

# SUEZ CHANNEL TUNNEL

## Suez Channel Tunnel, Port Said, Egypt

This new transport link under the Suez channel serves for the development of the Sinai region as one of the most important economic centers of Egypt.

Highway tunnel 2.87 km long (2x 2 lanes) under the Suez channel in Port Said, including 6 cross passages. Heading with a Slurry-TBM of a diameter of 13 m.

### Scope

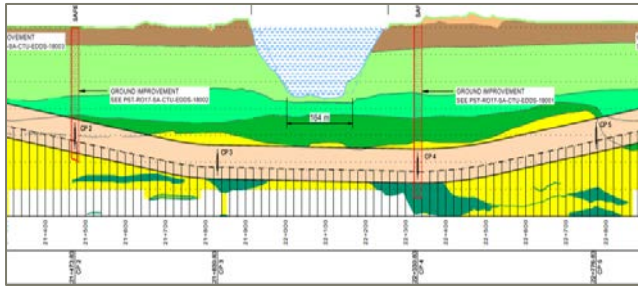
- 2 lane road tunnel
- 2 tubes
- Length 2x 2.87 km
- TBM advance, excavation diameter 13.05 m, inner diameter 11.4 m, difference in altitude 60 m
- 6 cross-passages, 3.4 m excavation diameter
- Conventional excavation of cross-passages
- Freezing method for cross-passage area
- Soil improvement measures by diaphragm walls
- Cut-and-cover tunnels (by JV)

### Challenges

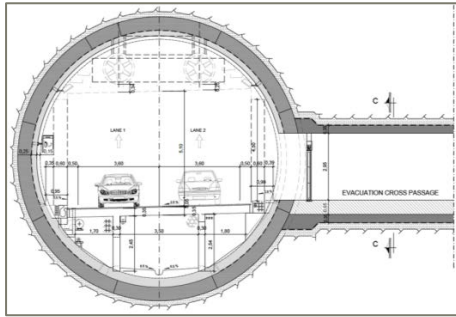
- Overburden max. 45 m at underpassing of the Suez channel
- High water pressure of up to 6 bars
- Complex geological conditions (Clay / Sand lenses)
- Very soft clay formations
- Very high settlement sensibility

### Amberg Services

- Geotechnical interpretation of existing data
- Elaboration of planning bases
- Construction project
- Implementation project



- Geological profile section channel underpassing



- Profile of a tunnel tube with cross-passage



- Preparational worksat site

## AMBERG FACTS

### Contracted value JV

- Total approx. 10 Mio. CHF

### Contracted value Amberg

- Total 3.1 Mio. CHF

### Project phases & duration

- Start of works 2014
- Completion pressumably 2016

### Project details

#### Tunnel

- Length 2x 2.87 km
- Diameter 13.05 m
- Altitude difference 50 m (Portals - Suez underpassage)

## CLIENT FACTS

### Overall cost

- No details provided

### Overview project

- Full design of the 2,9 km long twin tube road tunnel underpassing the Suezkanal at Port Said in Egypt.

### Geology

- Layers of soft to very soft clay soil and sand
- Ground water level close to surface
- Very complex geology wit extremely soft normal consolidated (up to under-consolidated) clay soils with very low permeability
- Sandy, watersaturated layer at the lowest point (50 m), high pressure (6 bar), aggressive ground water, natural Gas, claystones partially swellable
- High, long lasting settlements

## CHALLENGES



- Site organization, working areas



- Big conference facility



- Meeting at site

## ENGINEERING APPROACH



- Survey work with unusual background

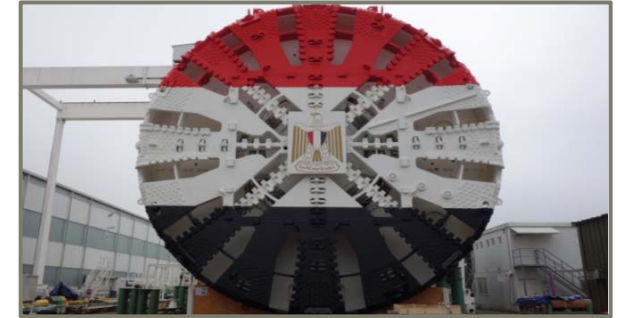


- Drilling work for concrete foundations



- Start shaft for TBM

## TECHNICAL SOLUTIONS



- Cutting wheel for mixed shield TBM



- TBM shield and back up



- TBM starting wall