

# CONCRETE CONNECT

BUILDING THE FUTURE – LAYER BY LAYER

ISSUE: 2/2024

## CONCRETE TILES CLAD COASTAL HOME



LONG-LASTING COLOUR  
FOR SURFACES

10 TIPS FOR GREENER  
CONCRETE

RETAINING WALLS  
ADD SYMMETRY

# CONTENTS



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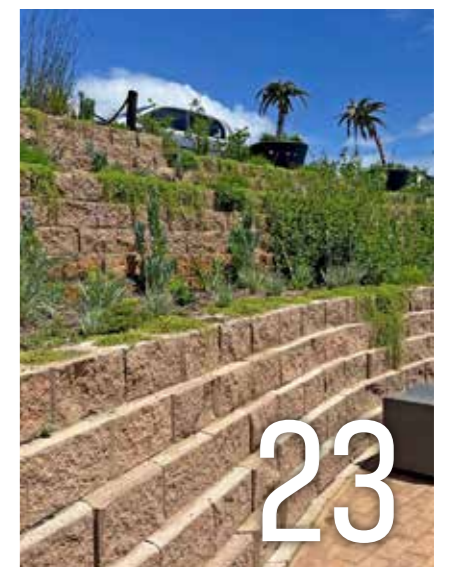


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# STATISTICS PROVE INFRASTRUCTURE'S OUTSIZED RETURNS

BY: ROELOF VAN DEN BERG, CEO  
OF THE GAP INFRASTRUCTURE  
CORPORATION (GIC)

Infrastructure has been named a top priority for South Africa over the next few years as we seek to bounce back from global economic shocks such as the pandemic and war in Ukraine and refocus attention on promoting socio-economic development.

But beyond major national concerns such as logistics and energy infrastructure, it's important not to overlook the fundamental role of less headline-grabbing, "bread and butter" infrastructure development projects for uplifting households out of poverty and driving economic growth.

Here are just three examples that demonstrate the importance of infrastructure development as a key mechanism for nation-building:

### Roads

Several studies suggest a direct link between road development and economic growth. But one particularly significant World Bank study by Fedderke and Bogetic, which analysed three decades of data for South Africa from 1970 to 2000, found that a 1% increase in the road network led to a 2.8 percentage point increase in the country's productivity growth.

Similar studies in other countries also demonstrate what can be achieved through road infrastructure development. In China, for example, the economic impact of road infrastructure development on rural roads was four times higher than on high-grade roads. Meanwhile, Sri Lanka, another developing country, saw a more than 60% increase in industry output following investment in its highway infrastructure.

Ultimately, roads are how we connect people to job opportunities, healthcare, education, services, and each other. Plus, higher quality paved roads lower travel times and costs,



The country has  
been making strong  
headway.

provide access to a wider range of vehicles such as delivery trucks, and enhance overall road safety.

So, as the public sector continues working diligently to upgrade road networks, this could unlock immense economic and social benefits. For example, in our experience, the long-term positive effects of GIC's work on roads in rural communities have been exponential.

### Housing

Homes have the potential to generate a steady income for homeowners. According to the Centre for Housing Finance in Africa, informal housing generates an estimated 11% of total rental income in South Africa, which creates a crucial income stream for homeowners who rent out rooms in their backyards.

Furthermore, research shows that a rise in house prices leads to an increase in job creation, as homeowners can leverage their homes as assets as collateral for loans to invest in their businesses.

Beyond being an important source of income for many households and a key driver of economic growth, housing also acts as a catalyst for improved living standards. Having a safe place to live and sleep provides a sense of security, improves people's health and well-being, and better enables breadwinners to find employment and children to further their studies. The impact of housing on lives and on the wider economy is therefore tremendous, serving as a powerful tool to combat poverty.

### Water and sanitation

Clean running water and reliable sanitation systems are critical for preventing disease, maintaining food safety, and supporting a strong and productive workforce that can participate in economic activities and earn an income.

Notably, water-related health issues are still a major concern worldwide. It's estimated that some 1.4 million deaths, or about 2.5% of all annual deaths globally could be prevented by providing more people with access to clean drinking water, sanitation, and hygiene.

Installing in-home water points and sanitation networks in towns across South Africa greatly reduces people's risk of diarrhoea and resulting undernutrition, as well as respiratory infections, and other health risks. And in the long run, a healthy population has the capacity to take the broader economy to new heights.

Fortunately, the country has been making strong headway in this regard, having already provided access to clean drinking water to around 90% of the population. Additionally, this number is set to increase as new infrastructure development projects get underway.

So, while often underappreciated, these areas of infrastructure remain vital to breaking the barriers to opportunity, and building a supportive environment for a brighter, more equitable future. ■

# CONCRETE ROOF TILES USED FOR WALL CLADDING ON COASTAL HOME



What is the outcome when one combines a challenging brief and a great product with ground-breaking creativity? Simply put, This Beautiful Fantastic, a double-storey timber-framed home abutting the beach at the Eastern Cape coastal resort town of Kammabai, Eerste Rivier.

Most architects specify precast concrete roof tiles exclusively for roof cladding, but not the design team for This Beautiful Fantastic. Instead they used slate-grey Shingle roof tiles, manufactured in George by Eagle Roof Tiles as a wall-cladding and roofing material.

According to architect Jacques Theron of

Ontwerp Studio, the project's main design driver was the architectural guidelines of the area which recommends timber-framed houses.

"Unlike most timber-framed houses in the immediate vicinity which are clad with timber-slatted facades, in this instance the design team opted to clad two elevations with roof tiling and for three compelling reasons: little to no maintenance requirement; durability and strength; and, as the photos demonstrate here, they make for an extremely attractive wall-façade cladding material, ideally suited to the Scandinavian barn-style design of the house," said Theron.

The tiles are fixed on conventional roof trusses and are supported with standard battens on the wall facades and, as the images show, the transition from roof covering to facade cladding is seamless. The tiles are securely fastened with nails and storm clips and can withstand storm winds up to 180km.

This Beautiful Fantastic was constructed as a haven for a Port Elizabeth family. Besides the downstairs living area, the house comprises an upstairs mezzanine, four bedrooms and three bathrooms. It was built in three sections with an external timber-framed entertainment area and a sea-facing wooden deck situated on either

side of the main structure, ensuring quality outdoor living.

Its timber-frame comprises wooden posts/columns, roof trusses, cross members and horizontal supports in locally-sourced SA Pine. Posts exposed to the elements are recessed for protection from the elements.

The bathrooms and some of the external walls were built with plastered masonry which helps anchor the timber framework.

One gable end comprises a well-integrated combination of the roof tiles, balau timber



*This Beautiful Fantastic was built with Eagle Roof Tiles Slate-grey Shingle roof tiles which were used to clad the wall facades as well as the roof.*

cladding and plastered masonry facades, with the roof tiles accounting for 80% of the façade covering. Guttering is in aluminium and is concealed so as not to spoil the seamless flow of the Shingle tiles from roof to wall façade.

"Unlike most timber-clad houses which must be sanded and re-sealed every five-to-ten years, roof tile cladding requires no maintenance. Moreover, the homely beauty of concrete roof tiles does not wane or diminish, but endures and improves with ageing," advises Theron. ■

## PROFESSIONAL TEAM

**Owner / Occupier:** Liezl & John Pape

**Architects:** Jacques Theron, Ontwerp Studio, Gqeberha Guy Hart, Khaya Design, Gqeberha, Clayton Johnson-Goddard, NMU, Gqeberha

**Engineer:** Rigo Govoni, Structural Solutions, Gqeberha

**Main Contractor:** Brandon Calitz, Calitz Building Projects, Kenton on Sea

**Electricians:** Righardt van Dyk, Menlo Electrical (Pty) Ltd, Jeffrey's Bay

**Plumber:** Mike Davies, MD Plumbers, Kenton on Sea

**Environmental Services:** Warren Lange, Horticulture Landscape Architecture & Planning, Port Alfred.



# TURBINE FOUNDATIONS AT SAN KRAAL WIND ENERGY FACILITY COMPLETED

Concor recently completed the hollow-cast of the last base at the San Kraal Wind Energy Facility in the Noupoort district, currently being developed by EDF Renewables and project partners H1 Holdings, Gibbs Crede and a local community trust.

