

GRANULAR AND MULTIPHASE FLOWS

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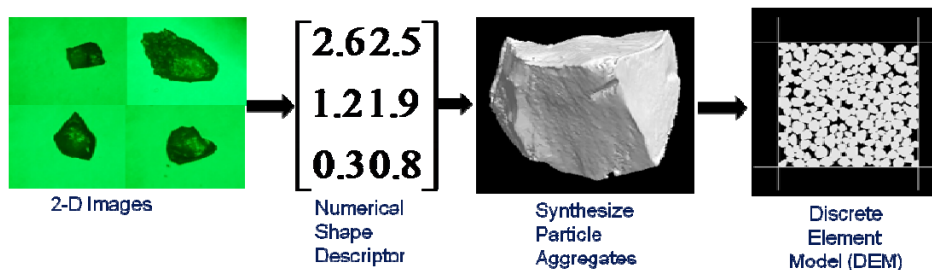
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Mechanical Engineering Center - Room 224

INFLUENCE OF INHERENT PARTICLE CHARACTERISTICS ON THE SHEAR STRENGTH PROPERTIES OF PARTICULATE MATERIALS

The dependence of liquefaction susceptibility of sands and gravels on particle shape and angularity has been well documented in the literature. However, quantification of particle morphology and its direct influence on liquefaction susceptibility has been hindered by the absence of quantitative models for particle shape, as well as the difficulty in modeling angular particle assemblies. In this presentation, a method for quantitative identification of particle morphology is reviewed. The influence of particle shape and angularity on shear strength of particulate materials is studied. The presentation will also discuss some recent studies conducted at Rowan University that describes the design and development of automated image processing algorithms that can estimate 3-D shape-descriptors for particle aggregates using a statistical combination of 2-D shape-descriptors from multiple 2-D projections. Equipment used range from a simple optical microscope to an X-ray Computed Tomography apparatus. In addition, the X-ray computed tomography apparatus is used to study the packing characteristics of granular media, which also has a significant effect on shear strength. New developments in modeling of granular soils using the Discrete Element Method (DEM) are also presented. Because the DEM software is limited to modeling particles with circular outlines, a new technique is developed to simulate angular grains by clumping a series of overlapping circular outlines with equivalent properties.



Dr. Sukumaran has been on the faculty at Rowan University since 1998. Her area of expertise is in microgeomechanics and has published several conference and journal papers. She has also published several papers on engineering education and the unique undergraduate curriculum at Rowan University, especially the Engineering Clinics. She worked at Amoco and the Norwegian Geotechnical Institute on offshore foundations for deepwater applications before joining Rowan. She is a member of the Soil Modeling Committee of the Geoinstitute and the Education Committee of USUCGER. She has also been involved in various outreach activities to recruit more women and minorities into engineering and is Director at Large of the Women in Engineering Division of ASEE.