

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Critical evaluation of continuum models for granular drainage**

KEN KAMRIN, JAEHYUK CHOI, MARTIN Z. BAZANT, R. R. ROSALES, Department of Mathematics, MIT, ARSHAD KUDROLLI, Department of Physics, Clark University — Which dense flow model is the best for which problems? Currently, there exist several known models for predicting steady-state velocity distributions in hopper or silo flow. This work offers a detailed comparison of the common dense flow models. Hourglass Theory, the Kinematic Model, and Saint-Venant's Plastic Model are applied within a narrow wedge hopper geometry, and the predicted flow is closely compared with experimental velocity profiles for glass beads in quasi-two-dimensional flows. Those models which support alternate boundary configurations are tested against experiment in spout and silo geometries. Due consideration is also made for the ease-of-use and restrictions of each model. Our goal is to develop general criteria for selecting the most suitable model under different circumstances. We also seek to evaluate the microscopic physical justifications for each model.

Martin Bazant  
Department of Mathematics, MIT

Date submitted: 01 Dec 2004

Electronic form version 1.4