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RAPID ROCK WEATHERING AT KALU-GANGA DAM SITE, CENTRAL PROVINCE, SRI LANKA

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Strength of a rock is a crucial factor for the lifetime and durability of any structure to be used as a construction material. Loosing of this strength rapidly than the average rate will reduce the durability of a construction. A rapid rock weathering phenomena of garnet-sillimanite-graphite gneiss after exposing to the atmosphere was observed at Kalu-Ganga Dam Site, Central Province, Sri Lanka. Field, Petrographic and geochemical studies were carried out on a series of fresh, moderately weathered and highly weathered rock samples from the location in-order to scrutinize the possible cause of this rapid weathering. A sulphide smell was evident in close contact with the weathered rocks, which are superficially brownish in colour and whitish inside. In tunnels and open surfaces of this rapid weathering rock, yellowish massive sulpher crystallization was observed. The presence of pyrite was noted in all the weathered rock samples. Brownish iron-oxide and hydroxide stains owing to iron leaching were evident along cracks and separated grain boundaries which may have resulted during rock blasting. Stains were more intense near pyrite. This was supported by Atomic Absorption Spectrometry (AAS) of microwave digested samples, which showed a higher concentration of Fe^{2+} in the weathered samples. Analysis for anions showed out that there is a higher concentration of SO_4^{2-} in moderately weathered rocks and with the increment of weathering the amount of SO_4^{2-} decrease. Initiated by the acidity of rain and ground water, the possible reaction occurring within the rock should be, $FeS + H^+ \rightarrow H_2SO_4 + Fe^{2+}$. This reaction will produce more H^+ ions keeping up the acidity and the reaction continually. Since Fe^{2+} retains in the weathered rock as oxides and hydroxides, its concentration is more or less constant. But the SO_4^{2-} is removed from the rock, mostly by dissolution so its concentration drops with weathering and reduced SO_4^{2-} is crystallized in the form of massive sulpher, on the outer surface of the rock.