



## Uma Oya Multipurpose Development Project (LK) Grouting Tunnel

<b>Employer</b>	Ministry of Mahaweli Development & Environment, Sri Lanka
<b>Client</b>	Farab Company, Energy & Water Projects
<b>Execution of works</b>	Renesco GmbH, Abt. Marti Geotechnik
<b>Designer</b>	Amberg Engineering AG
<b>Construction Period</b>	May - November 2015
<b>Contract Sum (grouting only)</b>	€ 3.500.000

## Project Description

The Uma Oya Multipurpose Development Project in the south-east of Sri Lanka serves the combined aims of power generation, irrigation and water supply improvement. The necessary works include two dams, a 15km long headrace tunnel and a 3.6km long tailrace tunnel. After approximately 3km of the TBM drive for the headrace tunnel, water started to infiltrate into the tunnel at a rate of around 370l/s. This led to the lowering of the water table, as well as drying-up of village wells in the immediate neighborhood. The drive consequently had to be suspended. As a premiss for the resumption of works, the authorities demanded a significant lowering of the water inflow into the tunnel.

## Scope of services

In the spring of 2015, Marti Geotechnik was awarded a contract for grouting works of the headrace tunnel. 40 tons of equipment and materials were immediately shipped to Sri Lanka by air freight. The mixing and injection system was converted for track operation and the drill rig was installed on the platform. The space available for drilling in the tunnel was limited to the internal diameter of the segmental lining "SL" (3.6m). The works included systematic cement grouting of the annular gap and rock mass grouting over a length of 560m. Additional chemical injections with polyurethane were carried out at locations subjected to particularly heavy water ingress. A certain rise of the water pressure (up to 13bar) was observed with ongoing grouting works. The high pressure demanded for a specially fabricated packer to ensure successful grouting. When, in December 2015, the overall water infiltration rate fell below 20l/s, the authorities approved the resumption of the works again.

## Key dimensions / special features

Pea gravel grouting: 3.440 holes

Rock mass grouting

- Number / length of boreholes: 1.700, l=3m
- Cementous grout: 440.000l
- Polyurethane resin: approx. 10.000kg
- Silicate foam: approx. 5.000kg

Due to the application of special anti washout additives the main part of the works could be executed by using economic cementous grouts.



1. Job site installations at portal
2. Grouting pumps and mixer in the tunnel