



LARGE SCALE TESTING

LINKING RESEARCH
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Keynote Speaker

MICRO-TO-MACRO MECHANISMS BEHIND SIZE EFFECTS IN COARSE GRANULAR SOILS

The practice of reducing particle sizes to produce laboratory-scale specimens for coarse soils and rockfills continues to draw attention, largely because its effectiveness remains uncertain. Over the years, numerous experimental methods have been proposed, and significant data has been compiled. However, researchers have often reported conflicting experimental observations, leading to apparent contradictions regarding size effects.

This lecture presents an integrated synthesis of the authors' experimental and numerical investigations dedicated to clarifying how size affects the shear response of coarse granular materials. Based on comprehensive large-scale laboratory and in situ tests on rockfills and gravelly soils, and complemented by campaigns of numerical tests using the discrete element method (DEM), the effects of several material properties are systematically isolated and studied at both the soil element and the particle scales. The study includes analyses of intrinsic parameters (grading, particle shape, and particle crushing strength), sample and testing conditions (boundary effects, specimen size, representative element volume (REV)), and state parameters (stress and density).

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