

Developing an insight into the particle-scale mechanisms that underlie suffusion in granular filters

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SYNOPSIS. Suffusion is a potential mechanism for internal erosion in the filters of dams and embankments. The mechanisms that drive the initiation and subsequent propagation of suffusion operate at the scale of the individual particles. Consequently it is difficult to analyze these mechanisms in detail using conventional experimental or numerical techniques. Discrete element modelling (DEM) is a method of numerical simulation that explicitly considers individual particles, their motions and the forces that are generated between them. This paper discusses the use of a 2D DEM model to analyze the influence of the particle size distribution on the material microstructure. Specifically the variation in contact forces, particle stresses, void ratios, pore size distribution and the connectivity of the particles are considered. While the results of these 2D simulations cannot be directly applied to real 3D soils, insight to inform our understanding of the mechanisms is gained.