driving both the demand for and application of concrete and promoting the latest advances and technologies.

LEFT: AfriSam and CLF have collaborated successfully on tilt-up construction projects, such as this 10 000 m² building. The floor of a building can be used as a casting bed for the wall panels, which are then simply lifted into position with a crane.





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Striving for CARBON NEUTRALITY

The Murray & Roberts Group is pioneering the latest developments in concrete technology in its ongoing effort to become a carbon neutral construction company. Research initiatives in this regard include the long term testing of geopolymer concrete at Transnet's City Deep Container Terminal in Johannesburg, a contract undertaken by Murray & Roberts Infrastructure for client Transnet Capital Projects.



"We have been able to carry out an enormous amount of testing on these slabs," Cyril Attwell, Murray & Roberts Construction, group concrete & research manager, says. The latest strengths achieved are 75 MPa to 85 MPa after about nine to 12 months since installation. "Essentially what we are doing is conducting trials for future applications of geopolymer concrete."

Characteristics being investigated include durability and abrasion resistance. "The abrasion resistance is far higher than that of normal concrete because it does not use water as its critical mass," Attwell says. He explains that geopolymer concrete refers to alkali-activated material. "The production of geopolymer concrete in civil construction projects is fairly recent."

Murray & Roberts is also looking at the application of geopolymer concrete in mine infrastructure, with a current trial taking place at the Matla Brine Ponds project. "Infrastructure is a major focus as this needs concrete that is highly durable and versatile. However, one of the biggest potential appli-

cations of geopolymer concrete is for the control of nuclear radiation."

Attwell points to research conducted at the University of Sheffield in the UK, whereby geopolymer concrete was used to effectively neutralise the highly radioactive casings of nuclear fuel rods by essentially binding the radioactive substances within the concrete material itself. This renders geopolymer concrete highly suitable for South Africa's estimated R1-trillion nuclear-build programme.

Another sustainability feature of the City Deep project was Transnet Capital Projects' stipulation that Murray & Roberts Infrastructure had to recycle the old concrete paving broken out of the site. About 86% of the old worn concrete pavements were broken up and reused in the end, amounting to about 123 840 m³ of the total 144 000 m³ of concrete. This far exceeded the client's original requirement.

"Transnet is a forward-thinking client, as shown by the fact that we were able to install geopolymer test slabs. Due to the success of the project, the client is excited about the

process going forward and looking actively at other projects where the use of concrete is limited." A particular environmental benefit of geopolymer concrete is that it does not require water for the curing process.

"Water is a scarce resource, and its use is likely to become constrained in the construction industry in the near future. We are currently designing a geopolymer concrete that can be cured by utilising carbon dioxide, with the added benefit of this material acting as a carbon sink as it traps the carbon dioxide in the geopolymeric form. This means the concrete becomes much stronger far more quickly," Attwell says.

Other research activities

Other research initiatives include the development of a 'coral concrete' for marine environments. "We are looking at applying an electro chemical process to our marine concrete that removes carbon dioxide from the ocean and binds it with calcium oxide to form calcium carbonate or coral around any concrete structures.

"The growth achieved is about 5 cm a year, which works well to protect such structures against mechanical wave action and corrosion," Attwell says.

Another focus area is Advanced Re-Crystallisation (ARC) technology, which refers to the optimisation of the arrangement of atoms and molecules in a solid and amorphous state with concrete. "At present Murray & Roberts is the only construction company applying ARC technology on a regular basis," Attwell says.

"By using ARC technology we cross-polymerise aggregate with the waste binders

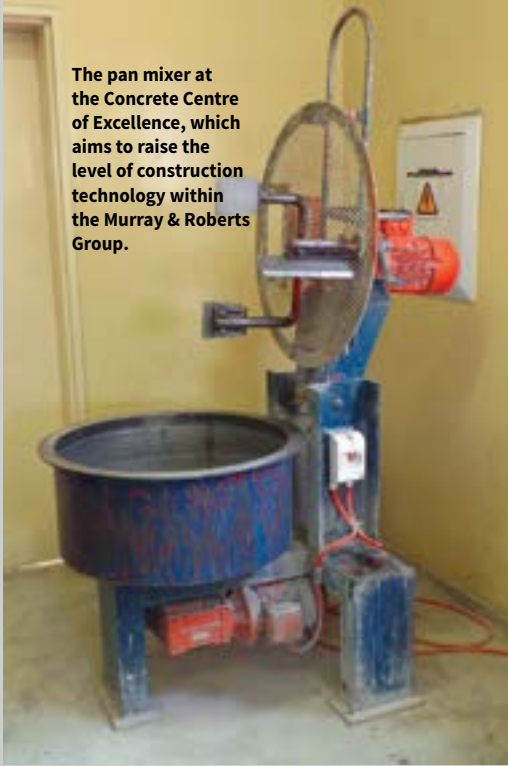
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The Concrete Centre of Excellence is located at the Elandsfontein head office of Murray & Roberts Construction.



Casting geopolymer concrete at Transnet's City Deep Container Terminal in Johannesburg.

The pan mixer at the Concrete Centre of Excellence, which aims to raise the level of construction technology within the Murray & Roberts Group.



The cube tester at the Concrete Centre of Excellence.



The drying oven at the Concrete Centre of Excellence.



used in geopolymer technology at room temperature while absorbing carbon to form a protective membrane due to the surface tension chemistry reducing the shrinkage and causing a curing membrane which forms automatically.

“The particular difference in the South African context is a re-engineered silicate blend and a chemical design methodology that reduces the activator requirement from about 200 litres per m³ to 20 litres per m³, as used at the City Deep project, while reducing the normal shrinkage experienced with geopolymer technology from 1% to 0,025% and reducing the requirement for heating during curing,” Attwell concludes. <



The curing baths at the Concrete Centre of Excellence.

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Geobrugg produces complete protection systems against rockfall, unstable rock and loose rock slopes, landslides, debris flow and avalanches. At the same time it supports the ordering party, planner and building contractor with its know-how from related spheres of application.

> With production facilities on three continents as well as branch offices and representatives around the globe, Geobrugg is always close to its customers.

High-tensile steel wire

Geobrugg solutions are based on netting and mesh made from high-tensile steel wire with a tensile strength of 1 770 N/mm². Its high cutting resistance, excellent energy absorption capacity, and long lifetime with low maintenance requirements make this an outstanding material. In fact, Geobrugg solutions set world records, as seen in the certification test where a Geobrugg ring net stopped a 20-ton concrete cube travelling at an impact velocity of 103 km/h.

Compared with conventional varieties of wire, high-tensile steel wire requires

significantly lower diameters to deliver the same – or even higher – levels of stability and toughness.

Innovation as tradition

Since Geobrugg's first avalanche prevention structure of wire ropes was created in 1951, it has continued to develop innovative mechanical protection systems. Central are ropes, nets and meshes of high-tensile steel wire. From these Geobrugg configures systems capable of coping with the most varied threat scenarios.