San Kraal is one of the facilities making up the Koruson 1 Cluster, on the border of the Eastern and Northern Cape provinces. It comprises three wind farms, namely Phezukomoya, San Kraal and Coleskop, each with installed capacities of 140 MW. Once completed, the 78 wind turbines on

the three wind farms will contribute 420 MW to the country's energy grid.

Each turbine base constructed measures over 20 m in diameter and is around 3,3 m deep, requiring over 400 m<sup>3</sup> of 45 MPa concrete – with an additional 18 m<sup>3</sup> of 50 MPa concrete in the plinth.

A significant difference on the Koruson 1 Cluster of projects was the use of hollow cast foundations, which require considerably less concrete than a conventional foundation, reducing the overall carbon

footprint of the project. While considerably more complex in design and execution, the hollow foundation allows for the inclusion of ducts and facilitates the post-tensioning of cables for the concrete tower. It also includes ducts for the power cables to the electrical reticulation network in the foundation.

At the same time, the construction of hollow foundations is more labour intensive, and requires more formwork and steel reinforcing. Each of the San Kraal wind turbine base foundations used a total of 64 tons of

**Main Image:** Each turbine base constructed measures over 20 m in diameter and is around 3,3 m deep. More complex in design and execution, the hollow foundation allows for the inclusion of ducts and facilitates the post-tensioning of cables for the concrete tower. The construction of hollow foundations is more labour intensive and requires more formwork and steel reinforcing. **Top:** Each of the San Kraal wind turbine base foundations used a total of 64 tons of reinforcing steel and required over 400 m<sup>3</sup> of 45 MPa concrete – with an additional 18 m<sup>3</sup> of 50 MPa concrete in the plinth. **Above:** Concor recently completed the final foundation cast for the San Kraal Wind Energy Facility in Noupoort, as part of the Koruson 1 Cluster.

reinforcing steel and Concor's steel fixing teams had to work with high levels of precision to meet the stringent tolerances required.

The complexity of the hollow foundation design required each foundation to be surveyed in four stages, to ensure they were cast in strict accordance with the design – and to align the 40 post-tension duct cable sleeves for the tensioning cables within a tolerance of millimetres. With a full-time Concor surveyor on site to conduct all the setting out and verification survey

work, a total of 168 setting out points were calculated for each base.

At the peak of construction, the project comprised about 400 employees, most of them from the local community of Noupoort. Concerted safety and technical training on site, as well as close supervision and guidance from Concor allowed the project to complete over 500,000 working hours without a lost-time injury. The contract to complete the turbine base foundations was completed in seven months. ■



Each of the San Kraal wind turbine base foundations used a total of 64 tons of reinforcing steel and Concor's steel fixing teams had to work with high levels of precision to meet the stringent tolerances required.



## NEW CAPE WAREHOUSE BUILT WITH PRECAST CONCRETE

Reserve-5, an attractive 5 500m<sup>2</sup> distribution warehouse in Brackenfell, Cape Town, has been built with several precast concrete elements supplied by Concrete Manufacturers Association member, Cape Concrete Works. Completed in December 2023, Reserve-5's precast components comprise columns, hollow-core slabs for walls and flooring, and precast stairs.

This is no ordinary distribution centre. Visually striking and pleasing to the eye, precast concrete has been skillfully deployed as an aesthetic as well as a structural component by architects BLOCK PLAN. What's more, of the 45 precast columns supplied by Cape Concrete, only two were placed inside the building for roof support.

"We were able to create a sense of rhythm across all elevations," said Gordon Hubbard, managing director of BLOCK PLAN. "We did this by placing the main body of the columns outside rather than on the inner side of the walling. This structural rhythm was further enhanced by capping off the walls with eight-metre L-beams. The 300mm upstand width of the beams mirrors the width of the columns and this gives the walls a very uniform concrete coping on all elevations. Moreover, the beams create a horizontal framework which forms a pleasing contrast to the vertical column work."



The partially complete southern elevation hollow-core wall.

**Visually striking and pleasing to the eye, precast concrete has been skillfully deployed as an aesthetic as well as a structural component by architects BLOCK PLAN.**

The wall columns were cast with vertical slots from top-to-bottom to accommodate the wall slabs and by positioning the body of the columns outside rather than inside the walls, more internal space was generated. Additional space was achieved by restricting the number of internal columns to two.

Cape Concrete installed all the precast concrete elements and Ekcon (Pty) Ltd Consulting Engineers handled the structural engineering.

Construction began with the installation of the columns. Spaced at eight metre intervals across all four elevations, the columns created a framework for the installation of the wall slabs and the roof assembly. Using the Peikko Bolting System, galvanised steel shoes were cast into the bottom of the columns and matching steel bolts were attached to the column footings. The bolts were spliced with the footing reinforcing, a process which required great precision, and to this end, Cape Concrete provided the contractors with templates to ensure that the footing bolts were placed accurately.

Cape Concrete also cast two lifting pins into each column which were neatly grouted once the columns had been installed. The pins enabled a mobile crane to lift the columns off the truck beds and



lower them into position over the footing bolts. Once column alignment had been adjusted with spacers, steel nuts were attached to the bolts to lock the columns permanently into position.

Before the hollow-core walling panels were inserted between the columns, a central heavy-duty roofing girder was assembled on the building's east-west axis. The girder was supported by the two internal columns and two wall columns. Thereafter lighter steel sections were bolted onto the girder

and some of the walling columns. Cape Concrete cast steel brackets into these columns to facilitate the attachment of the steel roof sections to them.

The warehouse has a floor-to-roof height of 11m and all the perimeter columns are 11m high. The two internal columns consist of 8.3m concrete columns mounted with 2.7m steel sections. PVC 200mm rain-water downpipes were cast into the two internal columns. This is because the roof falls towards the mid-point and all rain-water

**Above Right:** The partially completed warehouse showing the masonry walls of the office components on the left and right of the picture. | **Above:** The completed structure. | **Left:** Some of the northern elevation columns showing the vertical slots for the insertion of the hollow-core slabs.

drains into the downpipes and then into drainage pipes embedded in the flooring.

Once all the wall panels were in place, Cape Concrete installed the L-beams which were attached at either end with Y16 dowel bars. Reserve-5 was built for two tenants which was why it is split into two sections, at a two-to-one third ratio. The sections are divided by a brick wall which runs on a north south axis. The larger unit was built with four vehicle access doors and the smaller unit has two. The doors measure 5.5m (height) x 4.2m (width) and two of the doors in the larger unit were built adjacent to each other. Solid, rather than hollow-core panels were inserted above each door. These were required for bolting on the roller shutter door equipment. The construction of the frames for these doors required shorter columns and hollow-core slabs which were also supplied by Cape Concrete.

Each distribution section has a two-storey office component which is housed inside the greater building with floor footprints of 170m<sup>2</sup> and 300m<sup>2</sup> apiece. Cape Concrete's hollow-core slabs were used for constructing the first floor and roof sections in what were otherwise conventional brick and mortar structures. Just under nine metres long and 1.2m wide, the slabs were designed to carry 250kN so that the roof section of each can be used for additional storage. Furthermore, Cape Concrete supplied eight precast concrete staircases for the office structures.

It also supplied 10 solid panels with recesses for the installation of aluminium window frames. Installed at the upper level of the northern elevation, the windows provide the building with natural light.

Reserve-5 is one of five buildings constructed on adjacent sites in Brackenfell and Cape Concrete supplied precast concrete elements for these projects as well.

Gordon said that the use of precast concrete in Reserve-5 halved the construction time.

“It took only three weeks to install the columns and the walling as opposed to three months had in-situ concrete been used. Likewise the use of hollow-core slabs in the office sections saved several weeks.

“Besides other benefits such as standardisation and better quality control we were very happy with the quality of the precast concrete elements. Working with Cape Concrete is a pleasure. Always willing to compromise, they are always happy to sit around the table and resolve any outstanding matters,” concluded Gordon. ■

Reserve-5 is one of five buildings constructed on adjacent sites in Brackenfell and Cape Concrete supplied precast concrete elements for these projects as well.



# PROVIDING LONG LASTING COLOUR FOR CONCRETE



Stains and Dyes: Concrete stains and dyes are applied to the surface of cured concrete. Stains penetrate the concrete, creating a more natural, variegated look, while dyes tend to produce more uniform and vivid colours. Both methods require sealing to protect the colour and enhance longevity.

