

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Bulk horizontal size segregation in circular and parallel split-bottom cell¹ YI FAN, KIMBERLY HILL, St. Anthony Falls Lab, Department of Civil Engineering, University of Minnesota — We perform Discrete Element Method (DEM) simulations of mixtures of different sized granular materials sheared in circular and parallel split-bottom cells. Horizontal segregation patterns in bulk are observed in both systems, but it appears that the underlying dominant driving mechanisms are different. In the curved cell, a global vertical convection roll is observed whose center is located at the plane of highest shear rate. The boundary between regions dominated by larger particles and those dominated by smaller particles are separated by the centers of the convection roll and the shear zone. In the parallel system, there is no such global convection. Nevertheless, a horizontal segregation pattern emerges, in which larger particles accumulate to the middle of shear zone and smaller particles migrate to the edges of shear zone. In this case the horizontal segregation may be caused by horizontal shear gradients and associated kinematic features.

¹Acknowledge Support from NSF No. CMS-0625022 and NSF No. EEC-0630603.

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Date submitted: 10 Aug 2009

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