STUDY OF RAPID ROCK WEATHERING: A CASE STUDY FROM SAMANALAWEWA PROJECT, SRI LANKA

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Rocks utilized for the Samanalawewa Project have undergone severe weathering after excavation. Rocks in the project area have undergone differential weathering and therefore, various weathering grades can be observed in the project area. The rocks used as construction materials, foundation materials and road aggregates suffer this calamity and they became incongruous for the sustainability of the project. Further, the Adit "D" and rip rap zone of the dam are under intimidation owing to this weathering. Eventhough several rock types are utilized for the project, only one rock type has undergone rapid weathering for the last fifteen years. This rock type is identified as garnet sillimanite gneiss.

Once water interacts with the particular rock, water becomes acidic with time and this acidity causes rock weathering. This process is called acid hydrolysis. In order to generate such acidic nature, sulphuric acid forms during the rock water interaction. In reality, the acidity is the consequence of the dissolution of pyrite (FeS_2) in water. It is a complex series of chemical weathering reactions which are spontaneously initiated under an oxidizing environment. The reactions are analogous to "geologic weathering" which take place over extended periods of time, but the rates of reaction are orders of magnitude greater than in "natural" weathering systems. The accelerated reaction rates can release damaging quantities of acids, metal ions and other soluble components into the environment.

Spatial distribution of the pyrite is imperative, when the rock contains extra quantity of pyrite, low pH results. Therefore, different grades of weathered rock exist in the quarry site, along the adit and within the dam. In this particular case, geological structures also play an important role. To facilitate water movement, permeability of the rock is crucial. The permeability is a consequence of the micro-fractures in the rock produced, either by brittle deformation or during and after blasting. Eventhough the reaction initiates under oxidizing environment, it then proceeds without oxygen, hence once the reaction commences it will continue even under reducing environment. With the intention of preventing the rock from further weathering, the weathered part should be removed and then oxidizing environment should be deactivated.