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Importance of Geology of Road Cuttings - A Case Study from Southern Expressway, Sri Lanka

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ABSTRACT

During road construction practices in the hilly Sri Lankan Precambrian terrains, collapse of cut slopes due to unstable geological conditions is a common occurrence. This type of instability is triggered by intense precipitation in relatively short periods of time. Therefore, it is important that geologists play a significant role in engineering construction practices in the complex metamorphic terrain of Sri Lanka during preliminary reconnaissance studies and at the design level, in view of the fact that Sri Lankan metamorphic terrains have complex and non-continuous structures. Thus, special attention should be paid to the geology and structure of the cut slope, occurrence of old landslides, man's role in disturbing the geological conditions etc. This study is based on experience of the Southern Expressway is built along Precambrian rock successions of the Highland Complex composed of charnockite, charnockitic gneiss, migmatite and garnet biotite gneiss as major rock types.

To avert collapse of rocks or soils, efforts should be made to divert or cut off any percolations of rain water into the cut slope. The existing drainage network of the natural waterways should be strengthened by geotechnical structures such as cut off-, cascade-, side- and berm- drains and weep holes on retaining walls. Shotcreting of weak sectors such as highly fractured surfaces, cavity fillings, etc. should be done where necessary. Supply of unhindered smooth flow of water should be maintained to curtail infiltration and/or accumulation in the weathered, low strength rock/soil zones. Further, the newly cut faces should not be exposed to direct rainwater for long periods of time since thinly foliated highly weathered rock bands can absorb more water causing collapse. Grass-turfing is an effective method to protect cut slopes from erosion by rain water. Periodical monitoring of cut slopes is vital during and after highway construction.