### Long lasting colour

The longevity and vibrancy of the colour in concrete pavers heavily depend on the quality of the pigments used. High-quality inorganic pigments, such as those provided by industry leaders are formulated to withstand UV exposure, weathering and chemical attack.

Proper mix design is crucial for achieving desired colour outcomes. The water-to-cement ratio, type of cement and aggregates can all influence the final colour. Consistent mixing procedures ensure that the colourants are evenly distributed throughout the concrete.

Adequate curing of concrete is essential to prevent colour fading. Curing compounds or techniques that retain moisture can enhance colour development. Additionally, sealing the surface with high-quality sealers can protect the colour from UV rays, moisture and wear, extending the life of the colour.

Regular maintenance, including cleaning and resealing, helps preserve the colour of concrete. Avoiding harsh chemicals and using mild cleaning agents can prevent damage to the surface and maintain the vibrancy of the colour.

The use of high-quality colourants, proper application methods and diligent maintenance practices are key to achieving long-lasting and vibrant colours in concrete. By understanding the types of pigments available and the best practices for their use, concrete professionals can create aesthetically pleasing and durable surfaces that stand the test of time. ■

Decorative concrete has become a popular choice for outdoor surfaces due to its durability and aesthetic appeal. One of the key factors contributing to the attractiveness is the use of colorants that provide long-lasting and vibrant colours. These are some of the less-known technical aspects of the colorants used in concrete pavers, drawing on information from leading industry suppliers and technical resources.

### Inorganic Pigments

**Iron Oxide Pigments:** These are the most commonly used colourants in concrete. They offer excellent UV stability and resistance to fading, making them ideal for outdoor applications. Iron oxide pigments come in a range of colours, including reds, yellows, browns and blacks. The particles are finely ground to ensure even distribution and consistent colour.

**Chromium Oxide:** Primarily used for green hues, chromium oxide pigments provide exceptional stability and durability. They are resistant to alkali and UV radiation, ensuring that the colour remains vibrant over time. **Titanium Dioxide:** This pigment is used to produce white and light-coloured concrete pavers. Titanium dioxide is known for its brightness and ability to

maintain colour integrity under harsh environmental conditions.

### Organic Pigments

Organic pigments, though less commonly used than inorganic pigments, are employed for certain vibrant colours. These pigments are derived from carbon-based molecules and can offer intense colours. However, they may not have the same level of UV stability and durability as inorganic pigments, making them less suitable for applications with prolonged sun exposure.

### Application types

**Integral colouring:** In this method, pigments are mixed directly into the concrete before it is poured. This ensures that the colour is distributed uniformly throughout the entire batch of concrete, resulting in consistent and long-lasting colour. Integral colouring is particularly effective for large-scale projects where uniformity is crucial.

**Surface colouring:** The dry shake method uses pigments which are sprinkled onto the surface of freshly poured concrete and then worked into the surface during the finishing process. This method is often used to create a more intense colour on the surface while minimising the amount of pigment required.



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### About US

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# TOP 10 TIPS FOR GREENER READYMIX PRODUCTION

Concrete can be a highly sustainable building material when produced with environmental considerations throughout the manufacturing process. Here are ten practical tips to help you produce environmentally friendlier readymix concrete without increasing costs:

- 1 Recycle everything and especially water:** Implement a robust recycling program to minimize waste, focusing particularly on water, which is crucial in concrete production.
- 2 Batch more accurately:** Precision in batching reduces waste and ensures consistent quality, leading to a more sustainable product.
- 3 Reduce visible dust:** Implement dust control measures to improve air quality and reduce health hazards.
- 4 Minimize hidden pollutants:** Address sources of pollution such as idling trucks and inefficient engines to lower your carbon footprint.



Concrete can be a highly sustainable building material when produced with environmental considerations throughout the manufacturing process.

- 5 Introduce automation where appropriate:** Automation can enhance efficiency and reduce errors, leading to less waste and a greener production process.
- 6 Better utilisation of raw materials:** Optimise the use of raw materials to reduce waste and make the most of available resources.
- 7 Maintain high workforce morale:** Motivated staff are more efficient and waste less, contributing to a more sustainable operation.
- 8 Create a smart-plant environment:** Keep your plant neat, tidy and efficient to streamline processes and reduce waste.
- Leverage Android-based technology:** Utilise affordable technology such as tablets and smartphones to monitor and manage plant operations efficiently, reducing the need for more expensive and less sustainable equipment.
- 9**
- 10 Invest in energy-efficient equipment:** Ensure that all machinery and equipment are energy-efficient to reduce overall energy consumption and environmental impact.

By following these tips, you can produce greener readymix concrete and contribute to a more sustainable construction industry. ■

# SPEEDING UP CONCRETE CURING IN COLD WEATHER



Accelerators work during the first 18 hours of the concrete's curing time to ensure efficient hydration required to depalletize. Should temperatures be lower than freezing point, this makes the concrete strong enough to resist the expansion of water as it freezes – so that the concrete will not crack.

Patrick Flannigan, technical manager of the concrete business unit at CHRYSO Southern Africa, explains that there are two categories of accelerator – chloride and non-chloride. While chloride-based accelerators are usually the first choice, they cannot be used if there is steel in the structure or where steel reinforcing is present due to the risk of rust, corrosion and degradation.

"If there is steel reinforcing in the concrete, then a non-chloride accelerator must be selected," says Patrick.

Regarding the use of accelerators in readymix concrete that must travel varying distances to site, he points out the accelerator is best applied once the readymix has arrived on the customer's site. After it is added to the concrete in the mixing truck, it needs to be thoroughly mixed for 5 to 10 minutes before being poured. The admixture gives operators a good 30 to 40 minutes of workability before the accelerated hydration begins, depending on the type of concrete mix.

Another growing benefit of accelerators has emerged as a result of the global sustainability drive, he says, as cement producers, contractors and other customers aim to reduce their carbon footprint. This trend has seen the increased use of extenders such as fly ash and granulated slag in cement.

"The fly ash and slag only start working once there is an initial hydration of cement," he says. "This means that the early strength of a concrete mix will be delayed when there are extenders added."

The accelerating admixture overcomes this initial delay in the early setting, allowing users to achieve their sustainability goals without compromising on speed of the curing process. ■

With South Africa's winter season in full swing, many concrete users will know that slower curing times could derail their contract or production schedules but accelerating admixtures – or accelerators – are available to solve this challenge.



provinces like the Northern Cape and Eastern Cape where temperatures fluctuate widely. Efficient stripping time of formwork is crucial in allowing these projects to meet their stringent deadlines to complete construction and start delivering renewable energy.

With the country's generally temperate climate, it is easy to forget that many provinces and neighbouring Lesotho regularly experience sub-zero temperatures, points out Hannes Engelbrecht, concrete business unit director for domestic and Sub-Saharan Africa (SSA) at CHRYSO Southern Africa. Temperatures do not even need to reach freezing point; the concrete hydration process slows down steadily as temperature drops and actually stops when it goes below about 5 degrees Celsius.



"Low temperatures create a range of problems for contractors and concrete product manufacturers," says Hannes. "Most projects in today's world need to be delivered on a fast-track basis, so there is no room for slow concrete curing to hold up the schedule. Similar constraints apply in the manufacture of precast products, where production must simply keep up with customer orders and delivery deadlines."

He highlights that precast product manufacturers can use a combination of super plasticisers and accelerators to speed up their stripping times and reduce the storage space needed for products to cure.



AfriSam Roadstab Cement is a specialised, high quality composite cement engineered specifically for road stabilisation tasks. Available from leading construction materials supplier, AfriSam, this cement is designed to optimise the properties of soils used in road construction, notably by reducing their plasticity and enhancing their strength and stability.

The formulation of AfriSam Roadstab Cement aims to address the vital requirements of road construction projects by ensuring the durability and stability of road bases. The unique composition contributes to its efficacy, particularly in working with challenging soil types like clay. This addition not only improves the workability of the cement in various soil conditions but also facilitates easier handling and application during the construction process.

Stabilisation using cement also improves the properties of granular materials. When cementitious material is mixed with granular material in predetermined portions and is adequately mixed, compacted and cured, a bound material with significant strength is the result.

An important advantage of AfriSam Roadstab Cement is its extended open working times as it provides ample time for the proper placement and compaction of materials. This type of flexibility in the construction timeline is crucial for achieving optimal results in soil stabilisation, ensuring that the stabilised layers meet the required standards for strength and durability.

