Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Force distribution functions within thick layers of gravity-driven granular mixtures K.M. HILL, J. ZHANG, B. YOHANNES, St. Anthony Falls Laboratory, Department of Civil Engineering, University of Minnesota, Minneapolis, MN 55414, J.B. FREUND, Mechanical Science and Engineering, University of Illinois, Urbana, IL 61801 — We investigate computationally the probability distribution of the magnitudes of interparticle forces P(F) in thick gravity-driven layers of granular mixtures in half-filled rotated drums. In the majority of the layer where the particles move in solid-like rotation with the drum, P(F) decays exponentially above the average force, as reported in other jammed granular systems. However, from the bottom of the flowing layer to the top of the free surface, the shape of P(F) above the average force undergoes a gradual transition from one that decays exponentially to one that decays as a power-law. Over the same distance, the coordinate number decreases from near 4 at the bottom of the flowing layer to far less than 1 near the free surface. We show how these signatures of the changes in the flow structure modify the dominant segregation mechanisms for the different regions of the flowing layer.

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Date submitted: 06 Aug 2008 Electronic form version 1.4