UNDERGROUND TUNNEL MONITORING

Mont Terri Underground Laboratory
Swiss National Cooperative for the Disposal of Radioactive Waste (Nagra)

A CUSTOMER SUCCESS STORY
BY RST INSTRUMENTS LTD.

BACKGROUND
A tunnel for an underground laboratory for the Swiss National Cooperative for the Disposal of Radioactive Waste (Nagra), in Switzerland, required continuous monitoring during excavation until the roadheader finally milled through the individual VW transducers (see drawing above).

OBJECTIVE
The engineering team (Polymetra) wanted to monitor the pore pressure in the ground as it related to the effects of the tunnel excavation. Thereby, a cost-effective minable solution was required with reliable data output, even under heavy tunnel excavation.

SOLUTION
A subcontractor drilled a 16 m deep, inclined borehole from a niche through the tunnel face and fully grouted Vibrating Wire Piezometers from RST were installed. After the grout cured and the pore pressure stabilized, a road header was mining through the tunnel. The road header originated from an access tunnel to the point where it would mill through the individual piezometers. The piezometers withstood all the rigors of the site’s excavation until they were destroyed by the roadheader. Understanding the geomechanical forces during excavation is crucial to improve decision making for future excavation in mining and tunnel projects.

KEY FACTS

LOCATION
Switzerland

PROJECT PARTNERS
Owner: Nagra
Consultant (Engineer): Polymetra
Contractor: Polymetra

POLYMETRA®

PROJECT DETAILS
An underground tunnel excavation for a rock laboratory for Nagra required monitoring during excavation of a road header.

SCOPE/OBJECTIVE
The engineering team required continuous monitoring of the pore pressure in the tunnel profile during the excavations.

CHALLENGES
The borehole was inclined and the rock permeability was very low; the proposed solution (installed VW Piezometers) needed to work in these conditions and withstand the rigors of the excavation.

SOLUTION
A 16 m deep, inclined borehole was drilled from a niche through the tunnel face and fully grouted VW Piezometers from RST were installed. After the grout cured and the pore pressure stabilized, a road header was mining through the tunnel. The road header originated from an access tunnel to the point where it would mill through the individual piezometers. The piezometers withstood all the rigors of the site’s excavation until they were destroyed by the roadheader. Understanding the geomechanical forces during excavation is crucial to improve decision making for future excavation in mining and tunnel projects.

RESULTS
The piezometers withstood all the rigors of the site’s excavation and provided consistent data until final destruction by the road header. The collected data are crucial for the understanding of the geomechanical forces acting during excavation operations in future projects. Potential disruptions during the excavation were minimized and the road header was successfully constructed.

INSTRUMENTATION
3 VW Piezometers
DT2055B Data Logger

COMPLETION DATE
June 2019