Scaling of boundary stresses in a Couette flow of granular mixtures BEREKET YOHANNES, KIMBERLY HILL, University of Minnesota — Most constitutive laws for dense granular flows that predict stresses based on particle size and shear rates are developed based on experiments and simulations of uniformly sized spherical particle. These types of constitutive laws have not yet been formulated for granular mixtures. In order to investigate the applicability of certain constitutive laws for dense granular mixtures, we study the boundary stresses due to a Couette flow of binary mixtures of different sized particles using a 3D discrete element method (DEM). For a given mixture, as in a uniform particle size distribution, the stresses scale with the square of the shear rate. However, the stress appears to have a more complicated dependence on both the relative sizes of the particles in the mixture and the relative concentration of the different species. In these simulations the coordination number is found to be a better quantitative parameter than average size to describe the stresses. We present the relationship between boundary stresses, particle size distribution, and coordination number.

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