

水泥固化重金属铅污染土的强度特性研究

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Unconfined Compressive Strength Properties of Cement Solidified/Stabilized Lead-Contaminated Soils

摘要

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摘要 污染场地中开挖出来的污染土利用水泥固化处理(S/S法)后,其污染物质的淋滤特性和土体的强度得到改善,可用于场地的回填和堤坝的填筑等。针对该项技术,对水泥固化稳定后的重金属铅污染土的强度特性进行了研究。试验所用的铅污染土通过将硝酸铅溶液加入干土中人工制备而成,并考虑了不同铅离子含量和水泥掺量对水泥固化污染土强度特性的影响。试验结果表明:水泥固化污染土的无侧限抗压强度随着水泥掺量以及龄期的增长而提高;与常规水泥土(不含重金属污染物)强度相比,污染土中铅离子含量较低时,强度略有提高,铅离子含量较高时,强度显著降低;不同铅含量水泥土试样的应力应变关系均表现为强度越高,破坏应变越小;试样28 d龄期的变形模量与强度呈较好的线性对应关系。

关键词: 水泥固化稳定技术 污染土 重金属 铅 无侧限抗压强度 变形模量

Abstract: Replacement is one of widely used technologies for remediation of contaminated sites. The excavated contaminated soils can be treated off site by the stabilization/solidification (S/S) method, which uses cement as a binder to reduce the leachability of pollutants and achieves an end product with high strength. The treated contaminated soils can be reused as construction materials such as embankment fillings in the highway construction or backfill of shallow foundations. An experimental study on the unconfined compressive strength properties of cement stabilized/solidified heavy metal contaminated soils is presented. The heavy metal contaminated soils are prepared in the laboratory by adding lead nitrate as a source of pollutant. Cement is used as a S/S binder with different contents. The test results show that the presence of lead in soils interferes with the hydration process of cementitious matrix, which directly reflects the unconfined compressive strength development, stress-strain relationship and deformation modulus of the treated soils.

Keywords: cement-based solidification/stabilization contaminated soil heavy metal lead unconfined compressive strength deformation modulus

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