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IMPROVEMENT OF PROBLEMATIC SOIL USING CRUMB RUBBER TYRE

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Abstract Construction on problematic soil that has low bearing capacity, low shear strength, high compressibility, and high water-content will interfere with the smooth construction process and will affect time and cost due to repetitive maintenance. Pavement built on problematic soil as its subgrade is exposed to pavement failures, such as fatigue cracking, longitudinal cracking, and pumping, owing to swelling or shrinkage due to moisture variation and differential settlement. Therefore, improvement of the ground needs to commence so as to improve its load bearing capacity, in order to sustain the load on top of it. Consequently, the main aim of this study is to determine the effectiveness of crumb tyre rubber mixed with soil samples as one of the soil stabilisation techniques and to establish the optimum usage percentage of crumb tyre



rubber as a stabiliser. Clayey sand soil was mixed with 5%, 10% and 15% of crumb tyre rubber by weight of the soil sample and was tested for physical properties, such as particle size distribution and plasticity index. In obtaining the changes in strength, mixed clayey sand-crumb tyre rubber samples were subjected to compaction and California Bearing Ratio (CBR) tests. The results showed that the increment of crumb tyre rubber percentage as an additive, increased the CBR value and therefore enhanced the strength of the modified soil. However, the crumb tyre rubber stabiliser affected the optimum moisture content and maximum dry density of the modified samples by decreasing their values. The optimum percentage of crumb tyre rubber mixture was found to be 10% by weight at the end of this study. These findings indicate that the measured crumb tyre rubber is suitable for supporting the clayey sand soil for the subgrade of pavement construction.

Keywords

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