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A GEOSCIENTIFIC STUDY
OF
THE WATAWALA EARTHSLIDE

A thesis presented by

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ABSTRACT

A geoscientific study of the Watawala earthslide is presented in this thesis with a view to finding its nature, causative factors and mechanism and to propose mitigatory measures.

In-depth investigations involved aerial photo interpretation, geomorphological and geological mapping, drilling, sampling, in-situ and laboratory testings, surface and subsurface measurements of movements, rainfall analysis, piezometric measurements, observations on surface and subsurface water conditions and resistivity survey.

The area covered by the Watawala earthslide is underlain by undifferentiated rocks, Charnockites and Marbles folded into a series of antiforms and synforms (Synclinorium) trending NNW-SSE and plunging gently towards NNW. The major axis of the synclinorium, which is topographically derived from a joint, is parallel to the rail track in the study area. The slide runs along two joint valleys having bearings 204° and 235° .

Overburden varies from 5m in the head area of slide to about 70m below the rail track and is probably due to easily weathered rocks at the ground surface.

Hydrostatic heads were developed above the rail track due to alternative permeable and impermeable soil/rock layers, but no hydrostatic heads were below the rail track because of permeable ground. A large quantity of rain water tends to percolate into the ground and increase the instability of the slope during rainy seasons.

The slide had first got activated in the toe region. Its movement rate was high near the rail track and was the least {0.03m/day (Horizontally) and 0.02m/ day (Vertically)} when rainfalls of 50mm/day were recorded.

Major causative factors are unfavourable geological condition and poor drainage. The slide is known to be old and of a repetitive kind. It can be classified as a successive-rotational earthslide.

A well planned drainage system is a must for the stability. A bridge would not be feasible due to deep overburden at the same location. Maintaining the existing track would be a possibility if the water table is kept below shear surface through a proper mechanism. Otherwise, the track should be shifted upwards to avoid deep overburden area.