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Editorial

Weathering and its Effect on Rock Mass Characterization

Most civil engineering works are located close to the surface where the ground mass is affected by the weathering. Weathering implies decay and change in state from an original condition to a new condition as a result of external processes. Weathering takes place in all environments but is most intense in hot, wet climates where weathering may be expected to extend to great depths.

Long-term evaluation of rock engineering parameters in the Himalaya which is not only seismo-tectonically active but also a weathered sensitive zone is important. It has been observed that some rocks in the lesser Himalaya may be significantly affected for their strength and deformation characteristics once the rock mass is saturated during reservoir filling/operation. Also the rock mass as in the Himalayan region are soft and weathered having mineralogical composition highly prone to chemical weathering. These rocks appear to have some soluble contents/erodible joints filling and thus need to be investigated thoroughly on long-term basis. The importance of rock dynamics in civil engineering/mining activities and the performance study of underground structures subjected to blasting and seismicity particularly in soft and weathered rock mass conditions has also been reported from time to time by different researchers. It has been found that the dynamic effects in such condition may be even more significant compared to massive and strong rock mass conditions.

It is quite evident that weathering affects the mechanical properties of rock material and mass on the surface and at depths through physical and chemical weathering processes. Physical weathering leads to the opening of discontinuities by rock fractures, progressively breaking down the original rock to a soil-like material representing advanced stages of weathering. Chemical weathering results in chemical changes in minerals. Both physical and chemical weathering changes hard mineral into softer ones and loosens up the structure of a rock. Thus, reducing its strength (complete weathering creates soil) and other engineering properties. This means that even a hard rock like granite can be softer when exposed to weathering conditions over the period of time. Thus, weathering affects the engineering structures built at or near the Earth's surface.

The weathering of soft rocks is one of the primary causes of slope failure and shallow landslides in hilly areas. Therefore, understanding the nature of weathering is an important step in predicting the occurrence of slope failure and land-slides, including their timing, style and extent. In general, a slope becomes unstable gradually as the weathering of rocks proceeds inward from its surface and it typically fails during heavy rainfall or soon after. This type of failure is widely known from many places, especially from monsoon regions. Frequent failures along steep slopes composed of soft, degradable rocks are believed to be mainly attributed to the weathering of rocks, because individual failures are very shallow and they tend to repeat over time. It has also been observed that seepage caused by monsoon affects the support pressures significantly in large underground openings.

A paper entitled "*Importance of Weathering in Rock Engineering*" by R.K. Goel and Subhash Mitra presented in International Golden Jubilee Conference on Engineering Geology in New Millennium, EGNM-2015, New Delhi, India (Special Issue of Journal of Engineering Geology, October, New Delhi, pp.231-245) contains the details of effect of weathering on characterisation of rock mass for engineering designs.

-Subhash Mitra and R.K. Goel