



# Route 9 Shatin Heights Tunnels Tunnel Excavation Temporary Support

## Description of Work

Route 9 Shatin Heights tunnels are being constructed by the China State & China Railway JV (CSCR JV). The twin rock tunnels have a total length of approximately 1900 m and are excavated using the conventional drill and blast method. GCG (Asia) Ltd. was commissioned by CSCR JV to carry out the temporary tunnel support design for both the southbound and northbound tunnels at the North and South Portal areas, where overburden above the tunnel crown has a limited thickness. The work included a detailed review of the ground conditions, field mapping, rock mass classification using the “Q” system and numerical modelling of tunnel excavation.

The semi-circular tunnels are 19 m wide and 11 m high and are to be excavated sequentially in a heading and bench pattern in weathered rock un varying states of decomposition. Numerical modelling was carried out to predict both the ground settlement arising from the tunnel excavations and to determine the most appropriate temporary tunnel support system. A series of parametric studies were carried out that considered the influence of varying both the percentage of ground relaxation and the sequence of the tunnel excavation.

An extensive review of the geotechnical design parameters for granitic rocks adopted in Hong Kong was also carried out to determine an appropriate range of input parameters for the analyses. The results of the numerical modelling were used to optimise the temporary tunnel support system.

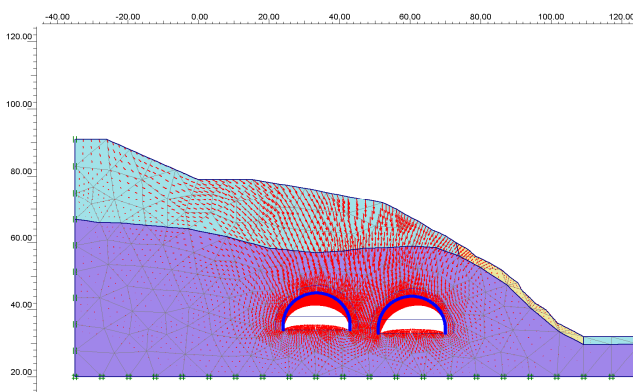
**Client:** China State & China  
Railway JV

**Dates:** 2003-2004 (GCG)

**Estimated Project Cost:**  
HK\$ 1.07 billion



Shatin Heights tunnel South Portal



Numerical modelling of the  
twin tunnel excavation