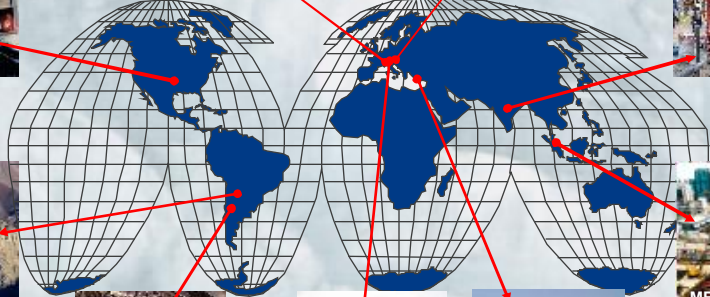


GC
GEOTECHNICAL CONSULTANTS

35 years experience, more than 1500 projects in more than 50 countries



France – Switzerland CERN – LHC Motorway sections Slovak Republic

Metro Washington Wheaton Station USA Metro Delhi India

Route Transandino Argentina/Chile Chile Metro Santiago Germany HSR Cologne – Frankfurt HEPP Birecik Turkey

MRT Singapore Singapore

Selected Projects

GC
GEOTECHNICAL CONSULTANTS

Fields of Activity

- Geotechnics & Tunnelling
- Geology
- Structural Engineering
- Water & Environment
- Transportation & Infrastructure
- Instrumentation, Data Management & Geotechnical Monitoring



LAST VIEWED

Risks



3



Great Belt Link 1994

Chimney Failure, Munich



Pinheiros, São Paulo



4

Challenges

■ Technical

- Geology, Geotechnics → Rock mass parameters
- Excavation and support methods
 - Excavation sequence
 - Excavation methods
 - Supports and auxiliary measures

■ Contractual

- Contractual set up – EPC, EPCM, BOT, DB, LS
- Risk allocation
- Reimbursement (Classification)