Tailored to meet the demanding needs of road stabilisation, AfriSam Roadstab Cement offers excellent performance across a wide spectrum of road material types. Its consistent quality and ability to reduce soil plasticity make it an essential component for constructing durable and stable roads.

By enhancing the strength and stability of road bases, AfriSam Roadstab Cement plays a critical role in the longevity and reliability of road infrastructure.

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## ENHANCING ROAD DURABILITY WITH CEMENT

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By enhancing the strength and stability of road bases, AfriSam Roadstab Cement plays a critical role in the longevity and reliability of road infrastructure. ■



## HISTORIC STELLENBOSCH BRIDGE REBUILT WITH PRECAST CONCRETE BEAMS

The old bridge over the Plankenbrug River (formerly Dwars River) in Stellenbosch has been rebuilt by Martin & East (Pty) Ltd with nine precast concrete beams supplied by Concrete Manufacturers Association member, Cape Concrete. Designed by Infrastructure consultancy, AECOM SA (Pty) Ltd, the first of this two-phase project was completed in August 2022 and the second in February 2023.

The new bridge will provide improved access to Bosman's Crossing, a burgeoning residential, commercial and light-industrial precinct situated in the old KVV Industrial Park immediately east of the bridge.

The site's first bridge appeared in 1691 on what was the old wagon road 'Highway', the earliest formal route into Stellenbosch, and one of the first, if not the first, bridge to have been built in South Africa. The site is considered an integral and authentic piece of Stellenbosch and indeed Cape history, and over the years the bridge was either upgraded or rebuilt.

The area's known historical links can be traced well beyond the 17th Century, in fact to the early Stone Age period some two million years ago. A monument just off the western approach to the bridge marks the point where stone implements, including a Palaeolithic quartzite axe, were discovered in 1899.

The bridge being replaced was erected in stone and in-situ concrete during the early part of the 20th Century. It was upgraded to a narrow double-lane thoroughfare in the 1950s when its abutments and central stone pier were enlarged and strengthened. During the 1960s the structure gradually fell out of use as one of the main routes into Stellenbosch after the construction of the Adam Tas Road Bridge over the Plankenbrug River had provided more direct and faster access. And from

the first decade of the new millennium onwards Distillery Rd was closed as a route into town and only served Bosman's Crossing, which it still does today.

However, the growth of the Bosman's Crossing precinct during the second decade of the 2020s, an increase in traffic and the deteriorating condition of the bridge, prompted the Stellenbosch Municipality to investigate widening and strengthening options.



The site is considered an integral and authentic piece of Stellenbosch and indeed Cape history, and over the years the bridge was either upgraded or rebuilt.



AECOM was appointed to inspect the bridge in 2020 and found the structure to be neither safe nor practical for existing and anticipated traffic volumes.

Based on this finding AECOM was commissioned to evaluate alternatives which compared repair, rehabilitation and upgrading options. And because of the site's possible historic significance the council also appointed a heritage architect to compile a report to be used as a guideline for the rebuild.

Prepared by Rennie Scurr Adendorff Architects and CTS Heritage in consultation with Heritage Western Cape, the report was submitted together with the permit application to upgrade the bridge. Covering the heritage, archaeological, landscape and contextual significance of the site, the report recommended that the new design should respond to the semi-rural character of its immediate surroundings rather than the commercial and residential aspects of Bosmans Crossing.

Several design proposals were considered in the report. In each case the improvements

**Because of the site's possible historic significance the council also appointed a heritage architect to compile a report to be used as a guideline for the rebuild.**

required to improve traffic flow and safety were assessed in terms of: the bridge's alignment and positioning; its component features; load bearing capacity of the old elements; river through-flow and flooding; and the need to limit any potential damage to the surrounding landscape and environment.

The engineering team tabled six design proposals which were workshopped with the heritage team and two options which adhered to both heritage and functional requirements were adopted

and developed further by the engineering team. One proposed retaining the central stone pier as a non-structural component in a single span bridge and the other advanced a two-span structure with a functional central pier.

AECOM's analysis confirmed that the bearing capacity of the existing central pier would be significantly exceeded if it were incorporated structurally in the proposed two-span design and would require another row of piles and further structural modifications. By contrast, in a single-span design using prestressed precast concrete beams supported by new abutments, the central pier could be retained in a non-structural capacity, and it was this solution which was finally chosen. The retention of the pier was recommended because, as with the old abutments, it predates the existing upper structure and could therefore serve as a visual link to the old stone bridge.

An additional heritage aspect was the re-instatement of four existing handrail bollards, which serve as entry markers at either end of the bridge.

Eight metres wide kerb-to-kerb and 22.5m long (two metres longer than the old bridge), the new bridge will accommodate two lanes of traffic. In addition, pedestrians and cyclists are being given cantilevered walkways on either side of the vehicle deck. Besides their functional purpose, the walkways enhance the visibility of the central pier and reflect the character of the old bridge.

The new bridge was designed by AECOM bridge engineer, Heinrich van Wijk, who proposed a precast beam design primarily because it saved time, reduced the risk of flood damage to formwork staging, and limited construction debris falling into the river bed.

"In a cast-in-situ bridge option, there is an element of flood risk when staging formwork above a river bed. Instead we chose to specify a precast construction technique, which limits disturbance in the riverbed and enhanced our application to the Department of Water Affairs for a water-use license," said van Wijk.

Van Wijk's design adheres to the South African bridge design code of TMH7 for NA and NB loads. One of the design constraints was the need to keep the bridge open during construction which is why it was being built in two phases. Apart from 1.5m wide edging which was demolished, the old bridge was left intact during the construction of Phase 1 and was only fully demolished once Phase 1 was opened to traffic.

"The abutments and deck were built in an integral monolithic design, unlike conventional bridges which are mounted on bearings with expansion joints at either end. The integral design approach allows the free articulation of the deck without imposing significant stresses on the abutments. Thermal expansion and contraction is the primary source of movement (elongation and shortening) and the magnitude of this movement is directly related to the length of the deck.

"For shorter decks, such as the Distillery Rd Bridge, conventional expansion joints are not needed. Instead thermal expansion and contraction can be accommodated by buried joints located at either end of the bridge, which allows for the small movement of the flexible abutments.

"Bank pad abutments were cast onto a single row of piles in two lifts. The first abutments were cast above new piles, which varied in depth between 13m and 19m, at either abutment end. The pile diameters were designed with sufficient flexibility to accommodate deck movement and the back-ends of the abutments were backfilled with rounded aggregate, which allowed for ratcheting movement within the fill and prevented the build-up of stresses behind the abutment," explained Van Wijk.

Cape Concrete cast nine 22.8m prestressed beams for the new structure: seven internal beams weighing 25 tonnes apiece; and two edge beams at 35 tonnes each. The edge

symmetrical with thicker sides and flat face finishes. Four beams were used in the construction of Phase 1 on the southern side of the bridge and five were used for Phase 2 on the northern section. Both edge beams were designed to support the cantilevered walkways with protruding transverse pull-out bars.

Martin & East construction manager, Ricardo De Sa said that a temporary barrier was placed on the old bridge during construction of Phase 1.

"Once the piles had been sunk, seven in Phase 1 and six in Phase 2, they were trimmed to the bottom of the foundation level before the first-lift abutments were cast. The second lifts acted as diaphragm beams, tying all the precast beams together at either end of the bridge. Moreover, we cast concrete jockey slabs between the second abutments and the feeder road sections at each end to act as an interface between the solid concrete of the bridge deck and the more flexible road surface," said De Sa.

When the first-lift abutments had reached the requisite seven-day strength, the precast beams were lowered onto temporary steel bearings which had been cast into the first abutment lifts of both phases. In addition, matching bearing steel plates were cast into the beams' soffit sides. After being lowered into position the beams were tied together at the bottom of the lower beam flanges with transverse reinforcing which was covered with a 150mm layer of in-situ concrete.

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The installed beams were capped with a permanent Nutec formwork and reinforcing for the 175mm-250mm cast in-situ bridge deck. The deck was cast with protruding rebar to tie into and support the cantilevered reinforcing of the walkways.

“Apart from some minor staging at each end of the bridge, the walkways were constructed without ground supported staging due to environmental concerns. This meant we had to come up with an alternative method of supporting and constructing the cantilevered platform.

“We opted for inverted steel-girder T-shaped suspension brackets, designed and manufactured by Formscaff, from which the support-work and formwork could be hung. The brackets, which extended 2.4m off the edge of the deck, were mounted on two pivot-point jacks,” explained De Sa.

