

BUILDING TODAY: Instant success in China

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QUEENSLAND-based *Instant* Screw Piling has made a big impact in the burgeoning Chinese construction industry, with its screw piling system said to be the first of its kind to enter the market.

The \$US4.5 billion Shell Nanhai petrochemicals project in Daya Bay, Southern China is ISP's first project in China. The plant, due for completion in 2005, will be the largest of its kind in the world, delivering 2.3 million tonnes of petrochemical products each year. It is the largest Sino-foreign project ever undertaken in China.

David Kelly, managing director and design engineer for ISP, recently returned from spending three months on site where large capacity screw piles were being installed.

"Introducing screw piling in China has been like starting a whole new industry," Kelly said. "The Chinese Government building standards that relate to a project of this scale are world class, and in excess of our own standards in Australia.

"We have been told many times by the Chinese government inspectors, Shell and the project manager BSF (a joint venture between Bechtel, United Kingdom-based Foster Wheeler and Sinopec) that this is the first time that screw piles have been used in China, and I guess this has added focus to what we are doing there.

"We are involved in the water and wastewater facilities component of the project, where both stormwater and polluted water from the site will be treated before being discharged into the Daya Bay through a 26km pipeline.

"The screw piles are holding down what is quite possibly the largest swimming pool in the world. The controlled discharge basin is a large holding tank that measures 110m by 110m and is 6m deep.

"The high water table in the surrounding soil exerts a hydrostatic force on the base of the basin, and means that when the basin is empty it would float.

Our screw piles are actually holding the tank down: I guess you could say that we are literally screwing the tank to the ground."

In addition to the need to resist tension (350kN) and compression (400kN) loads, a complex geotechnical matrix on the site makes screw piles the fastest and most economical piling solution. The screw piles are founded in an extremely weathered mudstone found 12-15m below the invert of the tank base.

The top 4m, comprising a clay-gravel mix with cobbles 200-900mm diameter, set a particular challenge. "This mix is too large to drill and remove using a conventional auger system, so we introduced a static piling rig to pre-form a pilot hole," Kelly said.

"This large rig weighs in at 600 tonnes and has a hydraulic system that enables a 500mm diameter steel probe to be forced 4m into the ground to form a pilot hole for the screw pile."

Once the screw pile installation is completed, the void surrounding the pile is backfilled with concrete. The one-piece screw piles have twin 700mm diameter helixes at their base and are the longest screw piles ISP has installed in one piece. The piling rig has a 20m mast, making it possible to install 15m piles.

Kelly said the high environmental protection and workplace health and safety issues on the project "contributed to a fabulous experience where we have demonstrated the wide benefits of screw piles in an environmentally sensitive manner".

ISP has previously supplied its system to projects in New Zealand, Singapore and across Australia. It expects further contracts to follow in China as the massive rollout of infrastructure projects, requiring new and rapid construction techniques, continues. – Greg Keane

Contractor