

## Novel sand diversion method protects harbour entrance

The contract for the construction of the Sand Bypass Project was awarded to Concor Joint Venture in September 2002 and is valued at approximately R100 million. The duration of the project is 36 months and is scheduled for completion at the same time as the main maritime contract on 6 October 2005.

The joint venture responsible for the construction of the Sand Bypass consists of a partnership between the sponsor Concor Holdings (Pty) Ltd and Ngqura Empowerment Contractors (NEC), which is made up by Africa Construction, Siyaya Civils, Sakhisizwe/Yethu JV and M.M. Civils.



The scope of works is split evenly between civils and electro-mechanical items. The later portion of works consists of the supply, installation and commissioning of various suction and pumping equipment as well as sand delivery pipelines. This work will be undertaken by Concor Engineering, a division of the Concor Group.

The civil portion of the works, which is being undertaken by seconded staff from Concor Civils and the various other NEC partner companies, consists of the construction of a pump station, a wave protection concrete wall and a 225m long concrete jetty pier which straddles a 250m long and 8,0m deep excavation in the sea bed.

Notwithstanding the importance of the various elements of the project, the most significant

item is the construction of the jetty pier. As the structure is located in the active surf zone, the contractor opted for land based construction methods to excavate the sand trap in the ocean bed and to construct the concrete jetty supported on vibro-driven piles.

### Bund wall

In order to execute the work in such a manner, a bund wall needed to be constructed to protect the works from the sea action. After extensive research and design, the decision was taken to construct the bund wall in the form of a horseshoe, utilizing sand filled bags. The sand is obtained from the adjacent beach and pumped into purpose designed bags with 320m<sup>3</sup> per hour dredging pumps.

The sand filled bags, weighing some 8 tons, are placed into the sea by means of 100 ton and 80 ton crawler cranes to form the bund wall with a trapezoidal cross section. At the "nose" of the wall, the embankment will have a base 30m wide and an overall height of 13m from the seabed to the crest of the wall. A total of 60 000m<sup>3</sup> of beach sand will be used to fill 18 000 bags.

Once the bund wall is completed, approximately 200 000m<sup>3</sup> of beach sand, in two phases, will be transported to create a temporary working platform to allow an impervious slurry wall and later piling followed by the concrete pier. Once the concrete pier has been constructed, the sand platform and sand bag bund wall are to be removed, allowing commissioning of the jet pumps. At this stage some 500 000m<sup>3</sup> of sand and rock will have been moved during the various stages of construction.

After having been handed over to the client, the jet pumps will dredge the sand trapped in the "Sand Trap Trench". The sand, which otherwise would have migrated into the harbour entrance channel, will be transported along a 300mm diameter pipeline and discharged 3,5km away on the eastern side of the Ngqura Harbour. Hence the concept of the Sand Bypass.

Although other sand bypasses have been constructed elsewhere, the uniqueness of the Ngqura Sand Bypass will be recorded as a first.

