

Abstract Submitted
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Size Segregation of Granular Materials ANURAG TRIPATHI, D.V.

KHAKHAR, Indian Institute of Technology Bombay — Segregation of granular materials due to size difference while flowing/energized is a very well known but poorly understood phenomena. Despite of some good understanding of the mechanism of size segregation, predictive models for size segregation are not available. Size segregation of binary granular mixtures flowing over inclined plane is studied by means of DEM simulations. Buoyant force acting on trace particles of a bigger size is obtained by varying the density of the trace particles rising/sinking in the granular flow. We show that moderately big trace particles of same density as that of the light particles tend to rise because of higher buoyancy forces than the weight of the trace particles. For very big trace particles of same density, however, the buoyant force becomes smaller than the weight of the particles causing the particles to settle down. Drag force on the trace particle is found to be given by Stokes' law. Friction drag is found to almost 10 – 12% of the weight of the trace particles. Incorporating the Stokes' law and balancing the segregation and diffusion flux of big particles, we are able to predict the number fraction of the big particles in terms of viscosity and diffusivity for moderately dilute binary mixture of different size particles. The proposed theory is tested against DEM simulation results and very good agreement has been found with the simulation results.

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