

Geotechnical Design of Bridge Foundations and Approaches in Hilly Granite Formation

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Abstract : This paper presents a case study of geotechnical design of bridge foundations and approaches in hilly granite formation in northern New South Wales of Australia. Firstly, the geological formation and existing cut slope conditions which have high risks of rock fall will be described. The bridge has three spans to be constructed using balanced cantilever method with a middle span of 150 m. After concept design option engineering, it was decided to change from pile foundation to pad footing with ground anchor system to optimize the bridge foundation design. The geotechnical design parameters were derived after two staged site investigations. The foundation design was carried out to satisfy both serviceability limit state and ultimate limit state during construction and in operation. It was found that the pad footing design was governed by serviceability limit state design loading cases. The design of bridge foundation also considered presence of weak rock layer intrusion and a layer of “no core” to ensure foundation stability. The precast mass concrete block system was considered for the retaining walls for the bridge approaches to resolve the constructability issue over hilly terrain. The design considered the retaining wall block sliding stability, while the overturning and internal stabilities are satisfied.

Keywords : pad footing, Hilly formation, stability, block works

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