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Influence of Particle Size Dispersity in Dense Packings on the Void Structure and the Interparticle Contact State[1] MARK BENEDICT, MEENAKSHI DUTT, University of Cambridge, BRUNO HANCOCK, CRAIG BENTHAM, Pfizer Global R & D, JAMES ELLIOTT, University of Cambridge — We explore both the effect of packing history prior to application of compressive strain, and the variation in the response with the size distribution of the component particles in a dense packing. We generate the packings by allowing the particles to settle under gravity for a fixed interval of time, or until a cut-off packing fraction is attained, followed by application of a compressive strain for a fixed interval of time. We repeat these studies using numerical experiments for samples of discrete size distributions (200 microns, 195-225 microns, 170-260 microns, 150-295 microns) and random (100-300 microns, 100-400 microns, 100-500 microns). We find the number of particles with fewer than 4 contacts to increase with size dispersity of the sample after the particles settle under gravity. In addition, the fraction of plastic contacts decreases with increasing variation in particle size during the compression (Dutt, Hancock, Bentham, Elliott, submitted). We use a combined approach of determining the porosity and the internal packing structure to obtain insight into the effect of particle size dispersity. The former is determined by the use of a dynamically tesselating algorithm to calculate the pore network in dense particulate systems (Benedict, Dutt & Elliott, to be published Physica A).

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