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Correlation between the uniaxial compressive strength and the point load strength index of the Pungchon limestone, Korea

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Recently, the use of underground openings for various purposes is expanding, particularly for the crushing and processing facilities in open-pit limestone mines. The suitability of current rockmass classification systems for limestone or dolostone is therefore one of the major concerns for field engineers. Consequently, development of the limestone mine site characterization model(LSCM) is underway through the joint efforts of some research institutes and universities in Korea.

An experimental program was undertaken to investigate the correlation between rock properties, for quick adaptation of the rockmass classification system in the field. The uniaxial compressive strength(UCS) of rock material is a key property for rockmass characterization purposes and, is reasonably included in the rock mass rating(RMR). As core samples for the uniaxial compression test are not always easily obtained, indirect tests such as the point load test can be a useful alternative, and various equations between the UCS and the point load strength index(Is50) have been reported in the literature. It is generally proposed that the relationship between the Is50 and the UCS value depends on the rock types and, also on the testing conditions.

This study investigates the correlation between the UCS and the Is50 of the Pungchon limestone, with a total of 48 core samples obtained from a underground limestone mine. Both uniaxial compression and point load specimens were prepared from the same segment of NX-sized rock cores. The derived equation obtained from regression analysis of two variables is UCS=26Is50, with the root-mean-square error of 13.18.