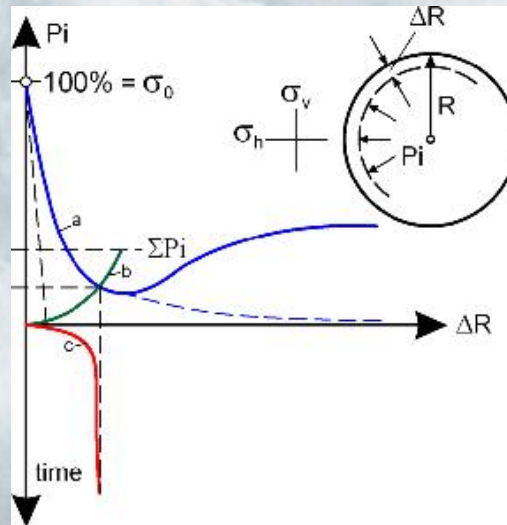
5

Partial Excavation



6

Fenner-Pacher-Feder Curve



7

Lining Stress Controllers

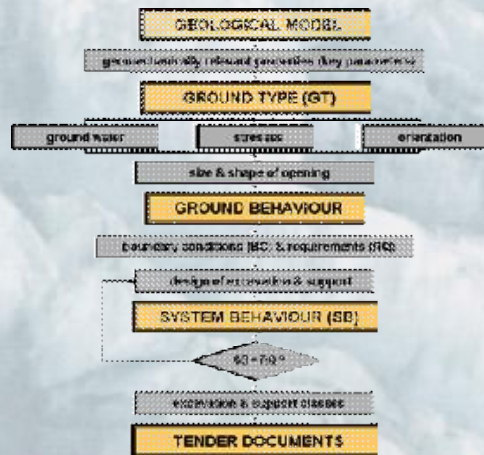


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Rock Mass Classification

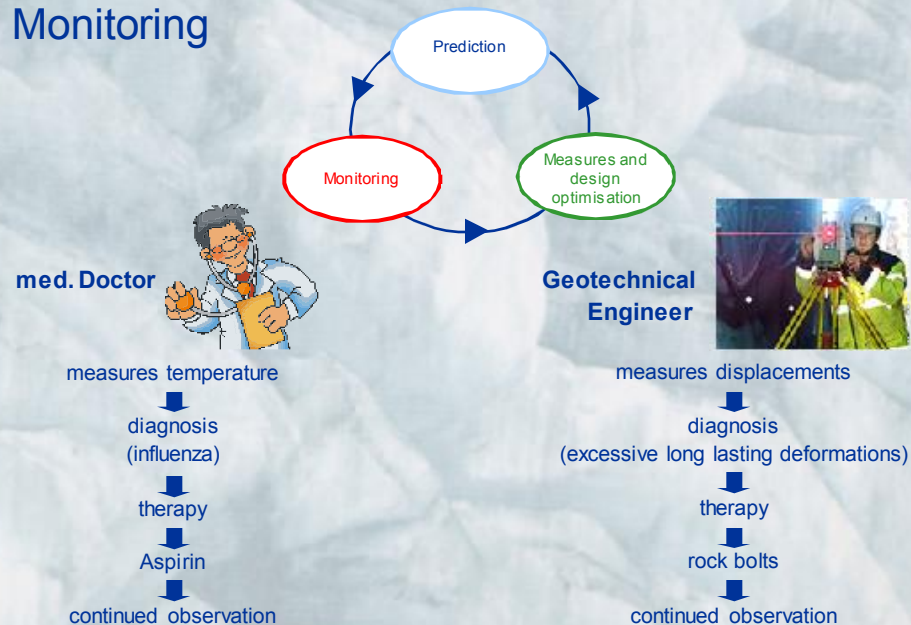
Flow Diagram of Rock Mass
Classification and Development of
Excavation & Support Classes

Rating Systems RMR Q-Value

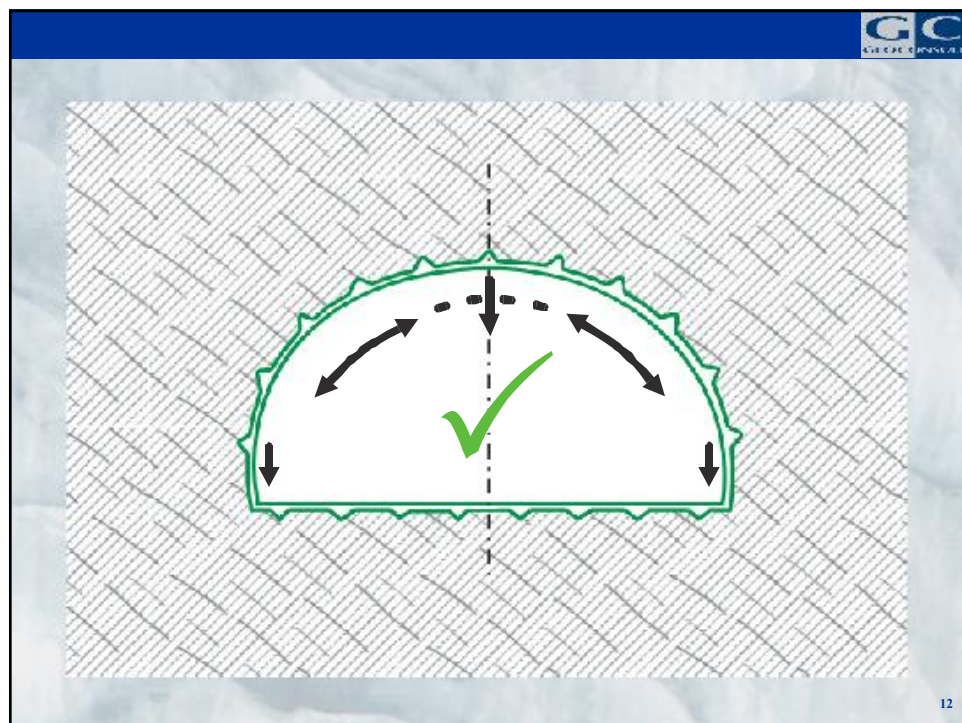
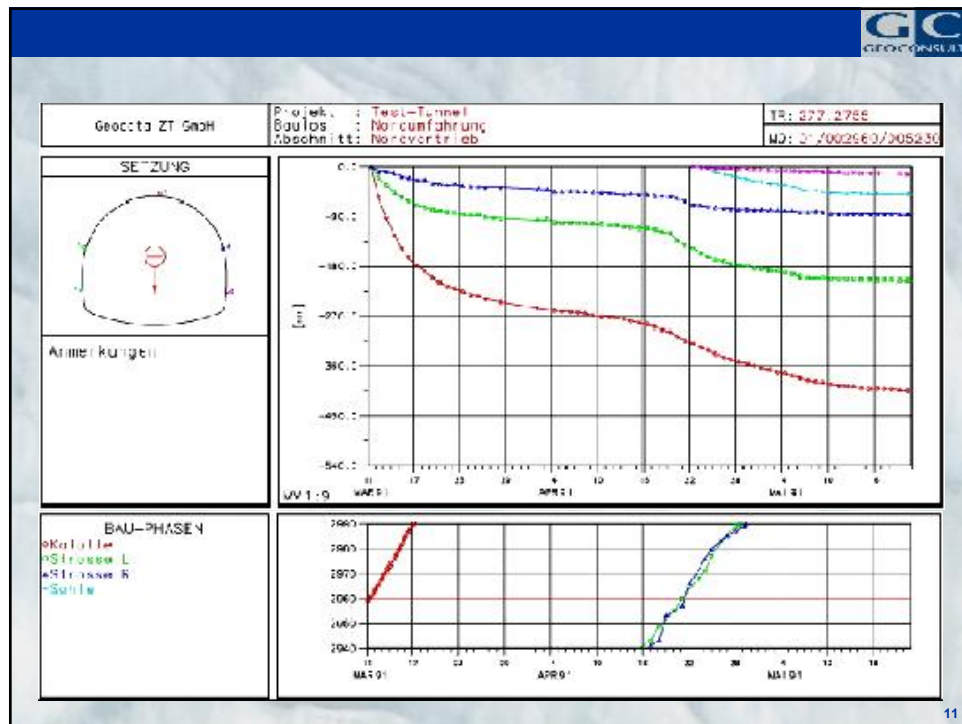