In addition, the brackets’ horizontal sections were secured to the underside of the deck with diwydag bars, and once all 24 T-brackets had been attached to the deck they were linked together with steel girders and poles to form an integrated support unit. Girder sections were also attached to the underside of the deck to support the Econoform panels used for casting the sloped soffit surface of the walkways.

Six transverse cantilever beams support each walkway slab. They include voids in the concrete to save weight and make provision for future service pipes. The cantilever beam reinforcing was spliced together with Y20 rebar rods which had been cast into the top deck. They were also spliced with R20 inclined pull-out rebar which extended from the bottom of the edge beams.



Additional formwork support was provided by tension cabling which was attached to the top of the vertical bracket sections and the lower support girders on the one side, and from the top of the bracket sections and the end of horizontal girders on the deck side. Once the walkway concrete attained an early strength of 60% of the required 40MPa rating, the cabling was de-tensioned.

After all the support work had been removed, a further 20mm of concrete was added to the top surfaces of the walkways rendering them flush with the 40mm premix layer on the bridge deck. This additional layer includes several service ducts and slopes at 1.5% for stormwater drainage. The bridge itself slopes at 1.0% from west to east for drainage.

The M-type beams were cast at Cape Concrete’s yard in Cape Town as a portal framework based on a bending schedule and rebar drawings supplied by AECOM. They comprise a wide bottom flange, a narrow web portion and a flared upper flange section.

“We used a W50 mix with a super plasticiser in a 100 slump flowable concrete which complied with three durability criteria: oxygen permeability; water sorptivity and chloride conductivity,” said Cape Concrete director Johan Nel. “The plasticiser reduced water consumption and gave us better workability. What’s more, we achieved a transfer strength of 40MPa which was reached in 18 hours using the high-strength mix design and steam curing.

“After de-tensioning, the beams assumed a vertical positive camber of between 15-20mm, but once they were positioned on the bridge and the in-situ deck slab had been cast, they adopted a neutral camber.

“Reinforcing becomes congested when using prestressed strands which is why we used a 13mm stone in the mix. It is vital for the concrete to flow through the rebar and fill the entire structure without air pockets, and smaller stones facilitate this process.

“We used external vibrators and pokers to remove all the air, but we only used pokers on the top flange sections.

“One of the plusses in M-type beam casting is that the bottom flange dimensions remain constant. If larger spans are required one simply adjusts the web or top flange depths. This means one can use an adjustable mould from an M2 to an M10 beam and M3 beams were used at Refinery Rd.

“In this instance the webs were a bit higher and the top flanges a bit deeper. But because the profile did not vary the beam casting was economical. Engineers often design using available moulds and if only small adjustments are required, it saves costs and reduces lead times,” concluded Nel.

Approximately 60m of feeder road on either sides of the bridge is being resurfaced and these new road sections will be bordered with new pavements. ■

**PROJECT TEAM**

- Client:** Stellenbosch Municipality
- Consulting engineers:** AECOM SA (Pty) Ltd
- Main Contactor:** Martin & East
- Precast beams:** Cape Concrete
- Support work:** Formscaff
- Heritage architects:** Rennie Scurr Adendorff Architects
- Heritage consultants:** CTS Heritage

# BERTS BRICKS

## JOINS THE SANS CERTIFIED ELITE

Concrete Manufacturers Association (CMA) member, Berts Bricks, has joined that illustrious ‘club’ of SANS-certified precast concrete producers. Its first audit, which was passed with flying colours, took place in May when the concrete brick and paver production plant at its Potchefstroom brick works were put to the test by CMACS, the CMA’s certification services arm.

The van der Merwe family have been producing clay bricks for four generations since 1939. At present they do so as Berts Bricks Potchefstroom and Molopo Bricks in Mahikeng under the leadership of Zack van der Merwe. As one of South Africa’s largest independent clay brick producers, its two factories leave a geographic footprint that covers 15% of the country’s land mass. What’s more, its products have been used in some of South Africa’s most prestigious projects including Montecasino in Johannesburg and Sun City in North West Province.

Sales director, Jacques Marais, says the combined capacity of the two factories i.e. Potchefstroom and Mahikeng, are able to accommodate the largest of contracts with ease.

“Both plants fire an extensive range of clay facing and stock bricks using the clamp kiln system which has been mechanised and leaves a very low carbon footprint.”

Production manager, Peter Geel, says the company began making cement bricks and concrete pavers in 2010 after importing a precast concrete block making plant in 2009. The plant’s concrete paver output is now SANS certified by CMACS.”

“The precast plant handles our entire cement brick range including the Cement Maxi, modular inners and stock bricks. It also produces our 50mm bevelled pavers and our 50mm cottage stone paver range, as well as our 60/80mm interlock pavers. A variety of colours can be produced on request. We also produce clay pavers which we offer in three colours.

“The original installed production capacity of our imported machine delivered an 18 second drop cycle. Through several years of innovative improvements this has been significantly improved to a consistent

sub 11 second cycle. We also achieved significantly better weighing accuracy when design improvements were made to the skip aggregates weighing mechanism.

“The entire production process is fully automated and PLC controlled through a touch-screen interface.

“In house quality management processes and systems were employed to achieve SANS specifications prior to CMACS certification. We joined the CMA three years ago and the Association has helped us enormously with improvements to our quality management systems, so much so that our transition to SANS certification required little additional input,” said Geel.

Berts Bricks manages its own quality and materials testing laboratory where aggregate specification, compliance and grading are analysed. Additionally, we test for abrasion resistance, tensile splitting and compression and water absorption, all of which are conducted in-house to ensure quality and standards compliance. Our laboratory is also a critical component in the clay-brick production process, conducting various material and energy quality tests throughout the various production processes.

Marais added that customer demand and a reliable total product quality focus was the main motivator in achieving SANS certification. ■



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## RE-DESIGNED RIB & BLOCK FLOORING SYSTEM FASTER AND MORE COST-EFFECTIVE



**Left:** Correctly spaced T-beams.  
**Above:** Filler blocks installed.

Manufacturers Association member, Mobicast, now supplies DRIDEK, a faster, more cost-effective alternative to traditional Rib & Block flooring, a system which the company has been manufacturing for many years.

In contrast to conventional Rib & Block construction, DRIDEK advances the use of precast concrete a step further by replacing reinforced ribs and cast in-situ structural concrete screed with a prestressed T-beam and compression block system.

This makes DRIDEK much quicker to install. No propping is required and installation takes only a day. This means that post-installation construction work can begin immediately thereafter. What's more, specialised skills are not needed for its installation.

According to Mobicast CEO, Chris van Zyl, the system requires very little wet concrete casting, hence the name DRIDEK.

"It was originally designed and patented by structural engineer, D.L. Belter of Gadomski Consulting Engineers and it has been used on a limited scale since 2008, mostly in the coastal regions of the Western Cape. We recognised the system's potential and this led us to invest in a DRIDEK plant at our Groot Brakrivier production facility near

They serve three functions: a safe working platform; permanent shuttering for the in-situ cross beams and compression blocks; and a soffit surface which can be plastered with ease.

Mossel Bay in 2022. Since then, more than 230 RDP houses, as well as many private dwellings and commercial buildings have been constructed with DRIDEK floor slabs."

A DRIDEK floor is constructed sequentially with the following elements:

- Prestressed T-Beams, 220mm deep and 150mm across the bottom flange with castellated cavities in the neutral axis to accommodate services and rebar for in-situ cross beams;

- Filler blocks 90mm thick;
- Y16 rebar for reinforcing cross beams;
- Service pipes and conduits for plumbing and electrical services;
- Compression blocks;
- A cement slurry/paste.

The installation process is simple requiring no costly equipment such as cranes. It begins with the installation T-beams, which can be lifted manually and placed 500mm apart on load-bearing walls. The filler blocks follow and are slotted snugly between the beams. They serve three functions: a safe working platform; permanent shuttering for the in-situ cross beams and compression blocks; and a soffit surface which can be plastered with ease.

Once all the filler blocks are in place, the cross-beam rebar is laid at right angles through castellated cavities in the T-beams at 1 200-1 500mm intervals, and the placement of all the pipes and conduits occurs simultaneously. Thereafter, compression blocks, with hollow undersides to accommodate the services, are placed on top of the filler blocks except where the cross beams are to be cast.

