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Flowing layer kinematics for constant dimension flowing layers with variable erosion velocities ADAM SPITULNIK, NICHOLAS POHLMAN, Northern Illinois Univ — Simulations of granular flow assume a consistent flowing layer profile observed in circular tumblers that were half full. While the constant shear rate model predicts mixing kinematics adequately, the model has not been empirically tested in systems where the erosion from the solid body has velocity components along the dynamic angle of repose. This research reports on experiments where the relationship between tumbler fill fraction and the kinematics of the erosion boundary transition into the flowing layer is analyzed. Tumblers greater than 50% full have inertial velocity along the angle of repose; fill conditions less than 50% enter with velocity opposite the free surface angle. Results show that varying the fill level while maintaining constant flowing layer length does not change the advection pattern within the flowing layer. The conclusion is that the 50% model is independent of fill level due to the kinetic energy of the flowing layer exceeding the potential energy at the erosion boundary.

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