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The flow rule of dense granular flows on a rough incline ROBERT ECKE, Los Alamos National Laboratory, TAMAS BORZSONYI, Inst. Solid State Physics and Optics — We present experimental findings on the flow rule for dense granular flows on a rough inclined plane using various materials including sand and glass beads of various sizes and four types of copper particles with different shapes. We characterize the materials by measuring h_s (the thickness at which the flow subsides) as a function of the plane inclination θ on various surfaces. Measuring the surface velocity u of the flow as a function of flow thickness h, we find that for sand and glass beads the Pouliquen flow rule $u/\sqrt{gh} \sim \beta h/h_s$ provides reasonable collapse of the $u(h)$ curves measured for various θ and mean particle diameter d. Improved collapse is obtained for sand and glass beads by using a scaling recently proposed by Jenkins of the form $u/\sqrt{gh} = \beta \cdot h \ \tan^2\theta/h_s \ \tan^2\theta_1$ where θ_1 is the angle at which the $h_s(\theta)$ curves diverge. Measuring the slope β for ten different sizes of sand and glass beads, we find a systematic, strong increase of β with the divergence angle θ_1 of h_s. The copper materials with different shapes are not well described by either flow rule with $u \sim h^{3/2}$.

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