



## Wan Chai Development Phase II – Precast Submerged Tube Tunnel Zhuhai Qi Wan (Precast Site)

Client : Highways Department  
Engineer: AECOM  
Customer: Leader Civil  
Engineering Corporation Ltd &  
Excel Concrete Ltd

Sector: Marine, Road Tunnel

Date: Nov 2012 – July 2013

### THE PROJECT

This is part of the Wanchai Development Phase II project located along the north water front of Hong Kong Island. The project involves reclamation, submerged tube tunnel over existing MTR Tsuen Wan Line creating by-pass for traffic under the water surface and a world-class continuous waterfront promenade from Central to Wanchai for citizens and visitors. One of the major challenges for this project is that the by-pass tunnel is directly on top on an existing operational MTR Line. Any additional surcharge and movement which will affect the existing MTR line would be catastrophic. Bored pile wall either side of the MTR line supporting a SINGLE precast immersed tube tunnel section bridging over the MTR tunnel was the adopted engineering approach.

### THE SOLUTION

A gigantic single precast unit was chosen over several large units, project time frame was tight and demanding concrete specification posed many challenges to our customers, the main contractor and concrete producer. The customers found a suitable dry dock in Zhuhai close to Hong Kong, large enough to allow them producing this precast section in one piece. Fosroc's complete waterproofing and admixture solution offered both convenience and performance to our customers. The concrete specification required high flowability, relatively high early strength with the use of PFA and silica fume in the design mix, coupled with very low water/binder ratio was proven very difficult to achieve with ordinary admixtures. Fosroc Auracast 400 provided the best performance to our concrete customer and Fosroc provided promptly technical services to assist the customer carrying out concrete trials within very tight project schedule. The entire section was divided into 9 major concrete pours gave a total of 20,000m<sup>3</sup> of concrete, dimension is 120mx 50m x12m deep, the size is comparable to a football pitch! This was the largest piece of precast unit in Asia at the time. Fosroc Proofex Engage was applied at the bottom of the precast tube tunnel, Supercast Waterstops and Reebol were used for all the necessary construction joints and formwork. Prior to the huge precast section to be towed, the dock wall was blasted allowing water to flow into the dry dock, the precast tunnel was able to float ready for transport. The completed section was towed by barges from Mainland to Hong Kong in a morning.

### THE RESULT

Fosroc admixture solution has proven to be technically advanced offering satisfactory results especially for marine and high performance concrete. This project marked a new page for Fosroc admixtures in Hong Kong. Fosroc's comprehensive waterproofing solution and technical services also gave our customers great satisfaction and confidence.

### PRODUCTS

- Auracast 400 (108,000 Litres)
- Proofex Engage (7000m<sup>2</sup>)  
Supercast Waterstop, Reebol



Completed Single Precast Section at  
Qi Wan precast dock



Precast tube tunnel over the existing  
MTR Tsuen Wan Line in position



Precast immersed tube being towed  
into position at the Victoria Harbour