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Shear resuspension and rheology of dense particles at moderate and large Re ESPERANZA LINARES-GUERRERO, MELANY HUNT, California Institute of Technology, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — We experimentally investigate the resuspension behavior of dense particles subjected to lateral shear in a Couette device for particle Reynolds numbers from 15 to 500. Before the shear is applied, the particles sediment and form a compact bed that sits in the bottom of an annular ring of the apparatus. At sufficiently high shear rate, applied by rotating the inner cylinder, the particles re-suspend and the bed expands reaching a steady state. The mean volume fraction of the bed is determined from the initial bed height, the Archimedes number, and the Stokes number. The measurements are compared with a model that predicts the bed expansion by considering a balance between the rate of settling and a shear induced Fickian flux for moderate to high Reynolds numbers. Good agreement was found between experiments and predictions, considering values of the diffusion coefficient found in the literature. Once the column has resuspended, a measurement of the effective viscosity is performed. We discuss the implications of the sedimenting granular phase on the rheology of the suspension.

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