

## Coal Combustion Product Type

Fly Ash

## Project Name

De Hoop Dam

## Project Location

Limpopo, South Africa

## Project Participants

Ash Resources, PPC Cement, ARQ Consulting Engineers, De Hoop Construction West, B&E International, Quanza JV, Limpopo RR & Construction, SA Rock Drills, SA French, NSI, Twin Cities, BASF

## Project Completion Date

2014

## Project Summary

The Limpopo province lies in the northernmost region of South Africa and boasts a hot, dry climate. Access to water has long been a concern for the towns and rural communities throughout the province. Equally important, water is also required for use by the mining sector to unlock Limpopo's vast platinum deposits—the largest known unexploited mineral wealth in the country. Construction of the De Hoop Dam is intended to store water for both of these purposes.

## Project Description

Construction of the De Hoop Dam was first announced by former President Thabo Mbeki in 2003. Site selection settled on a portion of the Steelpoort River in Limpopo's water-stressed Sekhukhune district. Plans called for an 81-meter-high, 1-kilometer-long roller compacted concrete (RCC) dam that would store 347.6 million cubic meters of water.

Several concrete mix designs were considered for the dam's construction. Past RCC dams in South Africa had opted for a mix incorporating low levels of cementitious material. Engineers for the De Hoop project ultimately settled on "high-paste, high-workability" mix designs where both immersed poker vibration and roller compaction were used together during placement—both firsts in South African dam construction.

High workability was important for the mixes because crusher sand had to be used for the project. The mixes' high cementitious content helped provide a more impermeable

concrete than traditional RCC mixes—allowing engineers to avoid the need to build the "skin concrete" normally required to attain the density required as a barrier to upstream water.

Ash Resources' Matla plant supplied the fly ash for the mix, which amounted to roughly 70 percent of the dam wall's total cementitious content. During the roughly five years of construction, the company supplied almost 165,000 metric tons of DuraPozz®Pro ash for the project. The workable concrete mixes allowed for fast-track construction, and several concrete placement "firsts" were set—including a (South African) record for placement of 131,000 cubic meters over 28 days during November 2011.

Construction of De Hoop Dam was recognized with several awards, including winning both the "Sustainable Concrete" and "Civil Engineering Structure" categories at the 2013 Fulton Awards, sponsored by the Concrete Society of Southern Africa.



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