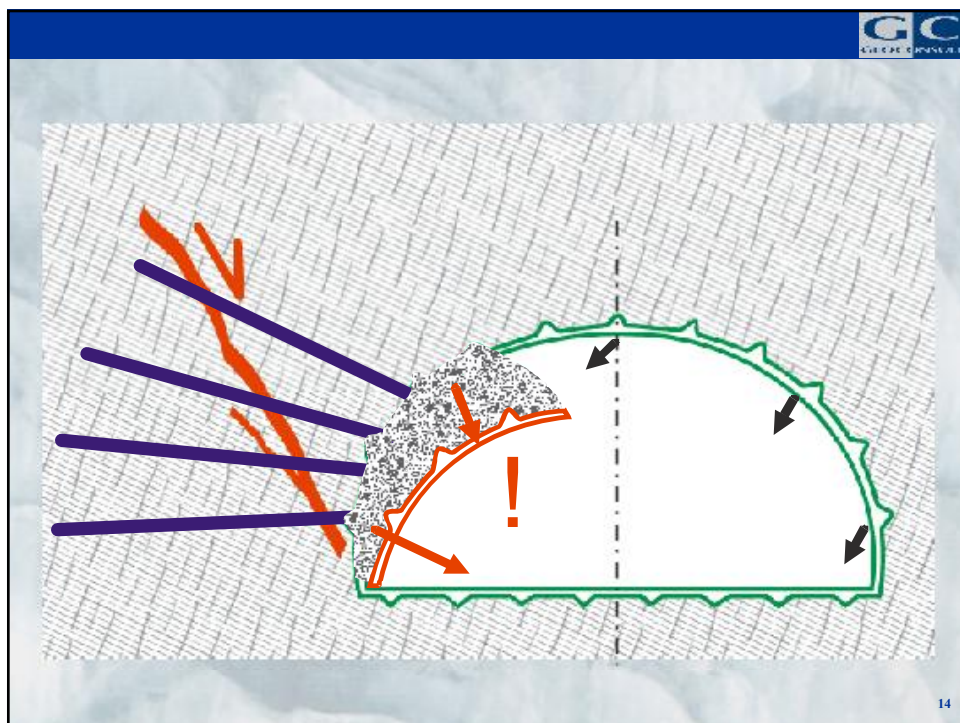
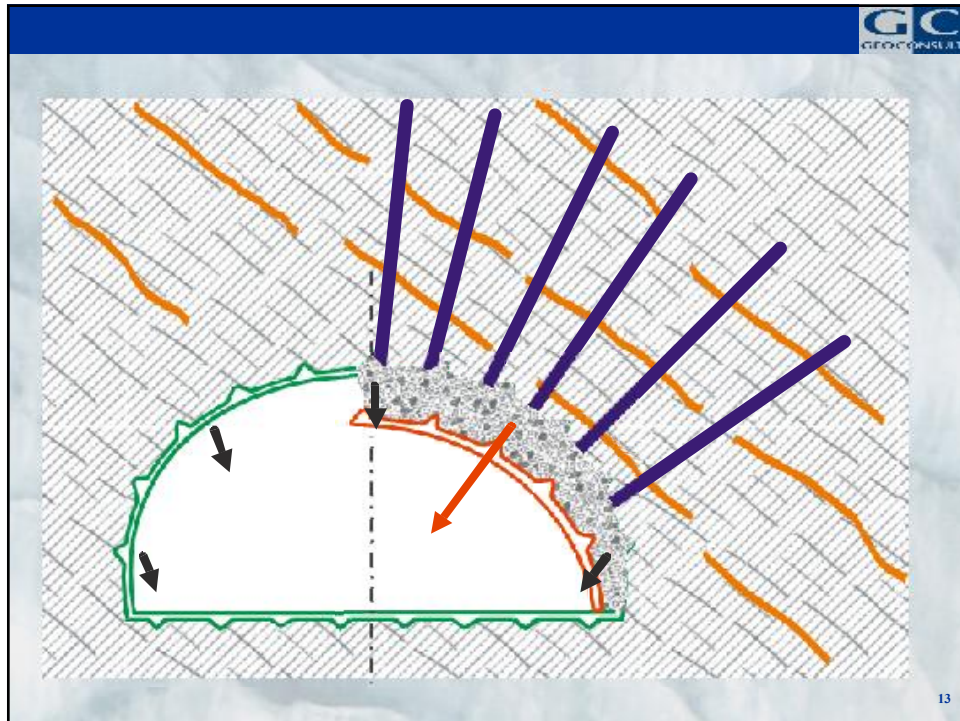
9

