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Rheological Measurements in Moderate-Reynolds-Number Liquid-Solid Flows[1] YICHUAN SONG, MELANY HUNT, California Institute of Technology — Prior studies on the rheology of suspensions typically cover flows in which the Reynolds numbers are less than 1; limited prior work by Koos *et al.* (2012) and Linares *et al.* (2017) focus on Reynolds numbers above 10. The current study focuses on experiments for moderate Reynolds numbers where both viscous and inertial effects are important (Re from 0.6 to 800). The rheological experiments for both neutrally buoyant and settling suspensions (density ratio of 1 to 1.05) include torque measurements of relatively large SAN and polystyrene particles (mm scale) with solid fractions from 10% to 50%, as well as flow visualization and bed expansion measurements. At Stokes numbers higher than 10, particle collisions in the flows become important and contribute to the measured torque. Results show an increased dependence of effective viscosity on the shear rate.

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yichuan song
California Institute of Technology

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