

## Phil Astle



### Associate Director

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Chartered Engineer

Member, Institution of Materials, Minerals & Mining

MSc Geotechnical Engineering

BSc Engineering Science (Civil)

### Expertise

Design of tunnels and underground excavations in soil and rock; sprayed concrete and in-situ concrete lining design; design of segmental tunnels linings; numerical modelling and analytical design methods; foundation design; retaining system design; slope stability and stabilisation; soil-structure interaction; construction management.

### Summary

Phil has more than 20 years experience in geotechnical and civil engineering design and construction on a wide range of building and heavy civil engineering projects. From 1993 until early 2006, Phil worked for Dr G Sauer Company where he specialised in the design of underground structures, latterly responsible for their operations in the UK. Phil developed a number of computer programs suitable for the design of tunnel support and lining systems both in soil and rock.

He was the co-author of the TRL report on the use of service tunnels on highway schemes in the UK and the DTp design advice note on NATM. Phil was responsible for the design of Las Mercedes Station on the Santiago Metro; that included 16m span in non-cohesive materials under shallow cover and advised on the design of three other stations. Phil also advised on the construction of a 15m wide cavern in soft ground for the Athens Metro. In the UK, Phil has been responsible for the design of underground structures on the Dockland's Woolwich Arsenal Extension; West Coast Main Line; Channel Tunnel Rail Link and various improvement works for London Underground.

Prior to this, Phil worked for Travers Morgan and Rendel Palmer Tritton where he was engaged as a geotechnical engineer responsible for the investigation and design of a range of schemes including foundations, retaining walls, slope stabilisation measures, coastal protection, earthworks and embankments, dams, highways, tunnels, contaminated land and groundwater studies.

Phil recently advised on the initial remedial works following the collapse of the tunnel onto the railway at Gerrard's Cross. He is currently assisting in the design of new tunnels forming part of the East Side Access project in New York.

### Notable Projects

- Metro de Santiago, Chile
- Pajares Tunnel, Spain
- Boston Central Artery Project, U.S.A
- Dockland's Light Railway, Woolwich Arsenal Extension
- Taiwan High Speed Railway