World Academy of Science, Engineering and Technology
International Journal of Transport and Vehicle Engineering
Vol:18, No:05, 2024

Impact of Carbonation on Lime-Treated High PI Clayey Soils

Authors : Saurav Bhattacharjee, Syam Nair

Abstract : Lime stabilization is a sustainable and economically viable option to address strength deficiencies of subgrade soils. However, exposure of stabilized layers to environmental elements can lead to a reduction in post-stabilization strength gain expected in these layers. The current study investigates the impact of carbonation on the strength properties of lime-treated soils. Manufactured soils prepared using varying proportions of bentonite silica mixtures were used in the study. Lime-treated mixtures were exposed to different experimental conditions created by varying the concentrations of CO_2 in the testing chamber. The impact of CO_2 diffusion was identified based on changes in carbonate content and strength (UCS) properties. Changes in soil morphology were also investigated as part of the study. The carbonation rate was observed to vary polynomially (2nd order) with exposure time. The strength properties of the mixes were observed to decrease with exposure time. Correlations were also developed to predict the carbonation rate in stabilized layers when exposed to atmospheric conditions.

Keywords : carbonation, soil, stabilization, morphology
Conference Title : ICPET 2024 : International Conference on Pavement Engineering and Technology
Conference Location : Montreal, Canada
Conference Dates : May 23-24, 2024