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Determination of the Shear Strength of Wastes Using Back-Analyses from Observed Failures

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Abstract : The determination of the strength characteristics of waste materials is essential when evaluating the stability of waste fills during initial placement and at the time of closure and rehabilitation of the landfill. Significant efforts, mostly experimental, have been deployed to date in attempts to quantify the mechanical properties of municipal wastes various stages of decomposition. Even though the studies and work done so far have helped in setting baseline parameters and characteristics for waste materials, inherent concerns remain as to the scalability of the findings between the laboratory and the field along with questions as to the suitability of the actual test conditions. These concerns are compounded by the complexity of the problem itself with significant variability in composition, placement conditions, and levels of decay of the various constituents of the waste fills. A complimentary, if not necessarily an alternative approach is to rely on field observations of behavior and instability of such materials. This paper describes an effort at obtaining relevant shear strength parameters from back-analyses of failures which have been observed at a major un-engineered waste fill along the Mediterranean shoreline. Results from the limit-equilibrium failure back-analyses are presented and compared to results from laboratory-scale testing on comparable waste materials.

Keywords : solid waste, shear strength, landfills, slope stability
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