

INSITU WEATHERING PROFILES OF SRI LANKAN METAMORPHIC ROCKS: A STUDY TO DEVELOP CLASSIFICATION SYSTEM FOR GNEISSIC ROCKS

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Engineering classification of weathered rock profiles is important and useful for geotechnical engineers and geologists in solving problems associated with many engineering applications. A proper investigation of field material is essential for the formulation of design problems. A number of classification systems for field identification of weathering profiles have been developed and are available in the literature. Basically a weathering profile can be divided into six grades of decomposition namely Residual Soil (RS), Completely Decomposed (CD), Highly Decomposed (HD), Moderately Decomposed (MD), Slightly Decomposed (SD) and Fresh Rock (FR). The engineering properties of these grades differ from each other. Also within the same grade engineering properties may vary according to the type of parent rock. Many classification systems that are developed for field identifications are based on colour change, discontinuity patterns and excavation methods of the material. The literature available for field identification of weathering profiles in tropical humid conditions is very limited. The classification systems available do not adequately represent local conditions and therefore limited application uses. A good classification system to recognise Sri Lankan weathering profiles for different rock types is important.

Geologically about 90% of Sri Lankan rocks are metamorphic and weathering of them occurs under humid tropical climatic conditions. Gneisses are the most abundantly available metamorphic rock in Sri Lanka. The objective of this study is to develop a classification system for Sri Lankan weathering profiles. This presentation highlights the part of the research carried out so far, which is mainly confined to Gneissic weathering profiles. The area selected for this study was the Wet Zone of Sri Lanka. Chemical weathering is more dominant than physical and biological weathering processes in Wet Zone. Geomorphologically, a series of geological uplifts, some strikingly large peaks and escarpments make the topography of the Wet Zone.

Sixteen classification systems developed for field identification and engineering properties were reviewed. Among those classification systems, the system proposed by Little (1969) was selected as an initial identification tool as it has been developed for rocks in tropical humid climatic regions. Thirty-eight quarries and more than sixty road cuts in different locations of the study area were investigated. At each location visual properties such as colour, texture, vegetation, geological structures, mineral bands, profile slope etc were carefully examined, and recorded. These properties were then compared with the Little's classification system. Careful examination of collected data shows that the weathering patterns of different rock types vary both climatically and topographically within the study area. The parent rock has significant influence on texture, profile thickness and engineering properties. Well-foliated rocks show comparatively thicker profiles, specially in valleys. Thin profiles are common near mountainous tops and on dip slopes. However, the identification features of the decomposition grades are independent of the profile thickness. Little's classification system was found to be reasonable in representing the profiles. However based on visual properties in the study certain modifications are proposed specially for CD, HD and MD in the Little's classification system. Further studies will be carried out to incorporate some engineering properties to the proposed modified Little's classification system.