

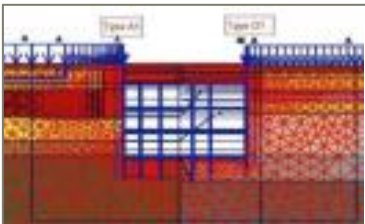
ENGINEERING SERVICES FOR CONTRACTORS

Contractors require targeted and effective contributions to streamline their complex construction projects.

Optimizing the alignment, modelling the cross section, or performing a numerical or geotechnical analysis during the design phase leads to considerable savings and achieves desired results of structural excellence.

We therefore offer a range of services of value to contractors, from pre-design to detailed design, through to construction and operation, for all kinds of underground structures.

We have supported numerous clients with our valued added knowledge, derived from our experience from a big range of successfully completed underground engineering projects.



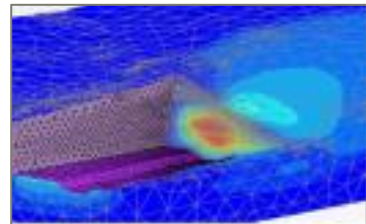
PLAXIS FEM analysis for station excavation



Start shaft for TBM



3D model



Model calculation Excavation

Our Services

Design

- Feasibility Design
- Tender Design
- Detailed Design
- BIM, 2D and 3D models and drawings

All types of underground structures

- Tunnels, Adits, Shafts and Galleries
- Caverns and Underground space

For any type of use

- Rail, Road and Metro
- Hydro and Utilities
- Underground Space

Geology & ground conditions

- Rock, soft ground and unconsolidated rock
- Long & deep alpine tunnels & underground structures

Excavation methods

- TBM
- Drill & blast
- Shielded machines in soil
- Mechanically assisted excavation (road headers, excavators, rippers, etc)

Additional Expertise

- Ventilation and Safety
- Assessment and Rehabilitation of existing structures
- Pipe umbrella, Jetting, Grouting, temporary-, and final support
- Risk Assessment, Project Management, Cost Control

Partner for all Project Phases (Prequal, Tender, Construction)

- Review tender from a designer view
- Gap analysis
- Identify and assess critical areas
- Assessment of the geology
- Value engineering to reduce costs and speed up the process
- Review contractor's alternative ideas from a designer view
- Estimate and programme design efforts on Design & Build tenders
- Assess & Design temporary ventilation for construction

Construction

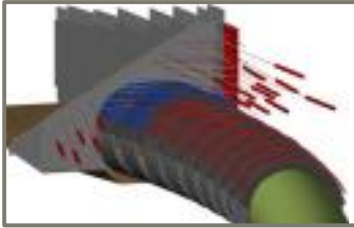
- Value engineering
- Detailed Design incl. reports, models and drawings
- Independent design checker
- Site supervision for contractor
- Quality Control tasks
- As built documentation
- Geological monitoring
- Monitoring of structures

Troubleshooting on site

- Expertise, consultancy
- Evaluation and design of possible solutions
- Analysis and Evaluation of various Construction Methods

Our Competence

- Comprehensive experience in underground design, from early feasibility to final detailed design
- Site supervision to support you all the way
- Smart and feasible underground and geotechnical engineering solutions
- Solid track record of working with contractors
- Clever, cost sensitive, value added alternatives
- Independent design checker



Your Benefits

- A competent partner and trouble shooter at any stage of your project
- Fast reliable and competent engineering solutions to complex geotechnical tasks
- Direct access to skilled and internationally trained engineers with solid practical know how
- Solutions that help you manage your risk, speed up the project schedule and reduce your costs



Selected References

Project	Boezberg rail tunnel Switzerland	Project	Delhi Metro line India
Services	- IG-Management - Contractors engineering - Detailed design For new double track railway tunnel; part of the 4 m corridor project Basel – Chiasso	Services	- Detailed design - Site supervision - Prediction of ground settlements Twin bored tunnels with shield TBM and an inner diameter of 5.7 m.
Client	Implenia	Client	Thai Development Public Company Ltd
Project	Nürnberg – Ingolstadt – HSR Germany	Project	Ahwaz Metro Iran
Services	- Technical approval - Detailed design - Structural documentation Double track line rail tunnel with 2.2 km length and double shell lining. Excavation by drill and blast.	Services	- Design & design Reviews - Alignment optimization - Quality and Risk Management Two metro tunnels of 23 km each, 23 stations by cut & cover. Excavation by EPB-TBMs Ø = 6.78 m.
Client	Bilfinger Berger	Client	Kayson
Project	Suez Canal road tunnel Egypt	Project	Downtown metro line 2 Singapore
Services	- Detailed design - Geotechnical interpretation - Implementation project Two 2.8 km long highway tunnels with 6 crosspassages under the Suez Canal	Services	- Contractors engineering - Detailed design & design review - Site supervision Twin bored tunnels with a total length of 5.4 km and 5.8 m inner diameter.
Client	Orascom / Arab Contractors	Client	SK Engineering and Construction

We are pleased to advise you in detail.

Contact us.



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