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Compression of granular pillars with constant width at top and bottom YUKA TAKEHARA, JENNIFER RIESER, University of Pennsylvania, JERRY GOLLUB, Haverford College, DOUGLAS DURIAN, University of Pennsylvania — Granular media display both elastic and plastic behavior, including the formation of shear bands under extreme loading. In this study, we performed two-dimensional granular pillar compression experiments and tracked of grain- and macro- scale flows via video imaging and force measurement. Especially we focus on the condition that the top and bottom widths of the granular pillars are constrained to avoid free expansion along the contact edge. This causes more energy to be stored elastically deep inside of the pillars, which gives rise to a different kind of shear banding than for free top/bottom widths. Furthermore we tried several series of experiments with different elastic/frictional particles and also ordered/disordered systems. We demonstrate how the micro properties and packing structure contribute to the formation of shear band to discuss the mechanical failure in disordered packing.

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