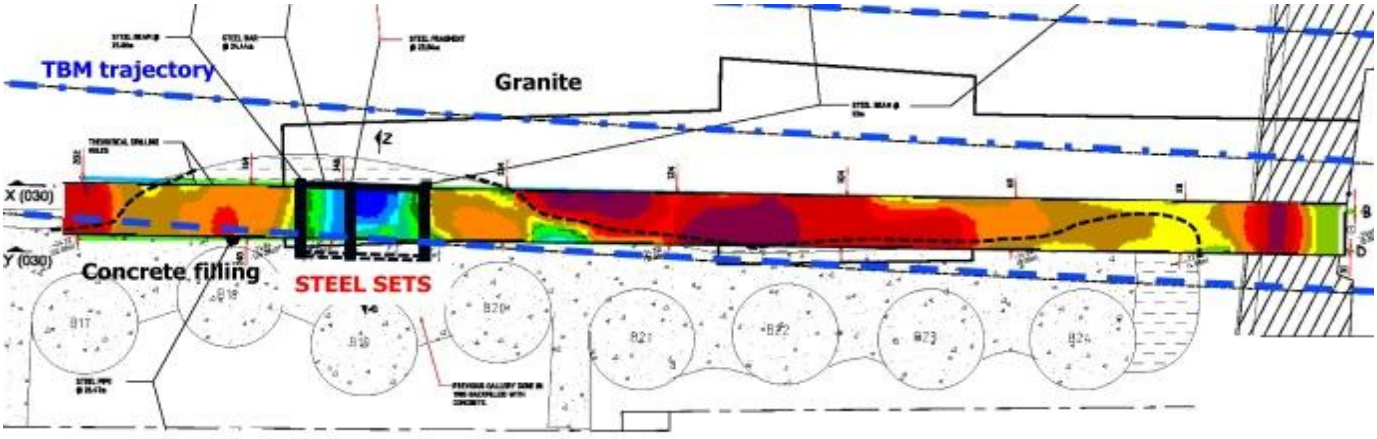
West Island Line tunnel Nr. 703 - MTRC

Horizontal borehole forward survey for buried steel set detection using geophysics

Hong Kong, China
Started in 2010, 1 months



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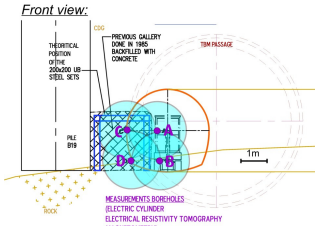

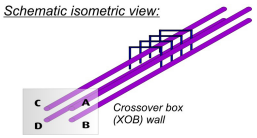

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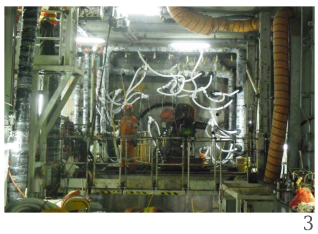

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In the framework of the MTR (Mass Transit Railway) WIL-703 contract, including the construction of twin tunnels between Sheung Wan and Sai Ying Pun Stations, SOLDATA conducted a geophysical survey from four 31 m long horizontal boreholes forming a rhomboid, working from the current front of the tunnel.

The aim of the study was to confirm the TBM alignment, by quantifying and locating existing buried steel sets in a former gallery.

Prior to the excavation of the tunnel using a TBM, three geophysical borehole surveying methods: Electric Cylinder®, Cross-Hole Electrical Resistivity Tomography (CHERT) and Magnetometry were implemented to detect steel sets reinforcing a former gallery, currently filled with concrete and mortar.

Electrical and magnetic methods provided information about the number and position of the steel sets, using the two following physical properties respectively: electrical resistivity and ferromagnetism.

Using three complementary methods, this survey defined the shape and position of these metallic steel sets and confirmed the TBM alignment. It helped the DMB Joint Venture and the client MTR to select the most efficient way of excavating the steel sets and other remains.

Finally, it has been decided to remove the detected steel sets. Hydro-geological conditions required to freeze the ground before starting any digging operations, carried out with a specially designed Tunnel Dismantling Machine.

MTR

DRAGAGES MAEDA BACHY JOINT VENTURE

Legends
1. Example of CHERT results (between boreholes B and D)
2. Application of geophysics
3. Ground freezing

Key figures
- Electric Cylinder®,
- Cross-Hole Electrical
- Resistivity Tomography (CHERT)
- Magnetometry