GEOLOGICAL AND GEOTECHNICAL ASSESSMENT OF TUNNEL SITE OF THE KOTO HYDROPOWER PROJECT, DISTRICT LOWER DIR, KHYBER PAKHTUNKHWA, PAKISTAN

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Abstract

The Koto Hydropower Project lies in the vicinity of Main Mantle Thrust for which the site area was assessed geologically and geotechnically with special emphasis on Tunnel construction and stability. A total of 51 representative bore holes having overall depth of 980 m were drilled at different locations and samples were collected to evaluate Tunnel feasibility for construction and stability. The qualitative and quantitative techniques used during this study includes rock quality designation, core recovery, permeability, water pressure/Lugeon, standard penetration and cone penetration tests. The lithologies and discontinuities encountered in bore holes, were identified and assessed for Tunnel construction and stability. The results indicated that the Tunnel Site is mainly dominated by igneous intrusions like diorite, granodiorite and gabbronorite along with minor metamorphic rocks for example amphibolites. The Tunnel Site is also possessing a thin layer overburden/regolith. The thickness of overburden falls within the optimum feasible range for Tunnel construction, otherwise its presence generally reduces the feasibility. The overall bed rock strength is designated as R5 at Tunnel inlet and R3 at Tunnel outlet on manual index test respectively, and hence shows suitable lithologies at Tunnel inlet comparted to Tunnel outlet. Likewise, the permeability test, water pressure test and joints analysis showed suitability of Tunnel Site for construction and stability.

Key Words: Koto Hydropower, Geotechnical, Lower Dir, Pakistan.