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Assessment of hydraulic conductivity of waste landfill liner materials by using modified bentonite under sea water condition

Xin Xu and Junboum Park
Seoul National University, South Korea

Leachates resulting from the waste landfill of waste can possibly cause the secondary environmental pollution. Liner has been installed in the reclaimed land of waste to block and purify permeation water flowing into groundwater and environment. This research is to develop spherical particle liner system by using modified bentonite for offshore waste final disposal. The particles include of core materials and coating materials which have high swelling capacity and low permeability. Liner materials should have high water resistance capacity and permeability coefficient below 1×10^{-7} cm/s under sea water condition. In this study, the core materials coated by the mixture of bentonite, sepiolite and guar gum to overcome the weak points of bentonite. Drying shrinkage cracking test and swelling index test was estimated to find the optimal mixing ratio of bentonite, sepiolite and guar gum. The hydraulic conductivity of the particle was also evaluated by using the rigid-wall permeameter. Through drying shrinkage cracking test results, we have found the content of sepiolite in the bentonite-sepiolite mixture is 15%. From free swelling test results, when weight ratios of guar gum in coating materials exceeding 7.5%, the swelling index of coating materials under sea water condition was higher than bentonite-sepiolite mixture without guar gum under fresh water condition. When weight ratios of guar gum exceeding 5% in coating materials, the hydraulic conductivity of the coating materials from rigid-wall permeameter was below 1.0×10^{-7} cm/s under sea water condition. The hydraulic conductivity of particles was below 1.0×10^{-7} cm/s by using rigid-wall permeameter.

Biography

Xin Xu is currently a PhD candidate at Seoul National University and his major is Geotechnical and Geoenvironmental Engineering. His research is about development of technology for offshore waste final disposal.

xuxinsnu@hotmail.com

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