Field tests ensure true protection

The performance of Geobrugg protection systems is not determined by calculation alone. It tests their systems according to the world's most rigorous directives in 1:1 field tests with impact and tearing tests. At the same time the performance parameters of all system components are regularly monitored by independent testing institutions.

Why are these systems more economical?

Geobrugg produces nets and meshes on three continents with precisely controllable production technology. This reduces the logistic expenditure and improves flexibility. Thanks to GEOBRUGG SUPERCOATING® and GEOBRUGG ULTRACOATING®, the latest

generation of zincaluminum wire coating, its products have three and 10 times longer life respectively than wires with zinc galvanisation only.

Project and risk-related

There are no standard solutions for complex threat situations. That is why Geobrugg analyses every hazard situation prior to developing individual and often totally new protection systems, based on highly specialised know-how.

In all cases Geobrugg will act as consultant with analysis, staking out, anchor testing, installation and acceptance, while in cases of special threats or requirements, it will be involved with engineering special solutions, adapting construction and doing project-specific trials or tests.

Services

In complex situations that involve potentially dangerous conditions, there is no such thing as a one-size-fits-all solution. That's why Geobrugg analyses every hazardous situation before it develops customised or entirely new solutions. These solutions are sound because they are based on the highly specialised expertise Geobrugg has accumulated from more than 60 years of processing steel wire.

Consultation

Geobrugg provides two avenues of consulting support for customers, planners, and building contractors: design consultation (needs analysis, surveying, anchor testing, and installation) and acceptance.

Software

The right system specifications will provide reliable protection against rock fall, debris

About Geobrugg

- Geobrugg AG is the specialist supplier of protection systems in the geotechnical, architecture and security industries.
- Geobrugg AG is an operating company of the Swiss BRUGG Group.
- The Geobrugg Group has an annual worldwide turnover of approximately CHF100-million.
- Geobrugg AG's main office and factory is at Romanshorn on Lake Constance in the eastern part of Switzerland.
- The BRUGG Group had a turnover of approximately CHF700-million in 2010 and is one of Europe's largest steel rope and associated product manufacturers.
- In 2011 Geobrugg AG celebrated 60 years protection systems against natural hazards. Back in 1951 engineers from the Kabelwerke Brugg produced wire rope nets that were used for the first avalanche prevention structure.



SPIDER® rock protection being installed.



High-tensile steel wire is characterised by high cutting resistance, high energy absorption capability and long life with low maintenance. This makes world records possible.

Geobrigg configures systems capable of coping with the most varied threat scenarios.

The Geobrigg headquarters and manufacturing base in Switzerland.

flows, and other natural hazards. That is why Geobrigg has developed a range of software products that have been verified and calibrated in tests that replicate real-life conditions.

soil. Coupled with either of two different sized spike plates, the TECCO® SYSTEM3 offers an attractive nail grid and, therefore, maximum efficiency during installation.

This system is lightweight, has rhomboid-shaped mesh (ideal for force transmission plus slope adaptation), is exceptionally economical.

Slope stabilisation solutions

Rockfall protection

TECCO® SYSTEM3

GBE barriers

Safety, cost-effectiveness, and sustainability: These are the qualities that have made the several million square metres of the TECCO® SYSTEM3 installed to date an unparalleled global success story.

Featuring high-tensile steel wire and an exceptionally straightforward installation method, this product is setting a new standard in the field of rockfall protection barriers. Geobriggs GBE barriers, designed for impact energy levels of up to 3 000 kJ, are delivered to construction sites preassembled for installation onto support posts.

TECCO® mesh, featuring 2 mm, 3 mm or 4 mm wire made from high-tensile steel, can be used to stabilise virtually any kind of slope, whether it consists of rock or loose



A Geobrigg ring net stopped a 20 tons concrete cube with an impact velocity of 90 km/h.

The system ensure rapid installation as it is a pre-assembled system, has a longer life-time as it comes with corrosion protection, is an environmentally friendly solution and ensures maximum protection. <

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PILING FOR 'SOAP CITY' STUDIOS

Leading piling company, Gauteng Piling, recently completed the sinking of 91 augercast piles to form the foundation for the new Stage 1 and 4 building in Sasani Studios' 'Soap City' complex in Highlands Park, Johannesburg.

Sasani Studios is a renowned TV broadcast studio and post-production facility that has since the 1980s been the home for many major TV soap operas and reality shows. Sasani was the technical partner to South Africa's first and longest running soapie, *Egoli*, and currently is the technical partner to e-TV's *Scandal* and *Rhythm City*, which operate out of the Sasani studios in Highlands North, and *7de Laan*, which is managed and supported in studios off-site. Sasani Studios has also been responsible for delivering the popular reality show, *Big Brother Africa*, for the past four years.

Gauteng Piling has worked on Sasani Studios projects before: its last project for the company was in 2013 when Gauteng Piling provided the piling for the fast-track construction of two studios on the Highlands North site to cater for *Scandal* and *Rhythm City*. The piling company was consequently directly appointed by Sasani management to handle the foundations for the new double-storey studio complex being built by main contractor, Chakita Construction.

Keo Lekutu, Gauteng Piling site manager for the project, says the new studio complex will be used for the filming of a high-profile TV reality show and will accommodate change rooms, wardrobe area, acting stages and sound rooms. Gauteng Piling had to provide 91 augercast piles in a period of 2,5 weeks. The depth of the piles

ranged from 7 m to 12 m, and their diameter from 450 mm to 950 mm.

"As Gauteng Piling had handled piling on several occasions on the same site before, we were well prepared for the drilling operations, and knew what to expect as far as soil conditions were concerned. The soil quality was, in general, good but we did in places strike underground concrete from old foundations. The heavy summer rains also flooded the site's lower platform and the main contractor had to import and compact material to make the site more workable," Lekutu states.

Gauteng Piling employed two Williams rigs from its fleet for the Sasani Studios piling: a Williams LDH digger with 5,5 t-m torque – which has for long been the benchmark for auger cast machines in the piling industry – and a Williams LLDH machine with 8,8 t-m torque.

An auger cast pile is formed by drilling a hole into the ground, placing some steel reinforcement into the hole and then filling the hole with concrete. No steel casings had to be inserted on this contract. Auger cast piles cause minimal disturbance, and are often used for noise and environmentally sensitive sites.

Since its establishment in Johannesburg in July 1996, Gauteng Piling has developed into one of the leading piling contractors in South Africa. The company has to date completed over 1 500 projects and its current fleet consists



Gauteng Piling site foreman, Tshifhiwa Ndwambi, pictured at one of the 91 piles the company provided for a new Sasani Studios building at Highlands North.

of 20 auger drilling machines, two cranes, two bore rigs, four Grundo hammers, and two lateral support machines.

