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CHARACTERISTICS OF SOILS IMPROVED WITH POLYETHYLENE TEREPHTHALATE WASTES

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Abstract

In this study we investigated the possibilities of using recyclable fine and coarse grain waste obtained by grinding Polyethylene Terephthalate (PET) containers, as light filling materials for different applications (clay dams, highway embankments, and backfills behind retaining structures). Various geotechnical tests were performed on clayey soil and soil-PET mixtures using recycled fine and coarse granules of Polyethylene Terephthalate bottles. The results indicated that the use of the recycled polymer mixed with clayey soils as a filling material is favorable for soil properties. The compaction test results indicate that the optimum dry densities of PET-soil mixtures are less than the optimum dry density of typical soils including the clayey soil used in this study (varying between 13.83 kN/m³ and 12.55 kN/m³). P-wave velocities values were correlated for PET mixtures. The results indicate that data concerning the dependence of P-wave velocity values and PET mixtures percentage can be correlated with a coefficient of determination between R²=0.93 to R²=0.73. Finally, the results show a good potential for using the PET waste as lightweight fill material.

Keywords: embankment, lightweight fill, Polyethylene Terephthalate bottles, recycling, soil improvement

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