Remediation of Petroleum Contaminated Soils Using High Carbon Content Fly Ash

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ABSTRACT:

Replacement of natural soils with recycled materials in highway construction is an emerging application area. A research study was conducted to investigate the effectiveness of high carbon content fly ash (HCCFA) as a binder during stabilization of petroleum-contaminated soils (PCSs) and evaluate the feasibility of using the final product in highway embankment construction. A battery of laboratory tests was conducted to evaluate the environmental suitability of stabilized PCSs. The test program included batch adsorption and long-term column leaching tests. Naphthalene and *o*-xylene, and a tertiary model non-aqueous phase liquid were used as the pollutants in batch sorption and column tests, respectively. Batch adsorption tests demonstrated a nonlinear adsorption behavior for naphthalene and *o*-xylene onto HCCFA. The adsorption test data suggested that HCCFA is a promising sorptive medium for petroleum hydrocarbons due to the presence of available carbon in its structure. Column leaching test results indicated that the naphthalene and *o*-xylene concentrations of the effluents collected from the stabilized PCSs columns were lower than those collected from the control columns. These laboratory test data suggest that HCCFA can be effective in remediation of PCSs; however, the level of petroleum contamination has a significant effect on the leaching properties.

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