

Applications of Engineering Geology in Hydro Power Tunnel Projects in Himalayan Geological Regime

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Abstract : Tunnel construction in Himalayan rock is a challenging task due to fragile nature of the strata. Tunnel excavation carried out from lower Himalayas to high Himalayas in different metamorphic rock. Therefore application of engineering geology plays a vital role during various stage of the tunneling projects. Engineering geology is defined as application of geology to construction of civil structures through engineering practice. It is applied to the design, construction and performance aspects of engineering structure on the surface or sub-surface like dam, underground and surface power house, cut slopes, tunnels and underground storage cavern for nuclear material. But this paper emphasized mostly on underground structures like big caverns of Power house, desilting chambers, and tunnels of various sizes. Construction of these structures in the fragile rock conditions of Himalayan geology from Western Himalayas to Eastern Himalayas necessitated the application of the engineering geology on the micro-scale base for the stability, performance, and longevity of the civil structures. Number of hydropower projects have been constructed, some of them are under construction and under investigation stage. These projects are located in various parts of Himalayas under various seismic-tectonic zones. Tunneling works are involved in these projects. This paper represents the various engineering geological practices adopted in investigation and construction stage of various projects based on experiences gained during past construction histories in Himalayan geology of young mountains in very fragile geological conditions. Highlighting and sharing of use of these techniques on various platforms will definitely enhance the knowledge for carrying out the construction of various projects for the development of society. Construction of the tunnels, surface, and sub-surface caverns, dams, highway, metro, highway tunnels are all based on engineering geological parameters in combinations with other engineering considerations.

Keywords : cavern-power house, desilting chambers and tunnels, seismic-tectonic-zones, earthquake-prone zones based on intensities

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