

Extending the future

By Wilhelm du Plessis

Building construction materials group, AfriSam, is committed to producing products that enable customers to build with confidence while at the same time protecting the environment through a responsible manufacturing process. It is South Africa's largest producer of aggregate and the second largest producer of cement and readymix concrete and is especially concerned about significantly reducing carbon emissions.

True to its principles

"AfriSam was involved in environmental responsibility initiatives long before it became part of common discussion," says AfriSam's group marketing manager, Victor Bouguenon. "With responsible, we mean setting the industry benchmark in terms of emission control and energy efficiency; committing ourselves to the reduction of waste; the reduced use of fossil fuels and the use of alternative energy/fuel resources; reducing our mining footprint and minimising the environmental impact of our operations; rehabilitating mined areas; safety; employee training; and reinvesting in communities in the areas in which we operate."

In fact, AfriSam was the first South African building materials producer to publish an environmental policy back in 1994. "This policy, which has undergone various revisions, commits AfriSam to sustainable development," says Bouguenon.

"For us sustainability fits squarely into our 'making a difference' policy," he says. "It is a case of not just doing business as usual." They have, for instance, launched the 'AfriSam-SAIA Award 4 Sustainable Architecture' which aims to applaud buildings that take regenerative, restorative, responsive and environmental concerns into consideration.

AfriSam has spent in excess of R1-billion in various improvement initiatives since the

environmental policy was formulated in 1994. "These ranged from installing sophisticated plant to reduce emissions, reducing the use of non-renewable resources such as coal, introducing technologies that have established us as the leader in the production of composite cements (between 1990 and 2006 they managed to reduce CO₂ emissions per ton by 34%) to significantly improving our energy efficiencies."

Eco Building Cement

One of the focuses for sustainable development in this policy is the 'minimisation of environmental degradation and pollution', so it only made sense that AfriSam has started a move whereby its products will further this process.

"Cement is the second largest utilised commodity in the world after water and contributes 5% of the world's carbon emissions," says Bouguenon. "We feel it is our responsibility to leave a legacy for the next generation while still moving forward."

When clinker is manufactured (the cementitious component of cement), 60% of CO₂ is emitted as a result of de-carbonisation. "By reducing the clinker component of cement, one reduces the CO₂ emission," says Rajen Naidoo, product technical manager – readymix Gauteng.

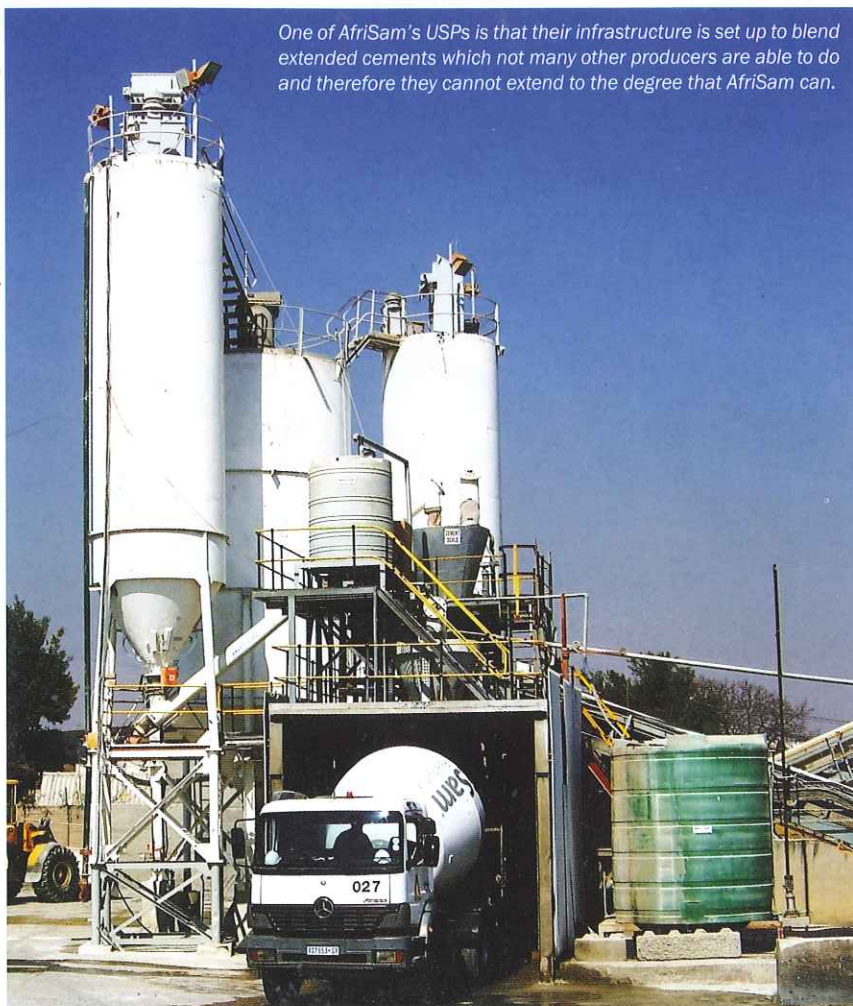
To achieve this reduction, less carbon-intensive materials are used to replace a percentage of the clinker component. "Mineral components like slagment (first used in the 1960s), fly ash (first used in the 1990s) and limestone are used as extenders," says Naidoo. Slagment and fly ash are, respectively, by-products from the iron making and electrical generating processes. What makes them even more attractive is that, by using them, they are able to produce high performance cements and concretes which are more eco-friendly.