The cross beams are cast with 25MPa concrete as soon as all the compression blocks have



been installed and the concrete required for this purpose is easily mixed by hand on the partially completed slab. This is the only wet concrete cast on site and is only 0.03m<sup>3</sup>/m<sup>2</sup> of the slab surface. The cross beams serve to create a fully integrated structure in which all the beams share the loading, a function which minimises cracking.

The final step is the pasting of a slurry/paste which is swept over the top of the slab to fill any cavities in the platform and to ensure a tight fit between all precast components. Approximately one bag of cement is required per 10m<sup>2</sup> for this purpose.

"A structural screed with steel mesh is not required, but if one is preferred then compression blocks are not used. Instead, wet concrete is cast on top of the filler blocks until it reaches a level 20mm above the top of the T-beams to accommodate

## Spreading the load through the entire floor is one of DRIDEK's major advantages because other systems can only achieve this by using much larger volumes of in-situ concrete.

the steel mesh. However, almost every client prefers using compression blocks because they are so easy to install and their use eliminates the risks in casting large volumes of wet concrete on site.

"Spreading the load through the entire floor is one of DRIDEK's major advantages because other systems can only achieve this by using much larger volumes of in-situ concrete. Another benefit is the minimal deflection of the T-beams, which under typical conditions is only 6,1mm over a 6m span, a statistic which better conventional Rib & Block

systems by a considerable margin. And as with conventional Rib & Block construction two ribs can be placed alongside each other for increased loading requirements.

"For most applications single beams can span up to 6,6m without propping and when using double beams, an 8m un-propped span can be achieved.

"Once a DRIDEK floor is completed an engineer's inspection is not required, one of the reasons why construction work can commence the following day," advises van Zyl. ■



Top: A lateral view of a completed DRIDEK floor. | Left: Completed services and cross-beam rebar. | Right: Compression blocks in place providing cavities for cross-beam casting.

# RETAINING WALLS ADD SYMMETRY TO CAPE PADEL COURTS



This installation shows the exceptional adaptability and functionality of Terraforce retaining-wall products.

Terraforce director Karin Johns adds that even though the blocks are lightweight for easy delivery and installation, when filled with soil, gravel or concrete they attain a mass which provides an additional vertical interlock.

"And when filled with soil, our reversible, hollow-core retainer block system facilitates the creation of wall gardens."

It was only a matter of time before Concrete Manufacturers Association, member, Terraforce entered the padel court arena.

In August/September 2023, Terraforce licensee, Decorton Retaining Systems, constructed several terraced and undulating retaining walls, framing two newly built padel courts for the Atlantic Beach Estate in Melkbosstrand, Western Cape.

The walls were constructed using Terraforce retaining wall and step blocks and were primarily built to place the padel courts on the same level as the estate's clubhouse. Other project drivers were the reduction of

wind force and the beautification of the area surrounding the courts.

Atlantic Beach Estate specified a rustic finish for the walls which is why it chose the Terraforce® L12 block with a rock-face finish. And Terraforce's 4x4 Step Block was used to build the access stairs.

"This installation shows the exceptional adaptability and functionality of Terraforce retaining-wall products," says SP Van Blerk of Decorton Retaining Systems. "The blocks can follow almost any contour, creating undulating retaining walls which not only prop the terraced landscape but are stunningly beautiful."

Terraforce retaining wall blocks are designed for simple stacking using a cost-effective horizontal interlocking mechanism and a shape - unhampered by nibs and slots - which allows for unrestricted wall gradients and curves. ■

### PROJECT TEAM

- Architects:** Harry Greenberg
- Contractor:** Plastotop Barrett's Sports Court
- Sub-Contractor:** Decorton Retaining Systems



Images Top: A beautifully undulating and multi-terraced retaining wall creates the perfect backdrop for the padel courts. | Above Left: The rustic beauty of the L12 block's rock-face finish combines well various types of foliage. | Above Right: One of the staircases built with the Terraforce 4x4 Step Block.



# REPAIRING CONCRETE BRICK PAVING

Concrete brick paving is a popular choice for homeowners due to its durability and aesthetic appeal. However, over time, these pavers may suffer from wear and tear, cracks, fading and subsidence. This guide provides detailed steps for repairing and renewing your concrete brick paving, ensuring it remains in excellent condition.

## Replacing pavers

### Identify and remove damaged pavers:

Locate the broken or severely damaged pavers. Using a screwdriver or chisel, carefully remove the joint sand around the paver. Insert a flat pry bar into the gap and gently lift the paver out. If the paver is stubborn, a rubber mallet can help loosen it.

**Prepare the base:** Once the damaged paver is removed, inspect the base material. If it's compromised, dig out the old base and replace it with a new layer of compacted gravel or sand. Ensure the base is level to avoid future issues.

**Install new pavers:** Place the new paver into the prepared space, ensuring it sits flush with the surrounding pavers. Tap it into place with a rubber mallet. Refill the joints with sand and compact it with a plate compactor to stabilize the paver.

## Resurfacing pavers

**Clean the surface:** Begin by cleaning the pavers thoroughly. Use a pressure washer to

remove dirt, grime and any loose material. Allow the pavers to dry completely before proceeding.

**Apply a resurfacer:** Mix a concrete resurfacer according to the manufacturer's instructions. Pour the mixture over the pavers and use a squeegee to spread it evenly, filling any minor cracks and crevices. Work in small sections to ensure even coverage.

**Finishing touches:** After the resurfacer has dried, apply a concrete sealer to protect the surface from future wear and tear. This also enhances the colour and adds a polished look.

## Renewing Faded Pavers

**Deep clean:** Clean the pavers using a mixture of water and mild detergent. Scrub with a stiff-bristled brush to remove stains and buildup. Rinse thoroughly and let dry.

**Apply a concrete stain or dye:** Choose a concrete stain or dye in your desired colour. Apply the stain using a sprayer or roller, following the manufacturer's instructions. Multiple coats may be necessary for a deeper colour. Allow each coat to dry completely before applying the next.

**Seal the surface:** Once the final coat of stain is dry, apply a concrete sealer to lock in the colour and protect the surface. This step is crucial for maintaining the vibrant appearance of your pavers.

## Repairing cracks

**Assess the damage:** Examine the extent of the cracks. If they are minor (less than 1/4 inch wide), a simple crack filler will suffice. For larger cracks, consider using a concrete patching compound.

**Clean the cracks:** Remove any loose debris and dirt from the cracks using a wire brush or air compressor. Clean the area thoroughly with water and let it dry.

**Fill the cracks:** For minor cracks, use a concrete crack filler. For larger cracks, mix a concrete patching compound according to the manufacturer's instructions and fill the crack using a trowel. Smooth the surface and let it cure.

**Resurface (if necessary):** If the cracks are extensive and affect the overall appearance, consider resurfacing the entire area as described earlier.

## Sand or Grout?

When it comes to filling joints between pavers, polymeric jointing sand is often recommended over traditional grout. Polymeric sand contains additives that bind the grains together, providing better stability and resistance to weed growth and erosion. Mason sand or concrete sand can be used for regular joint filling, but polymeric sand is superior for its durability.

## Best sand

For paver joints, polymeric sand is the best option. It is specifically designed for this purpose, offering a long-lasting solution that resists erosion, weeds and insects. When using polymeric sand, follow the manufacturer's instructions for application and activation.

## Concrete mix type

For patching and replacing pavers, a standard concrete mix (1 part cement, 2 parts sand, and 3 parts gravel) is sufficient. For resurfacing, use a specially formulated concrete resurfacer, which is designed to adhere well to existing concrete surfaces.

By following these steps, homeowners can effectively repair and renew their concrete brick paving, ensuring it remains attractive and functional for years to come. Regular maintenance and prompt repairs will extend the life of your paving and enhance the overall aesthetic of your property. ■



# EXCAVATORS ARE UNBEATABLE IN THE RIGHT APPLICATIONS

The Kubota KX080-3 excavator is proving to be a valuable asset in various construction projects across the country and is particularly suited to tasks in compact environments such as housing developments and industrial applications such as loading of materials, civil engineering projects and small to medium construction operations.

This small but tough machine is particularly good in applications where speed is concerned where the use of a dedicated excavator far outperforms other methods such as using TLB or other less suitable equipment. Its advanced features, combined with the extensive dealer network provided by South African distributor Smith Power Equipment, make it a wise choice for building contractors and concrete manufacturers.

