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NEW DEVELOPMENT PROJECTS

SOUTHEASTERN ANATOLIAN PROJECT URFA TUNNEL IRRIGATION (TURKEY)

will enable irrigation of 2 billion hectares of land and production of 25 billion Kwh of hydroelectrical energy.

The Southeastern Anatolian Project, when realized,

The Urfa Tunnel, when completed, will convey

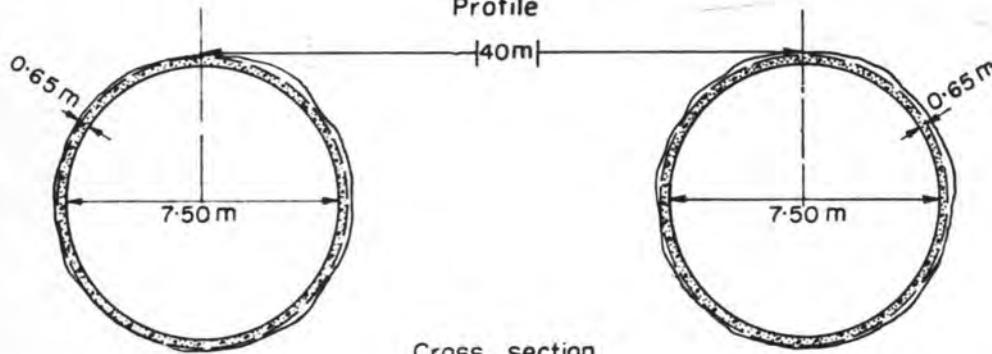
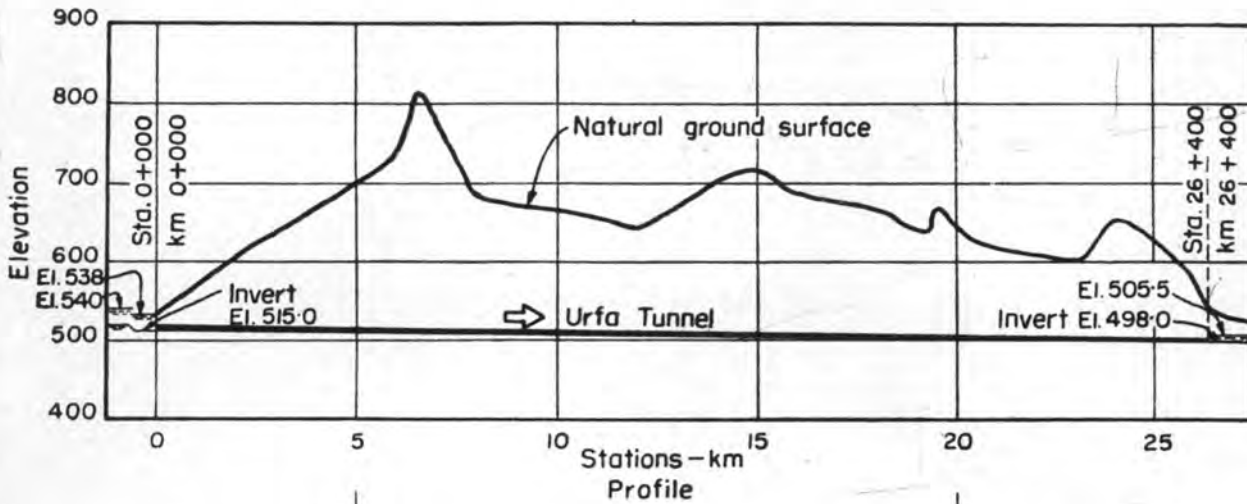
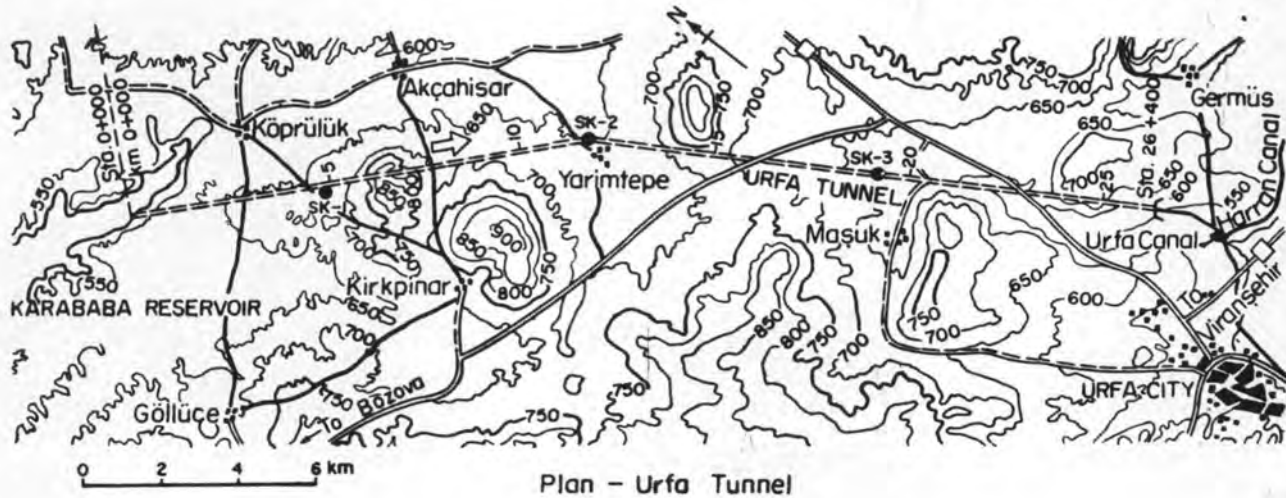


FIGURE 1 : Urfa tunnel design

332 m³/sec water from the Karababa Dam reservoir which will be built on Firat River, to Urfa-Harran and Mardin-Ceylanpinar Plains (totally 300,000 ha of land) where the area will be irrigated by gravity.

The Karababa Dam and Hydroelectric Powerplant is at final design stage and construction will start in 1979.

The construction of Urfa Tunnel was awarded to a Turkish construction firm in April 1977, and construction will be completed in 1984.

The geological structure of the soil through which the tunnel will pass is Paleocene, old marl and clayey limestone.

SALIENT FEATURES OF URFA TUNNEL

Number of tunnels	: 2 each with 40 m interval
Length of each tunnel	: 26.4 km
Type and diameter	: Circular, 7.50 m diameter
Lining thickness	: 0.65 m
Maximum discharge	: $2 \times 166 = 332$ m ³ /sec
Maximum velocity in tunnel	: 3.80 m/sec
Type of operation	: Under pressure

Flow control : 4 radial gates each 4.0 × 5.5 m at downstream side, 2 double sliding gates each 3.975 × 7.80 m at upstream side

Upstream water levels max. : 542.00 m
min. : 526.00 m

Water levels at outlets : 505.50 m

Gradient : 0.000644

Tunnel excavation : 3.6×10^6 m³

Tunnel approach excavation: 3.0×10^6 m³

Reinforced concrete : 1.0×10^6 m³

Scaffolding : 1.0×10^6 m³

Reinforcing bars : 50,000 tons

Temporary steel bracing : 17,000 tons

Rockbolts : 10,000 tons

Cement (Shotcrete and grouting inclusive) : 500×10^3 tons

Rubber waterstop : 300×10^3 m

Investment for tunnels : 400×10^6 US \$

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Featuring :

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- ★ application of systems analysis to some problems
- ★ application for system analysis in irrigation
- ★ some applications of system analysis to different problems of water resources planning
- ★ conclusion.