"It works on the principle that if you cannot measure it you cannot manage it."

The first branded product that AfriSam has produced to directly satisfy this policy, is its Eco Building Cement which was launched in May. It is produced at the company's Roodepoort factory. "The product has been received well in the market – during the first month it bettered our forecasts by 23% and sales have been growing impressively since," says Bouguenon. Moves are afoot to increase its availability outside Gauteng.

Although its Eco Building Cement is its first branded eco cement, AfriSam had already launched what they called 'Project

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Green Cement' in 2000. The building material market at that time only supplied pure cement to readymix operations. We were one of the first companies to introduce composite cements using less carbon-intensive materials," says Bouguenon.

"We have now produced our Eco Building Cement in bags and there is a definite need to extend it into bigger construction areas, hence our investigation into readymix to provide a solid and comprehensive green alternative for the construction industry," he says.

"The natural perception is that when something is environmentally-friendly it is going to cost more and we have worked very hard to ensure that this product does not carry a premium but is positioned at around the same price as our normal cement," explains Bouguenon.



Towards eco concrete

By using extenders, AfriSam's Eco Building Cement reduces the total carbon dioxide emitted into the atmosphere.

"This cement has a carbon rating of 401 g/kg which is less than half of the world average of 890 g/kg," says Naidoo. This rating system was introduced at the end of 2009 and indicates the carbon footprint of each of AfriSam's cement products relative to the world average as calculated by the World Business Council for Sustainable Development (WBCSD).

"In addition," says Bouguenon, "we assess the carbon footprint of our 40 readymix concrete operations and our 16 quarries and aggregate processing plants. We work on the principle that if you cannot measure it, you cannot manage it."

"One of AfriSam's USPs is that our infrastructure is set up to blend extended cements which not many other producers are able to do and therefore they cannot extend to the degree that we can. If you cannot extend the clinker factor, you are not getting to the heart of the carbon footprint problem since roughly 60% of CO₂ in the cement process is emitted as a result of de-carbonation. This is an inherent requirement of the clinker manufacturing process to convert unreactive limestone into reactive lime," warns Bouguenon.

"By extending our high performance cements, on the readymix side we can make the equivalent of what goes into that green bag," explains Naidoo.

"We are currently still busy with the trials to determine exactly what we are going to put out into the industry in terms of concrete. Typically the norm is that industry is supplied with concrete with a carbon footprint of about 450 kg/m³," says Naidoo. AfriSam is aiming to produce concrete for industry that will be significantly less than half this," explains Naidoo.

Research

The research team consists of the readymix sector (of which Naidoo is the product technical manager) and the cement sector of which Mike McDonald is the product technical manager.

'National standard'

The durability indices that are currently being specified are not yet a national standard. They were developed by the Universities of Cape Town and the Witwatersrand. "They have compiled a monogramme of what is considered a good, fair and bad concrete and have included indices which the industry in South Africa has adopted. These indices are used in specifications," says Naidoo.

SANRAL (South African National Roads Agency Limited) used these specifications on most of its road projects. "This also implies that the concrete must meet a minimum durability standard," says Naidoo. AfriSam has, since the introduction

of the durability standards, been meeting and bettering the specifications. "In order to meet the specifications the entire industry went in at higher cementitious contents. We have found that we can meet the specifications with much lower cementitious contents in our concrete," says Naidoo. This means that our concrete has a significantly lower carbon footprint and is exceptionally durable.

Benefits

The benefits of this product outweigh the conventional concrete produced up to now. Well designed and activated mineral components enhance the durability and workability of cement without affecting strength and setting behaviour negatively.

"Recent studies clearly indicate that the concrete that we supply is far superior in terms of durability – initial results show that these products are meeting the current durability specifications set by SANRAL.

By meeting these specifications the market is becoming increasingly more accepting of our highly extended products," states Naidoo.

Green Star rating

At the moment, adherence to the Green Building Standards is not compulsory. This means that building owners can voluntarily submit documentation to the Green Building Council of South Africa which assesses the submission and scores the building, giving it a Green Star rating.

Bouguenon believes that, in time, green buildings will become the norm. "It is a case of public pressure – as pressure comes to bear, people will be more inclined to move down that track. Some local governments are adopting it quite strongly and, if that pressure starts building, the architects, specifiers and developers will follow suit," says Bouguenon. As such, there is a strong move towards green buildings and the momentum of the Green Building Council of South Africa is gaining momentum.

"As a company, we have developed that meets WBCSD guidelines and determines the carbon footprint of a product. This model is now also being used by the Cement and Concrete Institute. We are applying the model to our existing mix designs to determine the emission values. Based on this, we then decide as a team what exactly we will be producing and supplying to market," says Naidoo.