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Determination of Geotechnical Properties of Travertine Lithotypes in Van-Turkey

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Abstract : Travertine is generally a weak or medium strong rock, and physical, mechanical and structural properties of travertines are direct impacts on geotechnical studies. New settlement areas were determined on travertine units after two destructive earthquakes which occurred on October 23rd, 2011 (M=7.1) and November 9th, 2011 (M=5.6) in Tabanlı and Edremit districts of Van province in Turkey, respectively. In the study area, the travertines have different lithotype and engineering properties such as strong crystalline crust, medium strong shrub, and weak reed which can affect mechanical and engineering properties of travertine and each level have different handicaps. Travertine has a higher strength when compared to the soil ground; however, it can have different handicaps such as having poor rock mass, karst caves and weathering alteration. Physico-mechanical properties of travertine in the study area are determined by laboratory tests and field observations. Uniaxial compressive strength (UCS) values were detected by indirect methods, and the strength map of different lithotype of Edremit travertine was created in order to define suitable settlement areas. Also, rock mass properties and underground structure were determined by bore holes, field studies, and geophysical method. The reason of this study is to investigate the relationship between lithotype and physicomechanical properties of travertines. According to the results, lithotype has an effect on physical, mechanical and rock mass properties of travertine levels. It is detected by several research methods that various handicaps may occur on such areas when the active tectonic structure of the area is evaluated along with the karstic cavities within the travertine and different lithotype qualities.

Keywords : travertine, lithotype, geotechnical parameters, Van earthquake
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