Os du Randt, divisional sales manager of Smith Power Equipment says the Kubota KX080-3 is well-suited for loading hoppers due to its precision and control. Its powerful hydraulic system provides the operator with smooth and efficient operations, making it easier to handle materials without spillage. The machine's compact size allows it to manoeuvre in tight spaces around the concrete plant, which is crucial for optimising workflow and maintaining safety standards.

"When it comes to digging foundations, the KX080-3 also stands out for its power and versatility. Its ability to handle various soil types and its excellent reach and digging

depth allow it to create accurate and stable foundations quickly. The Japanese manufacturer's legendary reliability means it will still be running efficiently long after lesser machines have been relegated to retirement."

## Selection assistance

Concrete manufacturers and contractors often face the choice between different types of equipment, such as TLBs (Tractor-Loader-Backhoes), skid steers, and mini excavators. Here are five reasons why the Kubota KX080-3 is great option:

The KX080-3's system offers greater precision, making it ideal for tasks that require careful handling, such as loading hoppers and detailed excavation work. TLBs and skid steers, while versatile, often lack the finesse needed for such tasks and are far slower due to the deployment of stabilisers and less powerful loading gear.

Despite its power, the KX080-3 has a compact design that allows it to operate in confined spaces. This is particularly beneficial in housing developments where space is often limited, and manoeuvrability is crucial.

The KX080-3 can be equipped with a variety of attachments, including buckets, breakers and augers. This versatility means it can perform a range of tasks that would otherwise require multiple machines, thus saving time and reducing costs.

The KX080-3 is designed with operator comfort in mind. Its spacious cab, ergonomic controls, and excellent visibility reduce operator fatigue and improve productivity. TLBs and skid steers often have less comfortable operating environments.

The KX080-3 boasts impressive fuel efficiency, which translates to lower operating costs. Its advanced engine technology ensures optimal performance while minimising fuel consumption which is a significant advantage over many larger, less efficient machines.

## Specifications and features

Os says the Kubota KX080-3 is equipped with a powerful 63.2 horsepower engine and has an operating weight of approximately 8,195 kg (18,065 lbs). Its bucket capacity ranges from 0.18 to 0.24 cubic meters, depending on the attachment used. It has a Hydraulic Quick Coupler which allows for fast and easy attachment changes and enhanced versatility on site.

An auto Idle System reduces fuel consumption and noise levels by automatically lowering the engine RPM when the machine is not in use, while its Load-Sensing Hydraulic System ensures smooth and efficient operation by adjusting the hydraulic flow based on the load.

"Perhaps the most compelling reason to consider a Kubota KX080-3 excavator is its support through Smith Power Equipment which has a comprehensive dealer network across the country. This network ensures that parts, service and support are readily available. This is crucial for minimising downtime and keeping projects on schedule," he concludes. ■



## SMART NEW OUTDOOR REACH TRUCK

Southern African Hyster dealer BHBW has introduced a new reach truck that works inside and outside providing even more flexibility for storage, handling and loading operations.

The new "2-in-1" RO1.6-2.0 reach truck models, for lifts up to two tonnes, unlock new possibilities on sites with mixed indoor and outdoor operations. Pallets can be retrieved indoors and then loaded into trucks outside, or trucks with varying floor conditions can be unloaded and the pallets put away in the warehouse – all with the same reach truck.

The new outdoor reach truck features Super Elastic tyres for load and drive wheels for use on uneven, outdoor ground conditions, as well as in indoor warehouse operations. The Super Elastic tyres are particularly effective at absorbing the effects of uneven ground surfaces, making it comfortable for drivers while giving the Hyster durability that tough applications depend on.

For added flexibility and warehouse optimisation, the new reach truck also supports operations in narrow warehouse aisles, with a more compact design compared to most counterbalance lift trucks.

For added flexibility and warehouse optimisation, the new reach truck also supports operations in narrow warehouse

aisles, with a more compact design compared to most counterbalance lift trucks. The outdoor reach truck offers 3-stage FFL masts, with tilting and side-shifting forks, support a lifting height of up to 7.5m in the warehouse.

A number of options are available to enable businesses to power productivity in their specific application. For instance, telescopic forks can be added to increase the range of possible pallet positions, or to provide flexibility for operations that may need to load or unload trucks from one side only.

Simple serviceability and diagnostics are integral to the design of the outdoor reach truck, helping to maximise operational uptime. The reach truck is equipped with a range of standard and optional sensors to help enhance component reliability, minimise downtime for repairs, and reduce the total cost of ownership. There is a long service interval of 1 000 hours, reducing service needs and cost. Parts are readily available and easily replaced.

The new Hyster outdoor reach truck adds new depth to BHBW's Hyster warehousing range, which also includes power pallet trucks, pallet stackers, standard reach trucks and low, mid and high-level order pickers and very narrow aisle trucks. ■

# AFFORDABLE BAKKIE FOR CONTRACTORS



JAC Motors announced the introduction of the new X200 2.8L TDI derivatives at a starting price of R295,566 (VAT excl.). These additions enhance the popular X200 forward-cab range, making it more affordable for contractors and material suppliers to acquire economical, rugged workhorses.

This move follows customer research indicating that prospective buyers of forward-cab bakkies seek more affordable acquisition prices due to increased budget pressures. With transportation costs rising, the new X200 2.8L TDI derivatives are the ultimate workhorses to reduce ownership costs.

"We launched the JAC Motors brand in South Africa in 2017 with the X200s, and over the years, they have proven their worth to many customers across Southern Africa," says Karl-Heinz Göbel. "Customers love our X200s for their fuel efficiency, versatility, practicality and dependability."

JAC Motors is the sole competitor in the forward-cab segment, offering a double-cab configuration that legally seats six people.

JAC Motors is the sole competitor in the forward-cab segment, offering a double-cab configuration that legally seats six people. This feature makes the X200 double-cab ideal for contractor teams, ensuring compliance with AARTO safety regulations prohibiting the transportation of workers on the back of a bakkie.

The two new derivatives to the X200 range feature JAC Motors' reliable 2.8-litre four-cylinder direct-injection, inter-cooled turbo-diesel engine mounted under the front seats. This fuel-efficient engine produces 68 kW at 3,600 r/min and 210 Nm of torque between 1,800 and 2,000 r/min.

The X200's powertrain design boasts excellent fuel economy. Power is delivered through a 5-speed manual transmission to the rear wheels. With maximum torque available at low rpm, drivers can minimise gear changes and reduce fuel usage, achieving an impressive average consumption of 8.0 l/100 km (combined cycle).

"The X200 range, featuring a proven 2.8-litre turbo-diesel engine, perfectly matches the country's challenging conditions. Customers can now select either the new 68 kW or existing 80 kW derivatives, ensuring they meet their cargo-moving needs without compromising on engine capacity or turbo power," says Göbel.

The X200 benefits from JAC Motors' new chassis stamping and welding treatment process, developed for the heavy-duty ladder-frame chassis used in their international N-Series truck range, making it robust for many different body applications. The main benefit of a solid ladder-frame chassis frame is the optimum axle weight distribution that enhances safety.

The X200's double-wishbone independent front suspension and robust ladder-frame chassis design allow for improved stability, excellent manoeuvrability and solid handling regardless of how much payload it carries. In addition, the maximum use of axle capacities for ideal payload weight distribution ensures that the driver, crew and cargo will be safe on the road, no matter the conditions.

The X200 features large disc brakes in front and drum brakes at the back, with a load-sensing proportioning valve (LSPV) delivering a safe stopping experience. The X200 double-cab also features ABS (Anti-lock Braking System), offering increased safety.

"When transporting heavy loads, typically what the X200 is made for, it is imperative to have a workhorse that can efficiently navigate different traffic conditions and maintain a constant speed on open roads and highways to ensure safe and timeous deliveries," says Göbel.

A forward-cab bakkie is more practical than a standard bakkie for workhorse applications. Its main benefit is the increased load box size with a much larger load volume, making these rugged workhorses ideal for construction and concrete manufacturer use.

The X200 single-cab's load box measures almost 2.8 metres and supports a large load area of 4,595 mm<sup>2</sup>. Its cargo area of 2,785 mm (length) x 1,650 mm (width), coupled with 355 mm high dropsides, is designed for optimal space utilisation. Its maximum permitted payload is 1,500 kg, which is more than that of its competitors.

