Probabilistic Modeling of Reinforced Landfill Final Covers for Sustainable Drainage

Wednesday, September 24, 2014
16:00 – 17:00, Room 2355 GG Brown

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Abstract: Final covers for landfills containing radioactive waste, municipal solid waste, and other materials with highly variable properties are expected to perform for decades, centuries, or longer. Forthcoming regulations governing these facilities as well as concerns about long-term maintenance costs are demanding construction techniques that minimize long-term interventions to guarantee this performance. A primary problem maintaining final cover performance is differential settlement. Localized depressions resulting from differential settlement can compromise the drainage performance of a final cover, its primary function. Geosynthetic reinforcement can reduce the effects of differential settlement, but a reliable method is needed to quantify the reinforcement required and to index this requirement to measures of risk. For example, such a method would construct a list of reinforcement options and calculate the expected value of life cycle maintenance costs (risk) for each option using the resulting distribution of failed zones requiring repair. This presentation discusses a probabilistic analysis method to model reinforced final cover performance. The method draws from previous studies of road subgrade and sinkhole bridging reinforcement to allow the modeling of reinforcement effects on differential settlement performance. Example results are presented to show how the method can be used to proportion final cover design.

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