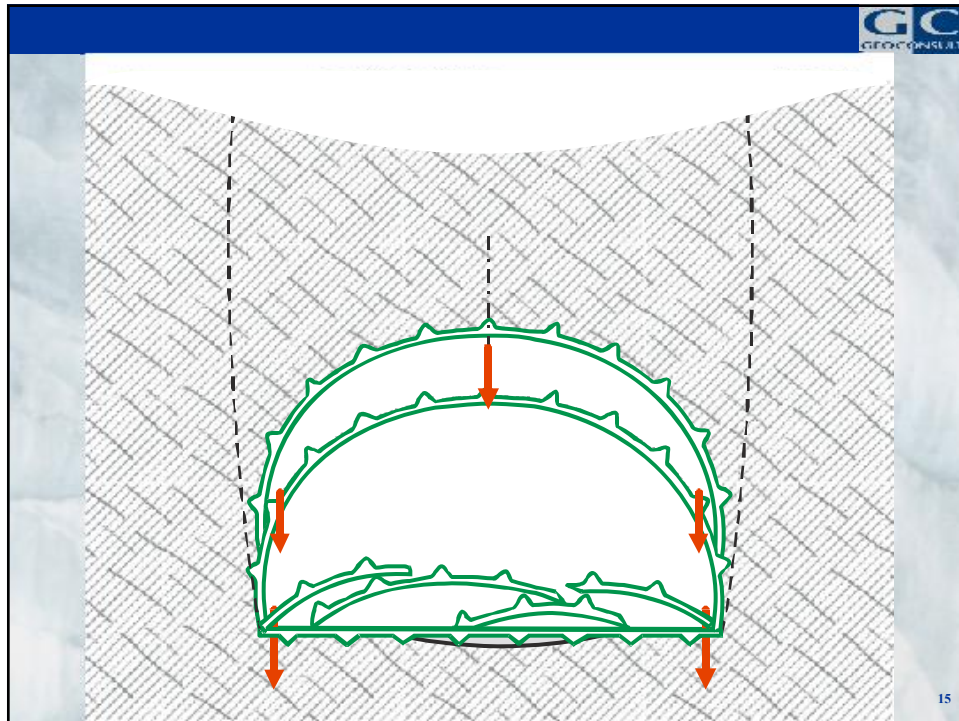
Monitoring



10

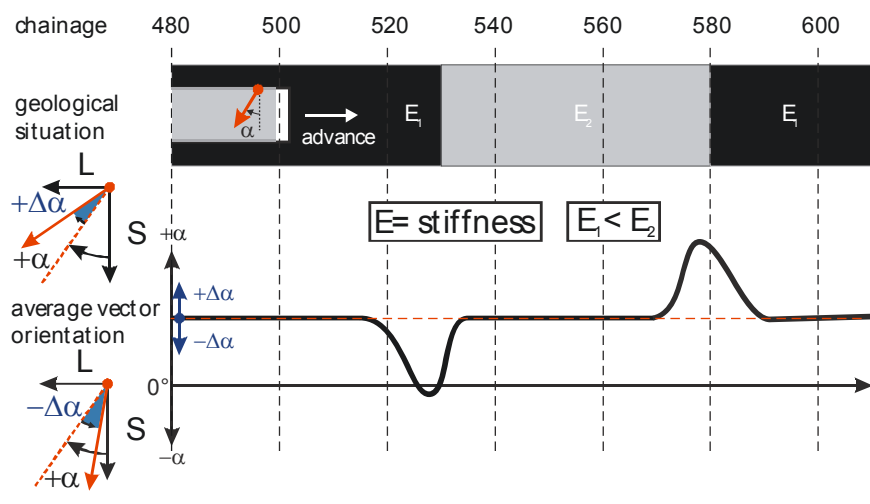






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Vector orientation longitudinal



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