

Abstract Submitted
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Dynamics of failure in cohesive granular packings¹ JENNIFER RIESER, University of Pennsylvania, WENBIN LI, JU LI, Massachusetts Institute of Technology, JERRY GOLLUB, University of Pennsylvania and Haverford College, DOUGLAS DURIAN, University of Pennsylvania — We explore the grain-scale interactions that precede large-scale deformations and mark the onset of mechanical failure in two-dimensional disordered granular packings. The two-dimensionality of the system allows for direct observation of all particle dynamics during the compression of a pillar. The grains are cohesive, with an attraction governed by tunable capillary forces induced through an interstitial fluid. For our analysis, we focus on the evolution of local rearrangements into shear bands within the pillar, quantifying the structural differences within the packing due to the presence of cohesion. We observe that cohesion results in greater spatial heterogeneity within the packing during compression. We also compare the compression of ordered and disordered packings.

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