

Abstract Submitted
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The response of dense dry granular material to the shear reversal¹

JIE ZHANG, Duke University, Department of Physics, JIE REN, SOMAYEH FARHADI, ROBERT BEHRINGER — We have performed two dimensional granular experiments under pure shear using bidisperse photo-elastic disks. Starting from a stress free state, a square box filled with granular particles is subject to shear. The forward shears involved various number of steps, leading to maximum strains between 0.1 and 0.3. The area is kept constant during the shear. The network of force chains gradually built up as the strain increased, leading to increased pressure and shear stress. Reverse shear was then applied to the system. Depending on the initial packing fraction and the strain at which the shear is reversed, the force chain network built prior to the shear reversal may be destroyed completely or partially destroyed. Following the force chain weakening, when the reserve shear is continuously applied to the system, there is a force chain strengthening. Following each change of the system, contact forces of individual disks were measured by applying an inverse algorithm. We also kept track of the displacement and angle of rotation of every particle from frame to frame. We present the results for the structure failure and reconstruction during shear reversals. We also present data for stresses, contact force distributions and other statistical measures.

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