International Session (Oral) | Symbol A (Atmospheric, Ocean, and Environmental Sciences) | A-GE Geological & Soil Environment

[A-GE03_30AM2]Subsurface Mass Transport and Environmental Assessment

Convener:*Yasushi Mori(Graduate School of Environmental and Life Science, Okayama University), Hirotaka Saito(Department of Ecoregion Science, Tokyo University of Agriculture and Technology), Ken Kawamoto(Graduate School of Science and Engineering, Saitama University), Shoichiro Hamamoto(Department of Biological and Environmental Engineering, The University of Tokyo), Ming Zhang(Institute for Geo-Resources and Environment, National Institute of Advanced Industrial Science and Technology), Chair:Yasushi Mori(Graduate School of Environmental and Life Science, Okayama University), Ming Zhang(Institute for Geo-Resources and Environment, National Institute of Advanced Industrial Science and Technology)

Wed. Apr 30, 2014 11:00 AM - 12:44 PM 213 (2F)

This session covers the topics on mass transport, waterand energy cycles in geoenvironment. Subjects related to laboratoryand field measurements, theoretical analysis, and numerical modelingwill be discussed. Presentations on geo-pollution, remediation,geological disposal of hazardous wastes, ground source heatutilization, mass transport in vadose zone, soil-water monitoring, andenvironmental assessment are encouraged.

12:20 PM - 12:35 PM

[AGE03-P06_PG]Consolidation characteristics of landfilling waste samples in Japan: Effects of waste compositions and various mixing pr

3-min talk in an oral session

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Keywords:Compaction, Consolidation, Sludge, landfill

Solid waste materials are highly heterogeneous depending on various waste compositions, making it difficult to understand their consolidation characteristics. The purpose of study is to find out effects of waste compositions and mixing proportions on the consolidation characteristics of compacted solid waste materials. In this study, totally 6 different waste materials, un-burnable domestic waste, un-burnable industrial waste, incineration ash, crushed concrete, organic sludge and inorganic sludge, were used as tested materials. By using the standard proctor test, compaction curves and maximum dry bulk densities were determined for each sample. Compaction results showed that maximum dry bulk densities of the Incineration ash (1.65 g/cm3) and crushed concrete (1.45g/cm3) were higher than the inorganic sludge (0.90 g/cm3) and organic sludge (0.742 g/cm3) respectively. The maximum dry bulk densities for mixed sample of inorganic sludge, concrete and incineration ash were larger than each independent waste sample. In especial, the maximum dry bulk density for the mixed sample with ratio 1:1:1 (dry mass basis) was 1.48 times larger than that for inorganic sludge.Consolidation tests were carried out for selected pre-compacted waste samples with degree of compaction higher than 90 % after the compaction tests. For the consolidation tests, oedometer test apparatus which dimension of 10 cm diameter and 10 cm height was used for the waste materials with particle size larger than 2mm. Results of each independent sample showed that the coefficient of consolidation (Cv) for crushed concrete and incineration ash was higher than organic and inorganic sludge wastes while compressibility of un-burnable industrial waste

was higher than the other materials due to a presence of compressible material. As the mixing ratio of crushed concrete in the mixed samples increased, the compression index (Cc) decreased. When the inorganic sludge and crushed concrete are mixed with the ratio 1:3, the Cc value of the mixed sample decreased up to 75% as compared to the one for only inorganic sludge. In addition, by mixing the inorganic sludge with the crushed concrete, the Cv values for mixed samples increased in the order of 10^{1}~10^{2}. Effect of mixed proportion of the various wastes on consolidation parameters will be further investigated.