COMPRESSIBILITY CHARACTERISTICS OF MUNICIPAL SOLID WASTE IN MEETHOTAMULLA WASTE FILL SITE

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Degree of Master of Engineering

Department of Civil Engineering

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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Prof. S.A.S. Kulathilaka

ABSTRACT

Municipal solid waste (MSW) is defined as solid waste generated from community, commercial and agricultural operations and it includes wastes from households, offices, stores, industries and other non-manufacturing activities. Management of municipal solid waste is a major problem all over the world. Recently, Municipal Solid Waste Management became a growing concern in Sri Lanka with the catastrophic landfill failures occurred at Meethotamulla. The need to ensure the stability of existing landfills which are mostly uncontrolled through appropriate engineering designs is a major task at present.

MSW forms the largest portion of the landfill and its strength and stiffness (compressibility) characteristics controls all aspects of landfill designs. In this research compressibility characteristics of MSW at different stages of decomposition were evaluated under both saturated and unsaturated conditions.

Considering the highly heterogeneous state of MSW, larger samples were tested using a Rowe Cell of diameter 150mm with loading, unloading and reloading increments. Characteristics such as; Coefficient of volume compressibility, coefficient of consolidation, coefficient of secondary consolidation, compression index, recompression index were determined to assess the applicability of conventional Terzaghi consolidation theory in modelling the MSW behavior. Results were compared with the behavior of residual soil and organic soils. The test results revealed that MSW experienced high primary and secondary consolidation settlements. These could be significantly reduced by preloading. The coefficient of consolidation values were quite high.

Keywords: Municipal solid waste (MSW), Consolidation characteristics, Meethotamulla, Rowe cell

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