Under the leadership of Hennie Bester, past president of Master Builders Association North, Gauteng Piling provided more than 500 piles for the construction of Southern African's largest single-phase retail centre, Mall of Africa, now under construction in Midrand. Other recent contracts handled by Gauteng Piling include the piling for the large-scaled Value Logistics warehouse in Kempton Park, the Fire & Ice Hotel in Pretoria, The Grove Shopping Centre and Bon Accord Police Station in Pretoria, and a new City Lodge Hotel being built in Newtown, as well as extensions to the Market Theatre complex also under construction in Newtown. The company also handled the piling for a new FAW auto dealership in Croydon in Ekurhuleni, as well as the I'langa Mall in Mbombela (Nelspruit). ■

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HONORARY LIFE MEMBERSHIP FOR SA BUILDING INDUSTRY STALWART

Master Builders Association (MBA) North has bestowed Honorary Life Membership on one of the stalwarts and highly respected members of the South African construction industry, Nico Maas.

Kimberly-born Maas studied Civil Engineering at the University of Pretoria through a bursary from the Department of Water Affairs for whom he worked for two years, initially in Planning in Pretoria and then in

Lea Smith, outgoing president of MBA North (left), awards Honorary Life Membership of the Association to Nico Maas, chairman of Gauteng Piling, and a past president of both Master Builders SA and Gauteng Master Builders Association.



1 - Rockfall barriers

Our flexible rockfall barriers are designed for impact energies ranging from 100 to 8'000 kJ. They are successfully tested in a 1:1 field test and certified in accordance with the Swiss and ETAG Guidelines for rockfall net approvals.

2 - Slope stabilisation

The TECCO® SYSTEM² is appropriate for stabilising steep soil, sediment and rock slopes as well as for retaining walls. The mesh is anchored with soil or rock nails behind the sliding layer pretensioned at a defined force using spike plates at the surface.



We protect people and infrastructure from the forces of nature

3 - Rockfall drape

The TECCO® rockfall drape is a safe and economical alternative for situations, where the catchment area is too small and the calculated rockfall bounce heights as well as the expected kinetic energies are too high for a dynamic rockfall barrier.

4 - Rock slope protection

The SPIDER® spiral rope net is suitable to protect rocks that threaten to break off or slide down from a slope, rock ledges and overhangs as well as unstable rock formations.

5 - Shallow landslide barriers

Comprehensive 1:1 tests in collaboration with the Swiss Federal Research WSL in three test installations have verified the function of our shallow landslide barriers. In contrast to flexible debris flow barriers, shallow landslide barriers are intended to be applied on unchanneled slopes.

6 - Debris flow barriers

Each of our flexible ring net barriers can stop as much as 1'000 m³ of material derived from rocky torrents containing boulders, trees and other vegetation, while allowing continued water flow; culverts are kept from clogging; road and railway embankments are protected.

Please contact our specialists if you require further information.



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PROUD HISTORY

Leading geotechnical contractor and solutions provider, Franki Africa (Franki), now part of the Keller Group, has been contracted to implement a range of geotechnical work on the Cape Town International Convention Centre (CTICC) East Expansion project.



Franki Africa has been contracted to implement a range of geotechnical work on the Cape Town International Conference Centre (CTICC) East Expansion project.

Franki's association with the CTICC started back in 2001 when Franki did the piling work there, together with the foundations and deep basement, by diaphragm wall technique, for the then Arabella Grand Hotel, now The Westin.

Franki Cape Town says they are proud to have been associated with the original CTICC development and now again with the CTICC East Expansion Project.

In fact, Franki has a long and proud history in the Cape where it started business some 68

years ago, in the late 1940s, which is the time when the Foreshore reclamation, where the CTICC is now situated, was completed and the land was made ready for development.

Since then Franki has been involved in the development of many of the structures now standing on the Foreshore, providing the design and construction of piled foundations and lateral support for basement construction. These structures include, amongst many others, the contentious elevated Foreshore Freeways, the huge Civic Centre, Artscape, the

high-rise Metropolitan building, The Cullinan and Southern Sun hotels together with the neighbouring office developments and the Icon building. Franki has also been very busy with the residential developments along the canal to the V & A Waterfront.

Recently Franki provided the lateral support for the deep basement of the tallest building in Cape Town, the Portside, on the edge of the Foreshore and has just completed the piling and the lateral support works for the new Netcare Hospital next to the CTICC East site.

With Franki's recent incorporation into the Keller worldwide group of companies, new products and technology have become available for use from within the group and Franki look forward to seeing even more cost effective solutions for deeper parking basements in the Foreshore area where a high water table in the reclaimed fill makes for difficult conditions for basement construction.

Franki Africa MD Roy McLintock adds that being part of the Keller Group is a tremendous boon all-round.

"The Keller Group is the world's largest independent geotechnical engineering contractor giving Franki access to a wide range of innovative technologies, finance for future growth and, of course, a wealth of geotechnical intellectual property and experience. This, with Franki's vast experience in working in Southern Africa and on the African continent, augurs well for the future," he says.



Construction in Namibia. While at the Department of Water Affairs, Maas co-authored the book, "Sediments in Dams of South Africa", with Professor Albert Rooseboom of the University of Stellenbosch. Maas subsequently worked for Grinaker's piling division for 20 years and was a director of the company Dura Piling from 1988 – 1996.

In 1985, he graduated with a B.Eng Honours in Construction Management from the University of Pretoria and continued with his Master's degree which he completed in 1998 with the dissertation "Low Utilisation and its influence on Plant Management". He also completed a Construction Management Programme at the University of Cape Town in 1982.

In 1996, Maas with his wife, Hettie, established one of South Africa's foremost piling companies, Gauteng Piling, serving as MD and co-owner.

After handing over the MD reins of Gauteng Piling to Hennie Bester, (who has served as president of MBA North for a total of three

years), in November 2010, Maas became Chairman of Gauteng Piling.

Among the many top offices Maas has occupied in the SA building industry are President of Master Builders SA, President of Gauteng Master Builders Association (the forerunner to MBA North), Chairman of the Construction Industry Confederation, and Chairman of Federated Employers Mutual (FEM) Assurance. He has also served on the Steering Committee of the Construction Transformation Charter Group, and on the boards of the BIFSA Pension Fund, the Construction Industry Development Board (CIDB), and is a Fellow of the South African Institution of Civil Engineers (SAICE).

A keen social golfer, Maas founded the QACCS Gauteng Golf Club, which consists of members of the quantity surveying, architectural, consulting engineering, contractors and suppliers sections of the construction industry.

In 2013, MBA North honoured Maas for Exceptional Service to the Building Industry,

and he also received a Merit Award and Medal for Outstanding Service to the University of Pretoria in 1974.

In awarding Honorary Life Membership to Nico Maas, MBA North executive director, Mohau Mphomela said Maas had always been ready and willing to contribute and serve the Construction Industry to the fullest. "He always finds the time wherever possible to fight for the betterment and upliftment of all those who have come across his path, to benefit the future of the Building Industry," Mphomela stated.

Maas, in his acceptance speech, made a strong plea for the building industry to continue to deliver quality at all costs.

