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DEM simulation of granular flow in a Couette device[1] VIDYAPATI VIDYAPATI, Iowa State University, M. KHERIPOUR LANGRUDI, GABRIEL TARDOS, The City College of the City University of New York, JIN SUN, SANKARAN SUNDARESAN, Princeton University, SHANKAR SUBRAMANIAM, Iowa State University — We study the shear motion of granular material in an annular shear cell operated in batch and continuous modes. In order to quantitatively simulate shear behavior of granular material composed of spherical shaped grains, a 3D discrete element method (DEM) is used. The ultimate goal of the present work is to compare DEM results for the normal and shear stresses in stationary and moving granular beds confined in Couette device with experimental results. The DEM captures the experimental observation of transition behavior from quasi– static (in batch mode operation) to rapid flow (in continuous mode operation) regime of granular flows. Although there are quantitative differences between DEM model predictions and experiments, the qualitative features are nicely reproduced. It is observed (both in experiments and in simulations) that the intermediate regime is broad enough to require a critical assessment of continuum models for granular flows.

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