

Geotechnical Engineering Seminar
Friday, April 4, 2008
Mason 142A, 12:00-1:00pm

Effect of mineral coatings on the behavior of particulate soil systems: I. Coating process

*by Joan Larrahondo
School of CEE, Georgia Tech*

ABSTRACT:

Geomaterials exhibit dramatic changes in mechanical behavior upon chemical and physical weathering, so strength issues are common in tropical and residual soils. Chemical weathering yields products, including metallic oxides, hydroxides and oxyhydroxides which accumulate on rock and soil surfaces due to their low solubility, and exhibit relatively high specific surface. The general objective of this ongoing research effort is to readily isolate, for controlled study in the laboratory, the effect of chemical weathering coatings on the engineering behavior of soils. Unlike previous studies on weathered geomaterials, chemical-weathering effects are evaluated in this work independently from stress history, parent rock discontinuities, and biological influence. Particles of fine silica sand were coated separately by adsorption of amorphous ferric hydroxide $\text{Fe}(\text{OH})_3(\text{s},\text{am})$ and the oxyhydroxide goethite $\beta\text{-FeO}(\text{OH})(\text{s})$ onto the sand surface at controlled pH, ionic strength, and temperature. Amorphous ferric hydroxide and goethite are products that chemical weathering of olivine and pyrite yield under atmospheric pressure. This presentation focuses on the laboratory coating process that has been implemented. Also, preliminary results from CD triaxial tests performed on both coated and uncoated control samples will be presented. The study of the relevance of chemical weathering on soil behavior will help address issues in tropical soils for geotechnical applications.

BIO:

Joan Larrahondo is a PhD candidate in the School of Civil and Environmental Engineering working with Dr. Susan Burns. He got his B.S. in Civil Engineering from the National University of Colombia, Bogotá (2003) and his M.S. in Civil Engineering at Georgia Tech, Atlanta (2006).