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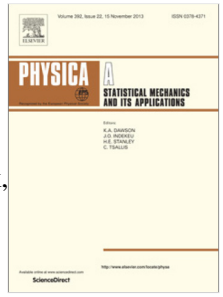

Effect of aspect ratio on the mechanical behavior of packings of spheroids

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Effect of aspect ratio on the mechanical behavior of packings of spheroids

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Abstract

This paper presents measurements of the mechanical response of assemblages formed by spheroid particles. Sets of such particles in the form of thin, cylindrical samples were subjected to uniaxial confined compression. The particles were flattened and elongated, with aspect ratios ranging from 0.5 to 2.5. All particles were fabricated using a 3D printer and each had the same volume. Because the particles had well-defined shapes, it was possible to experimentally observe how the mechanical response of the anisotropic and highly constrained samples depended on the elongation of the particles. In particular, we showed how the sample density, lateral pressure ratio, and work done to compact a sample of elongated or flattened particles changed with change in particle aspect ratio. Furthermore, we found that the evolution of packing density in subsequent loading-unloading cycles followed a stretched exponential law regardless of particle aspect ratio.

Keywords: uniaxial confined compression, granular matter, particle shape,

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