MODIFIED POINT LOAD TEST FOR DETERMINING UNIAXIAL COMPRESSIVE STRENGTH OF INTACT ROCKS

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Abstract

A modified point load (MPL) testing technique is proposed to correlate the results with the uniaxial compressive strength (UCS) of intact rocks. The test apparatus is similar to that of the conventional point load (CPL), except that the loading points are cut flat to have a circular cross-sectional area instead of using a half-spherical shape. The load is applied along the axis of cylindrical (disk) specimens. The results from finite element analysis suggest that the applied stress required to fail the MPL specimen increases logarithmically as the specimen thickness or diameter increases. The maximum tensile stress occurs directly below the loading area with a distance approximately equal to the loading diameter. Over 400 specimens of Saraburi marble have been tested to determine the compressive strength and the MPL and CPL strength index under a variety of specimen sizes and length-to-diameter ratios. The test results suggest that the MPL strength can be correlated with the UCS when the MPL specimens are relatively thin, and can be an indicator of the tensile strength when the specimens are significantly larger than the diameter of the loading points. Even though both MPL and CPL tests overestimate the actual UCS of the rocks, the MPL results yield a better correlation than does the CPL strength index.

Published in NARMS-TAC 2002, Hammah et al. (eds)