"If the industry can uphold top quality standards, it will survive despite major current challenges such as late payments, delays in implementation of budgeted governmental infrastructural projects, and the new BB-BEE Codes which, from May this year, will create one of the most difficult situations the industry has yet faced."



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BETTER and more SUSTAINABLE

The Lamontville Housing Project is aimed at eradicating the existing informal settlements within the Lamontville area and to develop formalised townships with fully serviced low income residential units which will result in a better and more sustainable living environment.

The site is located to the north of the Umlaas River (KwaZulu-Natal) and is bounded on its eastern side by the N2 National Road, on its western side by the suburbs of Park View and on its northern side by Mobeni Heights.

The overall project has an expected yield of 1 050 low income residential units to be constructed on various identified sites within the Lamontville area. 317 units have been completed under Phase I, and construction of Phase II is in progress to deliver the remaining units.

The scope of work includes the construction of top structure housing units, as well as civil infrastructure which includes asphalt surfaced vehicular access roads, concrete pedestrian access ways, retaining structures,

storm water reticulation, full waterborne sewerage and water reticulation.

Access road specialist steep slope solution

The SLB Consultants asked Maccaferri Africa to review the possibility of the use of a Mechanically Stabilised Earth (MSE) slope, of various heights up to 11 m maximum. A soft, green solution would improve the feel of the retained structures around the residential units and allow the slopes to be steepened safely.

The agreements will be that MSA would be the responsible party for the elemental design of the wall but that the global stability and the effect of the wall on the underlying soils and foundations would not form part of Maccaferri Africa's responsibility.

The MSE system chosen for the construction of the wall is the Maccaferri's Green Terramesh® system which consists of a double twisted wire mesh combined with a welded mesh panel and lined with a biodegradable geomat. This product is combined with secondary geosynthetic soil reinforcement between the units to work as a cohesive unit.

The Green Terramesh® system is well suited for the high retaining structure of the access road that required a softer engineering solution. It provides the initial engineering requirements for soil reinforcing of the backfill and then provides the landscapers and horticulturists the mechanisms with which they can vegetate to protect the exposed sloping face of the bank. This is a practical and environmentally acceptable solution to the problem of utilising the available land in a cost effectively and create the main access road into the developed area would be

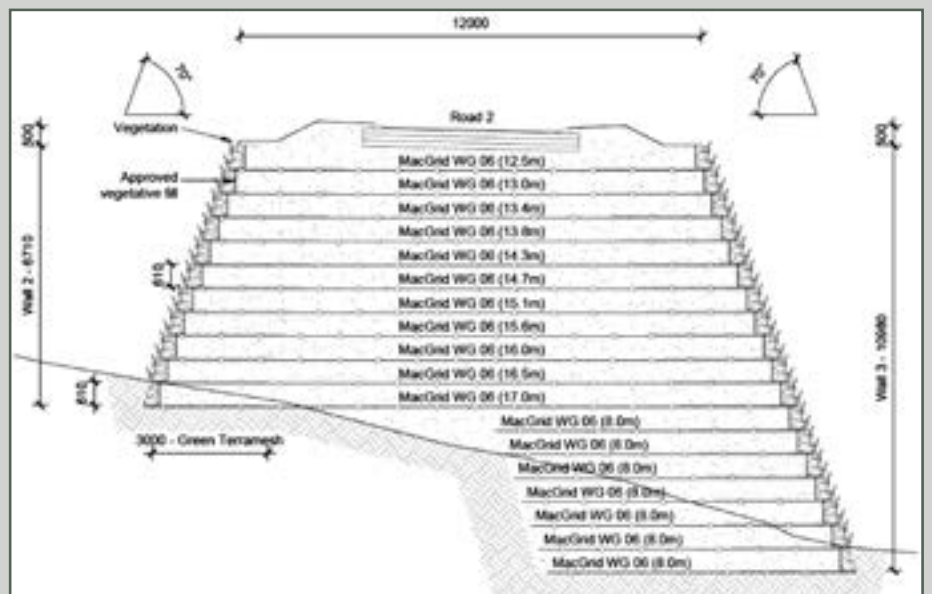
with a retaining structure. Using the Green Terramesh® unit from a bioengineering aspect is that it allows for the safe placement top soil at a steeper slope all along the front face of the slope without running the risk of the top soil washing away before the vegetation takes hold. The top soil is placed behind the BioMac® lining and is vegetated with seedlings which are plugged through the mat into the top soil or hydro seeded. The biodegradable BioMac® provides a protective front face to contain the top soil while and will reduce to nutritious mulch over the period that the plants are being established.

The design of the wall was done Maccaferri Technical Department using in-house MacStars software. The software is based on stability checks performed by using the conventional Limit Equilibrium Method methods (Bishop). The design also fulfils the requirements as specified in national for reinforced slopes SANS 207:2006.

The product – green terramesh®

Green Terramesh® Units are manufactured from a Type 80 double twist hexagonal woven wire mesh to the national standard SANS 1580. The mesh is continuous and provides both the reinforcing element as well as, together with a welded mesh panel, the front sloped face of the unit. The front face is lined with an Erosion Control Blanket (ECB) which assists with the retention of the topsoil and greening finish that can be provided.

The Green Terramesh® units are manufactured from heavily Class A Galfan (zinc alloy Zn 95Al5) wire to SANS 675 and SANS 10244-1. A polymer of PVC or PA6 nylon is extruded over the galfan coated wire to allow the corrosion protection up to 120 years. The PVC coating





Considerate to the environment

to SANS 1580 is grey and has a nominal thickness of 0,5 mm and the PA6 nylon coating to EN 10245-5 is black and has a nominal thickness of 0,4 mm. The dimensions are given in length of tail from the front face x width of the front face x height of the front face. Attached to the inside facing is a biodegradable ECB, a welded steel panel and two steel brackets, preformed to a 70° slope angle. ☒

The Green Terramesh® system is a versatile solution for the design of steep slopes that have to be constructed in confined spaces. Its use in conjunction to high strength geosynthetic grid reinforcement makes it possible to carry relatively high loads for the full design life, at strains within serviceability requirements. Careful attention to the natural vege-

tative processes makes it possible to blend the structure in with the surrounding environment. The contractor should be fully competent in normal civil engineering works such as material selection, setting out and compaction control and also be capable of working harmoniously with nature to take care of and improve the environment, where possible.

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2015 off to a FLYING START

FAW Vehicle Manufacturers SA has started the new year with another milestone added to its already remarkable track record. The truck manufacturer has officially started up its own Body Shop facility, adjacent to the Coega-based Assembly Plant, in order to build its own truck bodies.

> Yusheng Zhang, CEO of FAW Vehicle Manufacturers SA, says: "FAW continues its trendsetting path in local truck manufacture. Not only have we managed to produce our FAW trucks at the best quality levels, comparable to our FAW parent company in China – but we've been able to do so in a very short run-in period for a plant that only came on stream six months ago. Now we are also building our first tipper bodies from SKD packs imported from our parent plant in China."

