

## Characterization of Solid waste material from industrial landfill in Japan

Damith Nandika Hiniduma Liyanage<sup>1\*</sup>

<sup>1</sup>Graduate School of Science and Engineering, Saitama University, Japan

T. Koide<sup>2</sup>, K. Kawamoto<sup>1, 2</sup>, S. Hamamoto<sup>1, 2</sup>, T. Komatsu<sup>1, 2</sup>, and K. Endo<sup>3</sup>

<sup>1</sup>Graduate School of Science and Engineering, Saitama University, Japan

<sup>2</sup>Institute for Environmental Science and Technology, Saitama University, Japan

<sup>3</sup>Center for Material Cycles and Waste Management Research, National Institute for Environmental Studies, Japan

### Abstract

Knowledge of geotechnical properties of solid waste properties and their dependencies on the age (i.e., degradation of organic matter) and composition of solid waste material is important for optimizing design of engineering landfill and assessing its long-term performance. In this study, geotechnical properties of solid material with different size fractions taken from an industrial waste landfill in Japan were measured. Laboratory tests were performed to determine the index properties of water content, grain size distribution and composition, total organic content, C/N ratio, specific gravity, Atterberg limits, pH and EC values, and geotechnical properties of compaction, compressibility and shear strength parameters. Field moisture content of solid waste was around 48% and liquid limit and plastic limits were 65% and 42%, respectively. The specific gravities of solid waste material were 2.72 and 2.62 for the finer fraction (grain size less than 2mm) and coarser fraction (grain size lesser than 10mm) respectively. The C/N ratio of waste was around 56 for finer fractions. In addition, ignition losses were about 18.2% and 17.2% for finer fraction and coarser fraction, respectively. Higher C/N ratio and ignition loss value might suggest that the solid waste at finer fraction contains higher amount of less-decomposable organic matters. The pH value of landfill material is about 8.8 and EC value is about 2.8mS/cm, then both values prove that waste material is alkaline. Based on the measurement of the geotechnical properties for solid waste material with different size fraction, the relation between index and geotechnical properties will be investigated.

**KEYWORDS:** solid waste, landfill, index properties, geotechnical properties, degradation