


Effect of Jet Grouting Construction Parameters on Durability and Strength Properties of Full-Scale Clayey Soil-Cement Pile

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[M. F. Hasan](#) , [H. F. Hasan](#), [A. A. Mahdi](#) & [H. Canakci](#)

Jet grout is a recent soil-enhancement technology that is used to provide strength improvement to weak soils. In the present study, seven full-scale soil-cement piles (SCP) were constructed in clayey soil. The water-to-cement ratio was kept constant ($w/c = 1$); five injection pressures (300, 325, 350, 375, and 400 bar) and three rotational speeds (25, 35, and 45 rpm) were used. These parameters were used to investigate the durability of the resultant SCPs with respect to chemical attack (sulfuric acid) and wetting and drying. The geomechanical properties of the SCPs generally varied with injection pressure and rotation speed. In particular, chemical attack had a significant impact on the mechanical properties of SCP specimens with respect to both jet-grout rotation and injection pressure parameters, with a seawater solution having a beneficial effect on the mechanical properties of SCP specimens when compared with ambient conditions. Significant deterioration and deformation were detected in H_2SO_4 solution, which caused mass losses that ranged from -10.2% to -58.8% and -9.5% to 2.4%, respectively, at 105 days curing. The mass change stabilized at 20%–30% after the twelfth wetting and drying cycle.