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Geological and Geotechnical Investigation of a Landslide Prone Slope Along Koraput- Rayagada Railway Track Odisha, India: A Case Study

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Abstract : A number of landslides are occurring during the rainy season along Rayagada-Koraput Railway track for past three years. The track was constructed about 20 years ago. However, the protection measures are not able to control the recurring slope failures now. It leads to a loss to Indian Railway and its passengers ultimately leading to wastage of time and money. The slopes along Rayagada-Koraput track include both rock and soil slopes. The rock types include mainly Khondalite and Charnockite whereas soil slopes are mainly composed of laterite ranging from less weathered to highly weathered laterite. The field studies were carried out in one of the critical slope. Field study was followed by the kinematic analysis to assess the type of failure. Slake Durability test, Uniaxial Compression test, specific gravity test and triaxial test were done on rock samples to calculate and assess properties such as weathering index, unconfined compressive strength, density, cohesion, and friction angle. Following all the laboratory tests, rock mass rating was calculated. Further, from Kinematic analysis and Rock Mass Ratingbasic, Slope Mass Rating was proposed for each slope. The properties obtained were used to do the slope stability simulations using finite element method based modelling. After all the results, suitable protection measures, to prevent the loss due to slope failure, were suggested using the relation between Slope Mass Rating and protection measures.

Keywords : landslides, slope stability, rock mass rating, slope mass rating, numerical simulation
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