



Texture properties of 2D granular mixture of angular particle under biaxial compression

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Abstract

By means of Discrete Element Modeling (DEM), we investigate the shear strength properties and microstructure of 2D granular mixture composed of various regular polygonal particles (from triangle to icosagon and disk) under biaxial compression. Three cases were considered: 1) increase of proportion and angularity started from disk (S1); 2) increase of proportion by decreasing the angularity started from triangle (S2); 3) increase of proportion by random angularity started from disk (S3) and from polygons (S4). The results show that the shear strength changes with the mean angularity. On the other hand, the packing fraction slightly varies with the mean angularity. At the microscopic scale, the granular texture in term of the force, the contacts transmitted the force higher than the average force (strong force) are oriented in the direction of external applied loading but they represent only 40% of the total number of contacts. In addition, the tangential contact forces direction tend to be consistent with the maximum shear strength direction.

Keywords: Granular materials, Granular packing, Granular rheology, Particle shape effects, Discrete Element Method.