While the first FAW 'full-bodied' tippers roll off the assembly plant and body shop, the production team is already assessing

the viability of producing drop-side bodies for their range of robust and durable vehicles spanning the medium, heavy and extra-heavy commercial vehicle ranges on offer in Southern Africa. Other bodies, such as mixer drums, may also be assessed and considered in the future.

The layout of the Truck Body-building facility has been designed in accordance with environmental recommendations and standards. The build and logistics flow is highly efficient and cost-effective.

The 3 300 m³ building is well equipped with abundant ventilation, natural light and wide aisle space.

Once an SKD pack is off-loaded it is thoroughly checked for component quality. The bulk of the pack, namely the bin, is checked for preparation to the assembly line.

Other components, once checked, are moved to the 'in-sequence' stations where their fitment will take place – these include all hydraulics, lift arms and shafts.

Once the tipper body is carefully fitted, the completed vehicle is prepared for the Paint Shop. With the all the required hydraulics and the body fitment complete the FAW vehicle is primed, painted



The first-phase of the Coega plant, covering 103 000 m² of land and a 28 000 m² plant – complete with training facilities, allows the company to provide its extensive client base with a sense of pride and patriotism by 'buying local'. The plant will eventually ramp-up to produce 5 000 trucks per annum, supplying trucks to the region, in both right-hand and left-hand-drive derivatives. Plans in place estimate that 40% of production will be destined for the South African territories, while 60% will be exported.

and finished through the impressive Paint Shop, and parked in the Drying and Final Inspection lanes.

FAW Vehicle Manufacturers SA is one of few local OEMs to have built a large-scale Truck Body-building Shop, together with an appropriate Paint Shop Facility on this magnitude. It is equipped using the latest and best global technology for long-lasting truck body paint and finish.

At present the company projects that it will build approximately 100 tipper bodies in the first quarter 2015. It will progressively expand its truck body offering to possibly include other configurations, even customised trailers, depending on demand from FAW customers through the FAW dealer network.

"We have experienced a positive response from numerous of our long-standing customers who have indicated that they prefer a complete vehicle direct from FAW SA. Besides the cost advantages, the warranty and maintenance of their FAW vehicle are also simplified," says Zhang. <

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BREWERY flooring project

Specialist turnkey industrial flooring solutions provider AcryliCon recently completed a flooring project for a local brewery. The scope included the stripping of 2 000 m² of tiles, tile grouting, rehabilitation of the concrete surfaces and installation of Decor HID Incorporating Microban.

> Diamond Products – a leading specialist in the manufacture, of diamond tools and sole distributor of the Diamatic range of flooring equipment for industrial applications – supplied and supported AcryliCon with the specialist equipment used in the five-week project, which began on 15 January 2015 and involved five teams of trained AcryliCon operators.

A scarifying machine was used to plane surfaces after tiles were stripped. Makita electric breakers were used to remove this mass of tiles and tile mortar. Thereafter the Diamatic 435 grinder was used to grind down the profile of the floor and achieve a suitable bond key.

The Diamatic 435 grinder weighs 115 kg and has a working speed of 720 rpm, with a working width of 435 mm in diameter. This machine was ideal for the 2 000 m² project as it was portable enough to move around with ease. All machines had their own Diamatic vacuum to achieve a dustless operation. Bespoke dust extraction accessories were fitted to handheld grinders. The grinders attended to the detailing of hard to reach surface areas which were within the scope of the project.

AcryliCon MD Dean Ashmore notes that the products provided by Diamond Products were an essential part of the project. “Using Diamond Products tools, we were able to meet the needs of the customer specification while maintaining the highest AcryliCon standards prescribed by AcryliCon International,” he says.

Diamond Products director Brian Clark points out that the Diamatic range of machines are available in various sizes, ranging from a single head 220 V electric system for small jobs, to a triple planetary head 380 V systems for large projects. “Diamatic grinders are designed for dependability and offer ease of use while providing efficient, cost-effective results with very little environmental impact.”

The range of Diamatic products available through Diamond Products, including floor preparation, grinding equipment and vacuum dust control systems were introduced to the local market in 2013. During this time, the sales of these products has shown good growth.

Diamatic surface preparation equipment offers the user the benefit of a dust free operation, when a Diamatic dust collector is connected. The Diamatic system is simple and robust and the techniques involved in polishing and grinding with this system can be quickly and easily understood.

Clark reveals that Diamond Products offers a complete solution for improving the aesthetics and functionality of concrete surfaces, from residential and architectural applications, to commercial and industrial sites. “The equipment supplied by Diamond Products is currently being used by several flooring contractors for the grinding and polishing of concrete floors in many different applications throughout Southern Africa,” he continues.

AcryliCon has been operational in South Africa for the past six years with a large focus on industrial flooring. Ashmore notes that the state of the flooring industry is positive at the moment. “With our core focus being on flooring, we have seen a vibrant and dynamic industry growing steadily in South Africa.”

Ashmore adds that industrial floors are subjected to tough daily mechanical and chemical loads, and that floor protection should therefore be designed and warranted to withstand the same loads.

He highlights that AcryliCon provides a wide range of high quality, durable, cleanable, rapid curing and VOC-free systems to meet client needs. These solutions and applications are supported with a warranty of up to 10 years.

“An integral part of our business success and growth is partnering with equipment service providers such as Diamond Products



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“The equipment supplied by Diamond Products is currently being used by several flooring contractors for the grinding and polishing of concrete floors in many different applications throughout Southern Africa.”

who understand our business and know that breakdowns on-site over nights and weekends are not a welcome event. If this does happen however, the owners and the operational staff are always willing to assist in any way possible,” concludes Ashmore. <

SMALL HAMMERS BIG ON PERFORMANCE

Launched globally from the first quarter of 2015, the new Cat® E-Series small hydraulic hammer line-up is supplied in a four model range for fitment across a broad spectrum of machines extending from mini hydraulic excavators to skid steers and backhoe loaders.

Developed specifically for construction and demolition projects, these hammers are well-suited for robust applications such as concrete, asphalt, rock and light trenching. Replacing the previous generation D-Series, these small hammers are 100 percent designed, engineered and manufactured by Caterpillar at the OEM's Waco factory in Texas, USA, and are a seamless match for Cat carriers. They join the extensive range of medium and large Cat E-Series hammers.

The new Cat E-Series H35E/Es, H45E/Es, H55E/Es and H65E/Es small hammer models are available as side-plate or 'silenced' versions. Silenced hammers, which bear the 'Es' nomenclature, use a fully enclosed housing to suppress noise. This is a valuable feature in sensitive work environments and when the hammer is in close proximity to the operator.

Machine owners have the option of pin-on or flat-top mounting configurations. Flat-top models allow versatility for installation on Caterpillar, as well as earthmoving equipment made by other manufacturers. Pin-on models are available for the H55E and H65E in applications that require a dedicated hammer equipped machine.

