

# **Engineering Geological Study On The Slope Failure Along The Kimanis To Keningau Highway, Sabah, Malaysia.**

## **ABSTRACT**

The geology along the Kimanis to Keningau Highway provides a favourable setting for engineering geological instability. The area is underlain by the Crocker Formation (Late Eocene to Early Miocene age) to vary recent Quaternary alluvial materials which are still being deposited. Crocker Formation consists mostly of interbedded grey sandstones and grey mudstones or shales. The sandstones are texturally immature where angular to subrounded quartz grains are cemented by clay minerals and occasionally by calcite. The Crocker Formation has also undergone intense deformation. The tectonic complexities influenced the physical and mechanical properties of the rocks, resulting in a high degree of weathering and instability. The weathered materials are unstable and may experience sliding due to by high pore pressure and intensively geomorphological processes. In this study, a total of 28 selected critical slope failures were studied and classified into two main groups: rock slope and soil slope. Failures in soil slopes (including embankments) are 18 (64 %) whereas 10 of all failures (36 %) of rock slope. Soil slope failures normally involved large volumes of failed material as compared much rock slopes, where the failures are mostly small. Of the 18 failures in soil slopes, 6 (33 %) are embankment failures making them 21 % of all types of failures. Kinematics rock slope analyses indicates that the variable potential of circular, planar, wedges and toppling failures modes as well as the combination of more than one mode of aforementioned failure. Rock and soil slopes stability analysis indicates that the factor of safety value as unsafe (0.50 to 0.96). The main factors causing slope failure occurrences in the study area are natural (geology, meteorology, topography and drainage system) and human factors (lack of proper planning, human activities and community's attitude). Development planning has to consider the hazard and environmental management program. This engineering geological study should be prioritized and take into consideration in the initial step in all infrastructures program and it may play a vital role in landslide hazard and risk assessment to ensure the public safety.