



## **WG 17 – LONG TUNNELS AND GREAT DEPTH**

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## WG17 – Long Tunnels at Great Depth

- 4 intermediate meetings in Europe during last year
- 2 meetings in San Francisco
- 14 members from 9 different countries: China, France, Italy, Japan, Korea, Norway, Saudi Arabia, Switzerland and USA
- 7 of the attendees were former members to the WG
- Presentations on projects and review of state of advancement of exiting project :
  - Follo Line Project in Norway

# WG17 – Long Tunnels at Great Depth

- Final lecture of the report in 2 meetings:

## **TBM excavation of long and deep tunnels under difficult rock conditions**

Often long discussions to find an agreement

Opinion's confrontation is very interesting

**80% done**

It will be finished by web meeting

Goal: send report for peer review in September

# WG17 – Long Tunnels at Great Depth

– Progress in the constitution of the associated data base

ITA Working Group WG17  
TBM excavation of long and deep tunnels  
under difficult rock conditions

**Nant de Drance, Pumped storage power plant, main access tunnel**

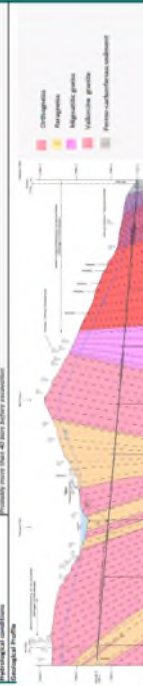
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**PROJECT CHARACTERISTICS**

Country: Switzerland  
Client: SAZ (S.A. des Appréciations de l'Etat)  
Contract: Long distance, Mixed technology  
TBM Type: N/A  
N/A  
N/A

**GEOLOGICAL CONDITIONS**

The tunnel is excavated in a complex geological environment consisting of various rock types, including gneiss, schists, and amphibolites. The rock mass is characterized by high strength and low permeability. The tunnel is excavated at a depth of 2,100 meters below the surface. The rock mass is characterized by high strength and low permeability. The tunnel is excavated at a depth of 2,100 meters below the surface.




**MAIN GEOTECHNICAL HAZARDS**

Definition of the Hazard Scenarios	Occurrence	Comments
Rock behavior	X	Excavation of TBM leading to some rockfall (disturbance between TBM walls) in soft bedding in gneiss (in some sections)
Rock burst	NO	TBM leading on some sections. The support on the lower TBM segment has been reinforced.
Highly deformable structure	NO	In one gallery the support was interrupted after the excavation of a parallel section.
Presence of water	NO	Due to the proximity of a big rock vein (Dronson) close to the project, water burst cannot be excluded. High water pressure (10 bars) has been observed during one section phase.
Face instability	NO	Excavation lead to multiple face problems. Measurements to ensure the safety of the workface.
Development of fissures	X	Fissures in rock, mud and water.

**TBM DESIGN DATA**

Two of the three excavations from the same TBM. The tunnel diameter is 7.25 m. The tunnel length is 2,100 m. The tunnel is excavated at a depth of 2,100 meters below the surface. The rock mass is characterized by high strength and low permeability. The tunnel is excavated at a depth of 2,100 meters below the surface.



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**TBM DESIGN DATA**

**GENERAL CHARACTERISTICS**

Tunnel length: 2,100 m  
Tunnel diameter: 7.25 m  
Tunnel depth: 2,100 m  
Tunnel type: N/A  
TBM Type: N/A  
N/A

**SUPPORT**

Excavation distance: 2,100 m  
Support type: N/A  
N/A

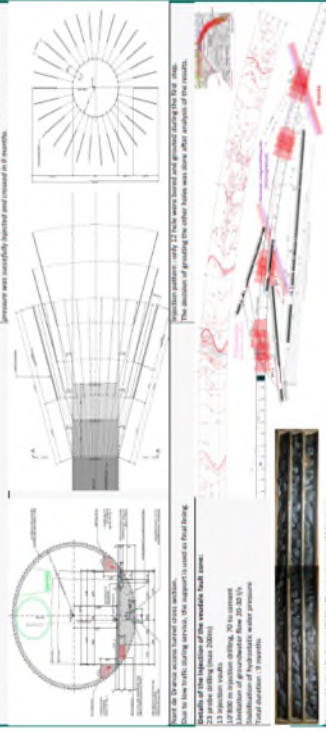
**FINAL LINING**

Final lining type: N/A  
N/A

**CONSTRUCTION EXPERIENCE**

**OBSERVATIONS**

Excavation of the tunnel is carried out in a complex geological environment. The rock mass is characterized by high strength and low permeability. The tunnel is excavated at a depth of 2,100 meters below the surface. The rock mass is characterized by high strength and low permeability. The tunnel is excavated at a depth of 2,100 meters below the surface.



**SOLUTIONS AND CONSEQUENCES**

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