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Experiment test of a Janssen formula in a dense granular column[1] KEVIN FACTO, University of Massachusetts-Amherst, TOM SCHICKER, University of Massachusetts-Amherst, NARAYANAN MENON, University of Massachusetts-Amherst — The stresses inside a tall column of either static or flowing granular material saturate with depth, because the weight of the material is borne by friction with the walls. In the static case, the height dependence of the stress is traditionally described by the Janssen formulation, in which the shear stress at the wall is assumed to be proportional to the normal stress. We report measurements of all three components of force at the wall of a dense, gravity-driven flow of glass beads. We find that the depth dependence of the stress in this slow flow is well-described by a Janssen-like formula. We are also able for the first time to directly test the Janssen assumption, and find that the fluctuations in the shear and normal forces at the wall are highly correlated. The measured friction angle is independent of flow rates for the slow flows we have examined, and is surprisingly close to the ensemble average of the friction angle measured when the flow is stopped.

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