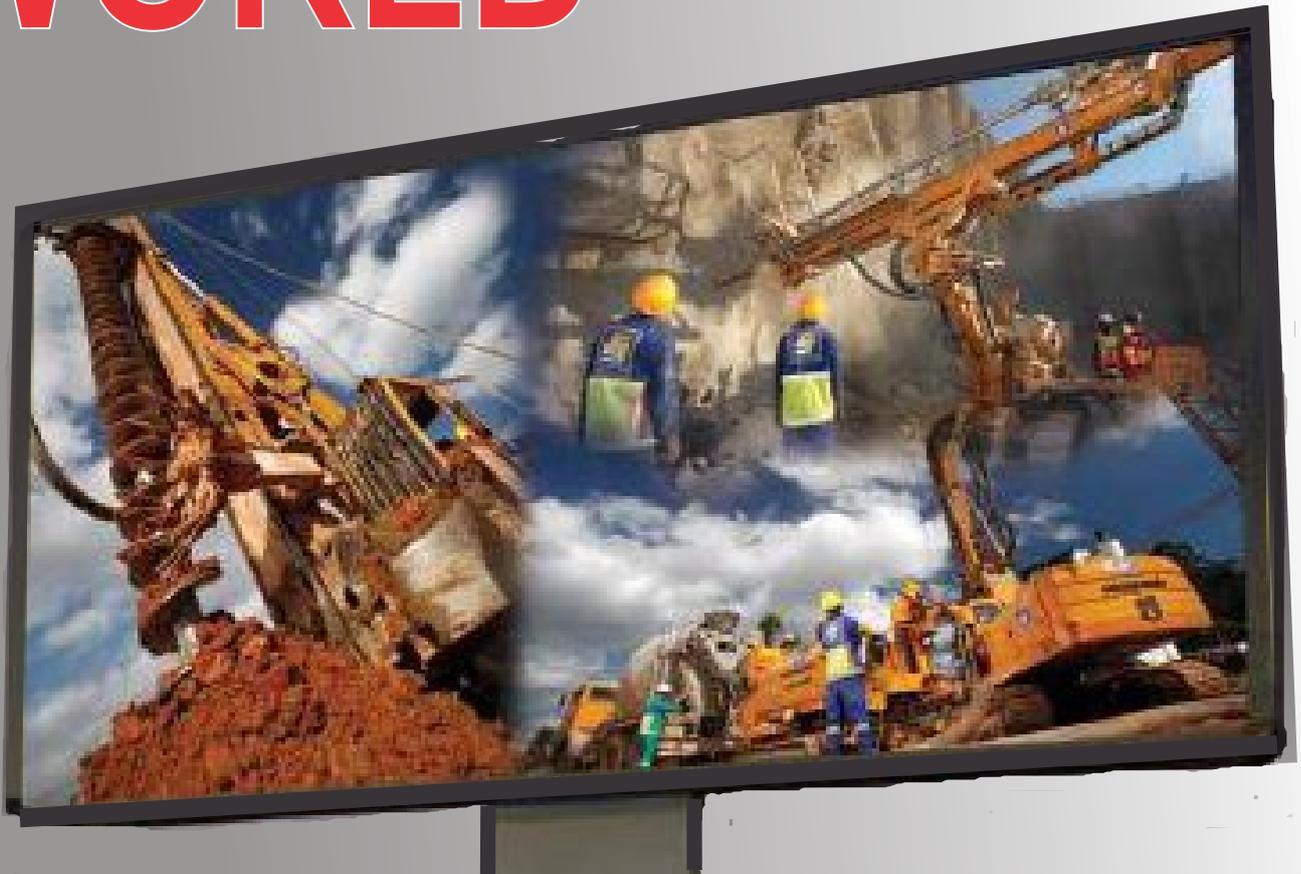


# CONSTRUCTION WORLD



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# Innovative technology saves money

Abu Dhabi's current fishing port is over 40 years old. Its structures are deteriorating, and it does not have the capacity to support the region's rapid growth in population and accompanying increase in the demand for marine services.

**AURECON HAS RECENTLY** completed a commission for the City of Abu Dhabi to develop a New Fishing Port to be constructed next to Saadiyat Island on reclaimed land.

Initiated in September 2009, the project's maritime works involved reclamation of 43 000 m<sup>2</sup> of land, as well as a quay wall. The 776 m and 18 m deep wall around the port is now complete, and has set an industry precedent in innovative precast technology in the region.

## A tight squeeze

"Because there was only 5 m between where the wall needed to be constructed and the sea, bringing the water level down so that precast panels could be attached to the wall was a major safety risk as it would require the use of heavy duty equipment over a prolonged



The completed quay wall.

period of time. Added to this, using such heavy equipment so close to the sea edge would be both expensive, and risky," explains Aurecon project manager, Nasser Abdalla.