The double-cab's maximum permitted payload is 1,300 kg, supporting a large load area of 3,654 mm<sup>2</sup>. Despite the space being used to fit three more people inside the cab, the cargo area of 2,215 mm (length) x 1,650 mm (width) and 355 mm high dropsides can still accommodate heavy and bulky loads, similar to that of its single-cab rivals.

The X200's optimal ride height and ultra-flat low deck of just 785 mm, combined with a standard dropside configuration, ensures easy loading and unloading. This design meets the modern demands of cargo transport, making work conditions more efficient and convenient.

"The no-nonsense work attitude of the X200 explains why it is such a favourite with customers worldwide. Its reliable drivetrain, excellent payload and low cost of ownership make it the ideal bakkie for the toughest jobs thrown its way," adds Göbel.

The X200's elevated driving position allows the driver to see and judge traffic better on open roads and enhances visibility when parking at loading bays. It also includes other advantages drivers and fleet owners appreciate, such as the ease of entrance and exit for drivers and crew in many load stop-and-drop situations.

The X200's compact size and minimum turning radius of 5.4 metres ensure easy manoeuvrability in places where larger trucks cannot navigate. A hydraulic-assisted power steering provides excellent handling, optimised manoeuvrability and safe driving characteristics in all load states and on any road surface.

Crumple zones, side-impact protection bars, height-adjustable headlamps and an immobiliser further enhance occupants' safety. Remote-controlled central locking with motion lock at 40 km/h and an engine that cannot start when the clutch is not engaged further contribute to the safety credentials of the X200.



The spacious air-conditioned cabs of both derivatives feature comfortable synthetic leather seats and headrests to ensure a relaxing drive. There is ample stowing space to ensure equipment can be safely packed away, creating a safe and comfortable work environment for the driver and passengers.

Although the X200 was developed to excel in the harshest working conditions, it features standard equipment such as a height-adjustable steering wheel, a Radio/CD/MP3 player with Bluetooth, and speakers fitted in the front doors. The X200 double-cab also boasts electric windows.

"The X200 is the only double-cab in a forward-cab configuration in the local market and offers distinctive benefits regarding crew transport. Considering that it still supports a payload of 1.3 tonnes like its single-cab rivals, it makes perfect sense for companies with labour-intensive working teams to buy this unique product to keep their workers safe and to comply with AARTO legislation," concludes Göbel.

The two new X200 2.8L TDI 68 kW derivatives also boast a 7-year/200,000 km warranty comprising a comprehensive 5-year/100,000 km warranty covering essential mechanical components, plus an additional 2-year/100,000 km warranty covering drivetrain components. Service intervals are scheduled for every 10,000 km/12-months.

JAC Motors has over 70 dealerships across Southern Africa to ensure its customer-centric approach to after-sales service provides an unmatched customer experience for all its customers. ■



## HOW SMALL CONTRACTORS ENSURE SUCCESSFUL PROJECTS

One of South Africa's best-known hire company, Coastal Hire, shares the secrets of success for small, small contractors to make their projects more successful. According to company experts, many projects' success depends on having the right equipment.

Here is advice from the hire experts to show small contractors how it's done:

**1. Choose the right equipment for the job**  
Choosing the right equipment is the first step towards a successful project. Coastal Hire provides a vast selection of high-quality equipment tailored to various needs. For instance, concrete mixers are essential for any construction project involving concrete. Using a reliable mixer ensures that your concrete is well-mixed and sets properly.



Small contractors can ensure successful projects by choosing the right tools to maintaining a clean and safe worksite.

**2. Optimize your workflow with reliable machinery**  
Efficiency is key. Coastal Hire's scaffolding and ladders can help you reach higher places safely and quickly, making tasks like painting or installing fixtures much easier.



**3. Ensure precision with the right tools**  
Precision tools are crucial for small contractors who need to maintain high standards of workmanship. Coastal Hire offers laser levels, dumpy levels and measuring wheels that ensure accuracy in your measurements and alignments.

**4. Maintain a clean and safe worksite**  
A clean and safe worksite is critical for project success. Coastal Hire's cleaning equipment, such as high-pressure washers and vacuum cleaners, help you keep your site tidy, which is not only important for safety but also for maintaining a professional appearance.

**5. Manage your budget effectively**  
Renting equipment from Coastal Hire allows small contractors to access top-tier equipment without the high upfront costs of purchasing. With flexible rental options, you can choose the exact equipment you need for the duration of your project, avoiding unnecessary expenses.

**6. Take advantage of expert advice**  
"Coastal Hire doesn't just provide equipment; we offer expert advice to help you choose the right tools for your project. Our knowledgeable staff can guide you in selecting the most suitable equipment, ensuring you have everything you need to complete your project."

"Small contractors can ensure successful projects by choosing the right tools to maintaining a clean and safe worksite, Coastal Hire provides everything you need to complete your projects efficiently and to a high standard." ■

*Images: Coastal Hire provides contractors with a wide range of equipment from rollers to compactors to specialised concrete drilling and cutting equipment and much more*



# UNDERSTANDING MASONRY DRILL BITS: A COMPREHENSIVE GUIDE



Masonry drill bits are specialized tools designed to cut through tough materials such as concrete, brick and stone. These drill bits are essential for contractors and DIY enthusiasts who work with masonry materials. This article explores the key aspects of masonry drill bits, including the power requirements for electric and rechargeable drills, the best materials for these bits and tips for their efficient and durable use.

### Power Requirements

When using masonry drill bits, the power of the drill is crucial. Electric drills are generally more powerful and are preferred for heavy-duty tasks. For drilling into hard concrete or thick stone, a corded electric drill with at least 7 amps of power is recommended. These drills provide consistent power and can handle extended drilling sessions without overheating.

Rechargeable (cordless) drills offer the advantage of portability and convenience. Modern cordless drills, equipped with lithium-ion batteries, can deliver impressive power, often ranging from 18V to 24V. However, for intensive masonry work, ensure the drill has a hammer function and high torque. This feature provides the percussive action necessary to break through hard surfaces.

### Best Materials

The effectiveness and longevity of a masonry drill bit largely depend on its material. Here are the top materials contractors should consider:

**Carbide-Tipped Bits:** These are the most common and recommended for masonry work. The carbide tip is extremely hard and maintains its sharpness longer, providing clean and precise holes.

**Diamond-Coated Bits:** Ideal for the hardest materials, diamond-coated bits are highly durable and offer superior cutting performance. They are more expensive but are worth the investment for extensive and frequent masonry drilling.

**High-Speed Steel (HSS) with Carbide Tips:** These bits combine the flexibility of high-speed steel with the hardness of carbide, making them versatile and robust for various masonry tasks.

### Effective use

To achieve maximum drilling speed and avoid damaging the concrete or bit, follow these guidelines. Proper drill setting is important. Always use the hammer drill setting for masonry. The hammering action helps break up the material, allowing the bit to penetrate more efficiently. Maintain

steady moderate pressure. Pushing too hard can overheat the bit and cause it to wear out quickly, while too little pressure can result in slow drilling and bit damage.

Masonry drilling generates significant heat. Periodically withdraw the bit from the hole to cool it down and clear away debris. Using water to cool the bit can also extend its lifespan and prevent overheating. For larger holes, start with a smaller pilot hole. This reduces stress on the bit and the material, making the process smoother and faster.

### Protecting the Concrete

To minimize breaking or spalling of concrete it is wise to pre-drill pilot holes: As mentioned, starting with a smaller bit can help prevent cracks and chips. Applying masking tape over the drilling area can help reduce spalling by keeping the surface intact as the bit enters. Begin drilling at a lower speed to establish the hole, then gradually increase the speed. This helps maintain control and reduces the risk of damaging the material.

### Extending bit lifespan

Use the right bit for the material. Ensure you are using a bit designed for the specific material you are drilling and avoid overheating. As mentioned, overheating can quickly degrade a bit. Keep the bit cool by using water or allowing it to cool periodically. Inspect your bits regularly for signs of wear and replace them as necessary. Dull bits are less effective and can damage both the drill and the material.

Keep your bits in a dry place and protect them from impact and moisture, which can cause rust and reduce their effectiveness.

Remember, choosing the right masonry drill bit and using it correctly is essential for efficient and precise drilling. By considering the power requirements, selecting high-quality materials, and following best practices for use and maintenance, you can achieve excellent results and extend the life of your drill bits. ■



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