ABSTRACT

MSc Thesis

THE IMPROVEMENT OF THE STRENGTH CHARACTERISTICS OF THE SOFT CLAYEY SOILS USING LİME COLUMNS

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The object of this study was to investigate the geotechnical characteristics of the soft clayey soils including gypsum which forms the considerable part of the soils at the Organized Industrial Region of Konya City and to improve the strength and compressibility characteristics of the same region's soft clayey soils including gypsum.

The basic purpose in using the limestone column application on the soft clayey soils including gypsum was to improve the surrounding soil with time by diffusion after adding slaked or unslaked lime into the holes opened inside the soils. The aim was to obtain the improvement in the strength characteristics of the soil as a result of clay-lime reaction occurred due to the spreading of lime with diffusion effect as time passes. Ten undisturbed samples in cubic molds of 30×30×30 cm dimensions were taken from 3 m depth of the site for laboratory studies. The water contents, gypsum contents, Atterberg limits, compression and strength characteristics of the samples were determined. Then, according to the test program, each specimen was drilled up to 200 mm depth with 20 mm and 38 mm diameters and various geometrical permutations (Photo 1-2). Unslaked lime was placed inside the holes with pressure and cured during the 7, 14, 28, 56 and 112 day periods. The lime columns were drilled from their centers and watered in order to accelerate the diffusion of lime to its surrounding soil. At the end of the curing periods, undisturbed samples were taken from each specimen at definite distances to the lime columns, and their compression and strength parameters were examined. Consequently, the

strength parameters of the treated specimens increased with respect to the untreated samples, while the compressibility parameters decreased.

Keywords: Soft Clay, lime column, gypsum, lime stabilization, Konya