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The Effect of Petrographic Characteristics on the Strength of Selected Basaltic Rocks from Turkey

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Abstract

Basalts show a variety of mineralogic, petrographic and chemical characteristics that may affect their strength properties. The aim of this study is to asses the influence of the petrographic characteristics of basaltic rocks on strength properties. In this study, eight different basaltic rocks generally from the Marmara Region of Turkey were examined to determine their petrographic, mineralogic and chemical characteristics. Then, density, unit weight, water absorption, effective porosity, sonic velocity and uniaxial compressive strength tests were conducted on the basalt samples. The relationships between these properties and the petrographical characteristics were described by simple regression analyses. According to the results obtained, strength properties of the basaltic rocks are controlled by not only physical properties but also minerals in the groundmass and phenocryst size of related rocks. Basaltic rocks which have groundmass including olivine, pyroxene, and plagioclase minerals had higher strength and less brittle properties when compared to basaltic rocks which have a groundmass containing volcanic glass and plagioclase microlite. In addition, as the percentage of microcrysts increases, the strength of basaltic rocks decreases.

Key words: Basaltic rocks, petrographic characteristics, rock strength, Turkey