## The solution

Aurecon, who provided project management, design management and construction supervision for the project, worked together with contractors Soletanche Bachy Dubai to develop a novel way around this problem. The contractor recommended fitting the precast panels to the wall panels prior to the construction phase, and not as a retrofit.

Aurecon's careful review of this design found that the process was indeed viable if the regular gap was left between each precast panel and wall panel. The off-site casting yard for the panels was carefully monitored by Aurecon as the project required very strict tolerances, as well as careful installation supervision.

"This innovation made it possible to deliver a great wall design with aesthetically pleasing cladding whereas, using conventional methods, it would have been impossible to do so, given the lack of space," says Abdalla. "This process not only overcame safety challenges, but ensured massive savings on both time and money to the tune of 20-million dirhams (R41 856-million)," adds Abdalla. It is the first time this innovation has been used in this region, and as such, a patent will soon be launched on the system.

## All-important replicability

"Importantly, the innovation has vast scaling-up potential. Apart from quay walls, use of the innovation can also be applied to include



A precast panel is moved into position.

excavations requiring the fitting of patterned or non-patterned facings to façades, such as car parks, cut and cover tunnels etc.," claims Abdalla.

The port's accompanying infrastructure and superstructure, including drainage systems, a fisherman's hostel to accommodate approximately 1 400 fishermen, admin offices, fish market, cleaning facility, block and crushed ice factory, outdoor and indoor auction area, as well as ship maintenance yard, is set to be initiated this year for completion by the end of 2013. ■

## Project team

- **Nasser Abdalla:** Senior project manager
- **Professor Hossam Refaat:** Ports and marine expert
- **Wim Frencken:** Project leader
- **Ken Gillard:** Project director
- **Stephen Hannel:** Site supervision and HSE
- **Sunil D'Souza:** Site supervision

# Leading supplier in the Western Cape

Portland Builders was founded in 1988 by Nico Heyns and Helenus Scholtz. The company has since been transformed into one of the leading suppliers of aggregates, ready-mix and hollow core in the Western Cape, operating under the name of Portland Group.

**PORTLAND HOLLOWCORE** manufactures their precast panels in a state-of-the-art factory situated on the Portland Quarry premises on the Vissershok Road.

Hollow core panels are manufactured using either an extrusion or slipforming process.

Portland's hollow core panels are manufactured using an Elematic Extrusion machine. This extrusion process involves feeding dry mix concrete onto rotation screws by means of a moving hopper. The screws force the concrete through shaping plates and out of the

rear of the extrusion machine, while holes are forced into the concrete panels by circular mandrills, trailing behind the screws.

Slipformed hollow core panels on the other hand are manufactured using a two or three stage process. The slipform machine is propelled by drive wheels and electronic motors. It feeds a layer of dry mix concrete onto the casting bed while moving along the bed with the hopper. This process is followed by an upper layer of concrete fed from another hopper above and around void formers which moves back and forth, forming longitudinal holes in the panels.

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Because of the smaller size of the holes, formed in the slipform process, more concrete is needed per panel than needed when making use of extrusion. For the extrusion process this causes weight saving, reduces transport costs and causes the more efficient usage of the prestressing cable. The larger hole also makes it easier to accommodate service pipes conduits including down lights and transformers.

Portland's extrusion machines are state-of-the art Elematic machinery imported from Finland. The hollow core panels created by these machines have longitudinal voids which reduces the volume of concrete used when compared to a solid concrete slab of the same depth. The manufacturing process also ensures that the undersides of the deck panels are perfectly smooth and level.

Hollow core panels are installed into load bearing support by means of mobile, tower or truck mounted cranes. After installation, small key joints between each panel are filled with concrete, and building work above the deck can continue with minimal delay having occurred.

Hollow core decks require no propping, allowing full unrestricted access for finishing trades to continue working below the deck. Portland manufactures panels - 160 mm thick, which can accommodate spans of up to 7 m. It also manufactures 200 mm thick panels to accommodate spans of up to 9,5 m between load bearing support.

Portland's wall panels are manufactured using the same process as their floor panels, but with a tongue and groove profile to accommodate the correct seating of each panel.

Hollow core decks and walling offers many benefits to the constructor. The panels are easily hoisted off the back of a truck and placed into position with a lower crane, making it a quick and dry process. The slabs are placed as soon as the supporting brickwork has been built to the correct height. The filling of V-joints with concrete can take place immediately and construction can continue without any delays. The Portland Hollowcore production plant, situated at Durbanville, can easily produce an average of 350 m<sup>2</sup> precast slabs per day without extended working hours. ■



6000m<sup>2</sup> Under Roof  
Production Facility



Wall Panels



Production Capability  
7000m<sup>2</sup> per Month



# Portland HOLLOWCORE

## Precast Decking and Walling

- Precast Hollowcore Panels* ●
- Panels for Walling & Retaining* ●
- Concrete Columns & Beams* ●
- Concrete Staircases* ●
- Design, Manufacture and Installation* ●

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