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Experimental and computational studies of segregation mechanisms using a split-bottom cell YI FAN, KIMBERLY HILL, St. Anthony Falls Laboratory, Department of Civil Engineering, University of Minnesota — We investigate the relative importance of certain "microscopic" (that is, particlescale) segregation mechanisms for densely sheared granular mixtures using a split-bottom cell. Unlike other experiments more commonly used to study segregation in dense flows, the split bottom cell induces a shear primarily in the horizontal direction and thus isolates the shear-related segregation mechanisms from the effect of gravity Experimentally, we find that (unlike in gravity driven shear flow) in the vertical direction, segregation associated with particle density is much faster than segregation associated with particle size. Further, investigations of the segregation structure in the bulk show that for particles differing only in size, the vertical segregation structure is somewhat restricted to the region close to free surface likely associated with a surficial porosity gradient We also perform Distinct Element Method (DEM) simulations to access the bulk kinematics, and find stratification associated with relative particle sizes can strongly influence the segregation dynamics.

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