



Asia

Tsuen Wan West Station Cracking of Approach Tunnels

Description of Work

The Tsuen Wan West Station is part of the KCRC West Rail Line. The 400 m long station and the associated two 300 m long tunnels were constructed using the cut-and-cover method in reclamation. The excavation was up to 20 m deep. An alternative floating box design was constructed at two sections of the tunnels. During construction, the concrete walls and roof of the box cracked, resulting in the potential for ingress of water and requiring a repair of the concrete.

The Contractor Penta Ocean-Kier Ltd commissioned GCG (Asia) Ltd to review the alternative design of the floating box and the site ground conditions. GCG (Asia) interpreted the ground conditions, derived soil stiffness parameters and adopted finite difference analyses to model the loading on the tunnels. The analyses modelled the variable ground conditions, by adjusting the spring stiffness constants along the tunnel alignments. GCG's analyses predicted the tunnel settlements comparable to the field measurements. The analyses revealed that the differential settlements in the longitudinal tunnel direction might have caused the tunnels to crack. GCG's review also highlighted the limitations of relating the soil stiffness to Standard Penetration Test N values carried out before excavation.

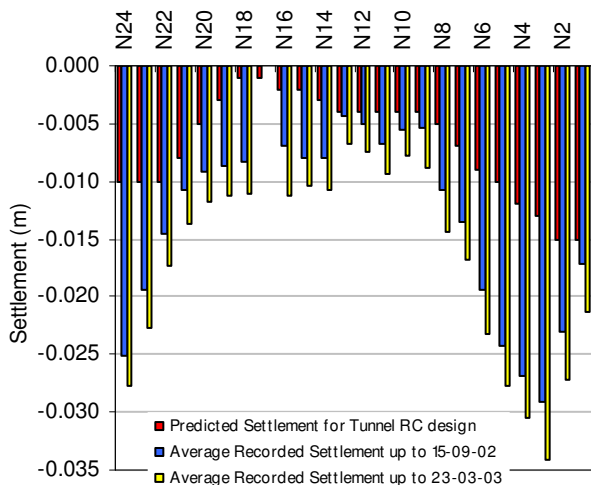
The GCG review report was used in supporting the Contractor's claim for costs of repairing the tunnel cracks.

Client: Penta Ocean-Kier JV

Date: 2000 – 2003

Approximate

Project Cost: HK\$ 1.76 billion



Settlements along North Tunnel



Tsuen Wan West Station