In terms of output, impact frequency on the H35E FT (Flat Top) is 600 – 1 800 blows per minute with the hammer designed for fitment on carrier weights from 1,1 to 2,4 tonnes. At the other end of the scale, this compares

A Cat H65Es fitted on a mini hydraulic excavator. For hydraulic excavators, the hammer range currently extends from the smallest 1.5 tonne Cat unit to the 75 tonne class Cat 374F L excavator fitted with the H180Es hammer, which has an approximately 3 990 kg operating weight.



Cat skid steer equipped with the new Cat H55Es. The impact frequency (blows per minute) is 600 – 1 680.

with the H65E FT, which delivers 720 – 1 740 blows per minute and is a match for machines with a carrier weight of three to nine tonnes.

In the field, Caterpillar's propriety hammer designs ensure robust, long-life operation, and simplified maintenance. For example, a single grease point provides hammer paste to tool bushings; and the power chamber and accumulator pressures can be checked and charged while the hammer is mounted on the machine. The power cell is designed for efficiency with only two major components, namely the front head and valve body.

"Caterpillar's tri-suspension system guides the power cell and reduces noise and vibration," explains Barloworld Equipment product specialist, Craig Christie, expanding on technological features.

"During operation, the automatic shut-off function eliminates blank firing and reduces internal wear, protecting the hammer from less experienced operators, whilst an integral accumulator protects the carrier pumps from hydraulic spiking, ensuring consistent performance," Christie adds.



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SUCCESS RECOGNISED INTERNATIONALLY

Babcock received an award for sales excellence at the recent SDLG construction equipment conference in Shanghai, China, held directly after Bauma China, China's largest construction equipment trade fair.

SDLG is a value-added range of mechanically driven wheel loaders, graders and vibratory rollers, ideal for applications in the re-handling, construction, quarrying, agricultural and aggregate industries. These machines offer extended trouble-free operation and are extremely maintenance friendly, fitted with basic electronics and standard components.

Babcock's general manager SDLG, Grant Sheppard, who attended both events accompanied by his two top performing salespeople,

says he was thrilled to receive the award, particularly since Babcock has only been the exclusive distributor of SDLG construction machinery in Southern Africa since early 2012.

"The award recognises the outstanding sales year we enjoyed in 2014," says Sheppard. "We were one of only two dealers to be recognised with this award and this is a milestone achievement for us.

"SDLG really came into its own in Southern Africa in 2013, but 2014 truly entrenched us as a brand to be reckoned with in the market. Last year, we more than tripled our sales staff have representation in all the major centres of South Africa and neighbouring countries. This investment is earning significant dividends and, building on this dynamic foundation, we have very high hopes for 2015.

Babcock's general manager SDLG, Grant Sheppard (centre), says he was thrilled to receive the award.

"Our achievement lies the fact that within a market sector that did not grow last year, we actually doubled the sales penetration of the SDLG brand. The reasons for this remarkable success include the level and quality of the support we offer our customers, our philosophy of partnering to enhance customer operations and the extensive sales and support footprint available to our customers across the region. SDLG is represented in all Babcock service centres in the region, which translates to more than 20 outlets. This shrewd strategy has successfully exploited the best possible advantage out of Babcock's existing footprint and afforded us a major competitive advantage."

Sheppard says during 2015 Babcock will extend its SDLG product range within the wheel loader and other market segments, in response to customer requests.

The international SDLG dealer network is expanding rapidly and there is an expectation that there will be more than 100 dealers worldwide by 2016. The brand's strategy puts customer satisfaction at the forefront, ensuring a strong aftermarket support offering. SDLG wheel loaders are one of the world's biggest selling product lines in this sector. ■



NOW WITH ADVANCED VIBRATION CONTROL

The HR4013 Rotary Hammer is powered by an 1 100 W motor and produces super speed and efficiency during drilling, chiselling and demolition operations in reinforced concrete.

> The new Anti Vibration technology built into this specific model will produce unrivalled lower levels of vibration. This is achieved by using active vibration absorbers, and damper springs absorb the reaction force caused by the drill bit at the moment of impact. The level of vibration is further reduced by completely separating the machine holding section from the motor/transmission section. Therefore, when the machine moves the handle stays still, similar to how a shock absorber works on a motor vehicle.

Another great new addition on the HR4013 is the soft no load function that reduces the vibration of the tool body when idling and accordingly decreases the amount of vibration to the operator's hands. It also minimises the deflection of the bit tip when you begin to chip.

The HR4013 has increased drilling efficiency which is 20% higher (using a 32 mm diameter bit) and a 45% higher chipping efficiency (with a bull point) when compared to its predecessor model.

An SDS-Max drive system, with a drilling capacity of 40 mm will drill just about anything.

The one-touch sliding chuck allows for quick and easy bit changes. Due to rotary hammers being used in rugged applications, Makita has focused on the safety aspects of both the operator and the tool. A torque limiter has been built in to ensure stable torque control that stops the rotation of the drill bit in case it hits against any reinforcing bars,



thus preventing possible muscular injuries to the operator or damage to the tool.

This 2-mode rotary hammer with its easy to operate operation mode change lever that is located on the top of the motor housing has four setting options –the lock-on position for continuous chiselling applications; a trigger position for intermittent chiselling applications; a bit angle setting and then of course the rotation with hammering.

A soft rubberised D-grip handle and side handle provides added comfort and greater control, while minimising hand fatigue and pain. It also reduces the level of vibration absorbed by the operator.

The HR4013 has a red LED service light that indicates when to replace the carbon brushes.

The Makita HR4013 with its low level of vibration will make a substantial difference to both user and project alike, enhancing operator comfort and productivity. ■

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A REALISTIC outlook for 2015

Having come out of an extremely tough 2014, Isuzu Trucks South Africa is geared up to face what is seemingly a more turbulent 2015. This was the overriding sentiment at the annual state of the business update that was addressed by chief operating officer, Craig Uren, who provided a holistic review of the state of play for the industry and a realistic outlook for the year ahead.



Craig Uren, Isuzu Trucks South Africa's CEO.

➤ Operating against a global and local backdrop characterised by conflict on many fronts – economic, political and religious – Uren stressed the importance of business being nimble enough to embrace uncertainty and managing many variables to remain competitive. The tough economic conditions that saw the overall truck market record a nominal annual growth of 2% at the end of December 2014, are set to continue in 2015. The medium commercial vehicle (MCV) segment dropped by 4,9%, while the heavy commercial vehicle (HCV) segment recorded a decline of 2,1% and the extra heavy commercial (XHCV) segment grew by 8,7%.

Isuzu Trucks South Africa had a solid performance at the end of 2014, exceeding the 4 000 units' sales mark for the second year in a row. Isuzu Truck remains the leader in the cab-over-chassis and medium

commercial vehicle (MCV) segment of the industry, with a current market share of 12,8% of the total truck market.

