



PROJECT DOSSIER

ROHTANG PASS HIGHWAY TUNNEL



PROJECT OVERVIEW

Project	Rohtang Pass Highway Tunnel Project
Location	Himachal Pradesh, India
Client	Border Road Organization (BRO)
Contractor	Strabag AG-Afcons JV
Consultants	D2-ICT JV
Duration	2011 – 2012

The Rohtang Pass Highway Tunnel in the Western Himalaya region of Northern India with its altitude of 3,980 m ranks among the highest trafficable passes in the world. It is located 51 km away from Manali and receives heavy snowfall and blizzards during winter for about four months. Rohtang Pass is intended to create an all-weather route to Leh and Lahaul and Spiti valleys in Himachal Pradesh.

With 8.8 km length at an altitude of 3,100 m, Rohtang Pass Highway Tunnel is the longest road tunnel in India at high altitude.

The altitude, the extreme climate as well as the geological conditions in the Himalaya were the challenges of this project. Within the tunnel area, rock comprises mainly schist and migmatite with expected disturbed zones and in some individual areas high squeezing rock.

- Shape (cross-section) of tunnel: Horseshoe
- Finished width: 10.00 m (32.8 ft) at road level.
- Construction technique: Drill & Blast with NATM
- Overburden: Maximum 1,900 m, average more than 600 m
- Emergency tunnel: A 2.25 m high and 3.6 m wide emergency tunnel is integrated in the tunnel cross-section beneath the main carriageway.



Monitoring solution

Encardio-rite was awarded I&M sub-contract for complete monitoring solutions for the tunneling works.

Besides geotechnical monitoring during tunneling, Encardio-rite also continuously conducted geophysical prediction by Tunnel Seismic Prediction System (TSP) ahead of tunneling to enable an early recognition of fault or fracture zones, or zones where the rock mass characteristic changes. A geological prognosis could be given that enabled the tunnel site management to determine necessary forthcoming tunneling measures.

Turnkey services

- Supply and installation of geotechnical instruments
- Supply and installation
- Tunnel seismic prediction by TSP®
- Weekly and monthly reporting with evaluation & interpretations

INSTRUMENT USED

- **Multi point extensometer:** 3 & 4 points MPBX were installed at north portal site at different chainage of tunnel for monitoring of rock settlement. The readings of extensometers were very helpful for monitoring the rock behavior.
- **Load cell:** Installed at few locations near 3-point extensometer for correlating the data.
- **Bi-reflective target:** Through-out the tunnel at different arrays to measure convergence.
- **Tunnel Seismic Prediction System (TSP):** TSP measurements were applied in regular intervals of ~ 80-100 m at both South and North portals. In most of the survey prediction, range reached from 50 to 100 m ahead of the tunnel face in order to fulfill a sufficient coverage of pre-information. The results show that TSP is a valuable tool to obtain additional important information on conditions of rock to be excavated. Sufficient quality data could be obtained with a prediction range of 50 to 100 m ahead the tunnel face.

Experienced and proficient I&M team of Encardio-rite rapidly delivered reliable data/information to ensure the safety of both people and construction.

Monitoring reports including interpretations of variations observed in instrument data, mentioning the factors likely to affect their behavior e.g. construction, rock movement, etc. were provided to the contractor on a regular basis.