N-Series products accounted for 21% of the MCV market, giving Isuzu market leadership of this segment and F-Series achieved 23,4% of the HCV market. Since the recent introduction of the FX Series this range has grown and achieved 3,3% of the EHCV.

The Japanese manufacturer's success in the South African market can be attributed to their product differentiation, innovation and customer-centred approach to finding solutions that will increase customers' profitability and productivity.

Productivity at Isuzu Truck's Port Elizabeth-based plant was extremely healthy in 2014, considering the wide labour unrest experienced by many automotive manufacturers that have an operational footprint in South Africa.

In comparison to similar territories, South Africa is pretty much on par with its Isuzu Truck counterparts in successful emerging markets. "The fundamental driver of our solid performance is the AMT Technology, which Isuzu brought to the MCV and HCV market in SA and uses extensively across our product range. In some cases one will find that AMT-enhanced models account for up to 70% of total sales in a specific range – that in itself is testimony of the market's confidence in the Isuzu specific technology," Uren added.

Painting a picture of what success would look like for the business in 2015, Uren put a stake in the ground and said that his team would work towards achieving further good growth on the 4 046 units sold last year, continue to drive product innovation and constantly seek opportunity in adversity.

On the environmental responsibility front, the company will continue conducting trials on products that run on green fuel sources and test hybrid models with selected customers in the local market.

The company plans to make significant investment into local business in 2015 and 2016 to enhance the Isuzu Truck SA business model and this includes developing local communities and promoting entrepreneurship on the social responsibility front, but will only reveal details of its plans in due course. ◀

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ANTI-RUST COATING SEALS IN SAVINGS

The easy-to-apply and environmentally-friendly RustPrufe corrosion protection solution for non-porous surfaces eliminates the need to repair damage to steel surfaces occurring during extended storage periods or shipping and handling.



ABOVE, LEFT: Filter Focus COO Craig FitzGerald. **ABOVE, RIGHT:** Rust-Prufe is environmentally-friendly and with zero toxicity leftover, the coating can be disposed of safely in landfills. **RIGHT:** Upon application, the product is peeled off by hand to reveal a clean and rust-free surface.



The solution is ideal for industrial and mining applications, and is available through wear control specialist, Filter Focus. COO Craig FitzGerald notes that RustPrufe is a painted or sprayed-on acrylic polymer emulsion that dries to form a seamless, skin-tight weather and UV-resistant protective barrier.

"Items such as valves, gears, shafts, and motors are often subjected to harsh climatic conditions, and RustPrufe is the most convenient, cost-effective and user-friendly option to ensure that these costly components are not damaged in transit," he explains.

FitzGerald points out that the components do not have to be sanded down or rust treated. "Upon application, the product is peeled off by hand to reveal a clean and rust-free surface. As a result, cost savings during routine maintenance and repair shutdowns are tremendous."

Unlike traditional tape, wax and oil coatings that must be scraped off and cleaned with solvents, RustPrufe does not leave behind a residue. It is also highly-durable and, should tears or perforations appear, they can be closed by applying the coating to the exposed area with a paintbrush.

Onsite components are often exposed to aggressive environments and require continuous efforts to maintain. FitzGerald highlights the fact

that RustPrufe can also be applied in these applications as a permanent anti-corrosion coating on operational equipment.

"RustPrufe is also acid-resistant, and has been successfully used to protect electric motors in acid plants on numerous South African mines. The solution is also utilised in the fertiliser industry, where it is applied on earthmoving machinery to protect it from nitrates that eat away at the metal," he adds.

RustPrufe is also environmentally-friendly and with zero toxicity leftover, the coating can be disposed of safely in landfills. "With no harmful chemicals, PPE is not required and an absence of harmful vapours and fumes means that the solution can be applied in confined spaces too," FitzGerald concludes.

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MAKING LIGHT of heavy loads

Aluminium Loading Systems, importer and distributor of high quality loading systems based in Alrode, Johannesburg, has been appointed as the exclusive distributor of superior quality light weight CLM aluminium loading ramps to sub-Saharan Africa.

> The aluminium ramps are designed and manufactured by Italian company CLM based in Modena. This specialist company uses very high quality fibre extrusion that originates from Sweden to produce the ramps.

“The modern world is rapidly moving towards fibre material,” notes Aluminium Loading systems director, Deryck Jordan. He points out that the aeronautical and space industry has been using carbon fibre for many years and that the use of this material has spread to numerous other industries including the automotive sector.

“The exceptionally high strength and light weight properties of aluminium make it the ideal manufacturing material for these ramps,” continues Jordan. “The result is a product that is both incredibly strong and remarkably light in weight, a very important consideration in the transport industry because of its influence on a carrier’s payload.”

In addition to the high strength material, the ramps also feature an exclusive double T-section, a unique design feature which creates a very small surface that guarantees the highest bending strength with the least weight.

According to Jordan, the aluminium loading systems are used widely and with great success around the world including the USA, Europe and Australia. “The South African market is also familiar with the CLM loading systems so when in early 2014 the range became available in the local market, we recognised that this product, with its outstanding quality and versatility, holds tremendous market potential. Essentially any market sector involved in the loading and unloading of machines or that transport goods will have a demand for these loading ramps.

“This includes but is definitely not limited to industries such as construction equipment and mining as well as logistic and machine rental companies. In a nutshell, basically any equipment, machine or vehicle with wheels and tracks can benefit from the CLM system.”

The comprehensive Aluminium Loading Systems portfolio comprises more than 300 standard design types.

The exceptionally low weight of the ramps belie their incredible strength and Jordan believes that perception is going to pose a challenge. “It is difficult to comprehend that something can be so light in weight and yet be so strong but it is precisely this paradox that is fundamental to the product’s extreme efficiency.”

The aluminium loading systems offer a number of important time and cost saving benefits to deliver a cost effective solution:

- Exceptional mobility: The fully mobile ramps can be conveniently used for loading and unloading anywhere, even in the most remote locations.
- Easy, manual handling: The ramps are light enough to be manually lifted on and off the carrier and are easily placed into position, eliminating the need for special lifting equipment.
- Increased payload capacity: The carrier can transport a higher payload due to the low weight of the aluminium ramps compared to heavy steel structures.
- World-class quality certification: All CLM loading ramps are subjected to very high quality certification. This includes the



Aluminium loading ramps: from wheel chairs to 50 ton equipment.



Aluminium Ramps can be used for the fast and safe loading and unloading of equipment, machines or vehicles with wheels or tracks.

welding process which is essential for certification. A sample of every batch undergoes rigorous testing.

- All CLM products have a one year warranty.

Jordan says in closing that within the next five years he would like to see a distribution footprint that effectively offers the CLM Loading Systems to rural areas where local entrepreneurs and ourselves can build a partnership that will create job opportunities for the community. <

DUE NORTH

The Pinetown-based company is earning a reputation as South Africa's premier designer, developer, manufacturer and supplier of personal protection equipment (PPE) and related safety products that are ideally-suited to a number of industries and applications.

North CEO Craig Garvie notes that the company's expertise and experience are unparalleled. "North is becoming recognised as an industry leader with our commitment to providing the highest quality head-to-toe protection. Our carefully developed line of safety equipment is manufactured in accordance with the strictest quality standards and is tried-and-tested in numerous applications."

According to Garvie, North prides itself on exceeding its client's expectations and constantly looks for opportunities to make improvements. "Currently we are focused on bettering our serviceability. There are so many players in this sector and not everyone gives customers the service they're entitled to."

To accommodate all customers, North has opened a chain of retail stores around the country. "We see a huge market for smaller buyers looking for PPE supply for their own businesses. Our retail section is going to be about servicing the smaller business units, who have been neglected in the past," says Garvie.

He observes that certain industry sectors lend themselves to retail. "Farming, for example, does not require large amounts of personal protective equipment. Farmers are not necessarily interested in a sales representative coming onsite to sell a small quantity of overalls. Instead, they find it more convenient to go into town once a week to purchase the necessary PPE items hassle-free."

According to Garvie, contractors will also benefit. "The North retail store is ideal for a contractor who may have been awarded a new job and needs to quickly collect a PPE item for the day. It is also ideal for purchasing extra PPE, should a team have to be swiftly expanded due to unforeseen circumstances."

Garvie says the primary aim of the North retail stores is accessibility, by allowing customers to walk in and walk out with the products that they require. "We want to make our products freely available, provide customers with choice, while ensuring that our pricing remains competitive."

North manufactures a significant amount of its stocked products,



North Staff at the Cape Town branch.



Craig Garvie, CEO of North safety products, with staff outside the new store.

which Garvie believes gives the company a competitive advantage in its industry. "It definitely gives us a pricing advantage on some of the competitors that only resell products. We do, however, also stock other quality brands to ensure that the client is provided with the best selection at the most competitive prices."

Consolidating on its success, a primary aim for North has been to break into the African market. "We're growing our business via investments into Africa," notes Garvie. "We already have controlling interests in companies based in Mozambique, Zambia, the DRC and Kenya, and are supported by stable partnerships with local associates there."

Recognising that staff members are the company's most valuable resource, Garvie contends that it is vital to invest in their development. "We equip employees with the tools for overall job satisfaction and provide them with opportunities to reach the next level of expertise. We also have a number of training initiatives that continually add to the skills base of our employees."

Ultimately, Garvie believes there are three factors influencing North's success. "I believe that our national footprint, together with our investment in Africa, having dedicated staff and paying particular attention to customer service are all standing us in good stead to remain an industry leader," he concludes. ■

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CHAMPIONING ENGINEERED REPLACEMENT PARTS

The real danger with replacement parts is that companies produce 'copycat' parts by duplicating the look of the original part. In contrast, IPD parts are engineered replacement parts produced under stringent quality control measures to ensure integrity and optimum performance.

"They not only resemble parts from the Original Equipment Manufacturer (OEM), but their performance under working conditions is identical to that of the OEM part," says Andrew Yorke, operations director, Metric Automotive Engineering.

As a local distributor of IPD engine parts, Metric Automotive Engineering has access to new part numbers released on a monthly basis to cover the popular Caterpillar® C Series engines. IPD is an international manufacturer of engine parts for Caterpillar® engines.

"We are proud to be first to market with aftermarket parts of this quality," York says. Metric Automotive Engineering is one of South Africa's most comprehensively equipped diesel engine and component re-manufacturers.

"Since being appointed IPD's distributor in South Africa in 2008,

we have been servicing an increasing number of customers who have recognised and experienced the significant cost savings associated with world-class quality replacement parts," Yorke says.

"The focus of both Metric Automotive Engineering and IPD has been on helping equipment owners to save money without risk to reliability. Essentially IPD products are Caterpillar® replacement parts, manufactured in a Lloyds accredited ISO 9001:2000 quality controlled environment."

"The major advantage for our customers is that they are able to source engine parts from an engineering company – the very parts which we use in the remanufacture of our own engines," Yorke says.

"This, in turn, gives them optimum confidence about the quality and integrity of the parts. We are not simply a parts supplier. As an engine component remanufacturer, we have the necessary expertise and experience to be able to identify quality parts," Yorke says.

"While most other engine rebuilders need to buy in their replacement parts, we have the tremendous advantage of an in-house stockholding of high quality Caterpillar®-equivalent parts. This effectively positions us as a preferred supplier for heavy duty remanufactured diesel engines.

"By eliminating the middle man in parts purchasing, we are able to pass on a substantial cost saving to our customers, at the same time maintaining total control of quality throughout the remanufacturing process," Yorke concludes. ■

THE NEEDS OF YOUNG ENGINEERS

The South African Institution of Civil Engineering (SAICE) inaugurated its 2015 President, Malcolm Pautz, at the SAICE Presidential Inauguration and Gala Dinner at Emperors Palace in Johannesburg on 12 February 2015.

> Pautz is the youngest ever president since SAICE's establishment in 1903.

In his address, Pautz challenged Generation Y engineers to be bold, to have courage, to never be afraid of taking initiative, or to be involved; while judging themselves on self-integrity and accountability. To the engineers stemming from the traditionalists and the baby boomer eras, the challenge is to listen to the young engineers, to guide and mentor them, and to identify future leaders who will have the task to make the National Development Plan, as well as the Millennium Development Goal, a reality. ■



Malcolm Pautz, 2015 SAICE President, shakes hands on receiving the presidential chain from Stanford Mkhacane, 2014 President of SAICE.

DATE SET FOR 2016 WOOD EX FOR AFRICA

The next WoodEX for Africa will be held at Gallagher Convention Centre in Midrand, South Africa, from 9 to 11 June 2016.

> Held annually since 2012 WoodEX for Africa has enjoyed tremendous support from the local and international timber industry and the event is now established as Africa's leading industry showcase.

Stephan Jooste, director of WoodEX for Africa, says the organisers are exploring the possibility of partnering with a major international industry exhibition and a decision was made to present WoodEX for Africa bi-annually from 2016, in order for the event to fit in with the global timber industry calendar.

Following WoodEX for Africa 2014, the event received outstanding feedback from its exhibitors and visitors, with exhibitors reporting positive feedback in terms of the quality of visitors, the great networking opportunities, market exposure and business conducted. Visitors indicated that they were specifically impressed with the outstanding quality of the exhibitors' displays and the professional appearance of the event. ■



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APPOINTMENTS

Jeffares & Green Engineering & Environmental Consulting



LEFT: Paul Olivier, managing director. RIGHT: Phakamile Ngqumshe, branch manager of the head office in Johannesburg and simultaneously as regional director (northern region) and a member of J&G's EXCO.

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Mapelastic Smart	●	●	●		
Mapelastic Foundation		●	●	●	
Mapelastic Aqua Defense	●		●		
Mapelastic Guard					●

Complementary products to the Mapelastic range include:
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