

Fragmentation of a Cohesive Granular Aggregate Upon Impact

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When solid grains are mixed with a small amount of liquid, they can form a cohesive aggregate, held together by capillary bridges. Upon impacting a solid surface, such a granular aggregate fragments into multiple pieces. The number and size of these fragments depend on the initial kinetic energy of the aggregate as well as the properties of the grains and the interstitial liquid.

We conduct experiments to measure the number and size distribution of fragments following impact, varying impact velocity, grain size, and liquid properties such as surface tension and viscosity. Our findings show that the fragmentation behavior can be rationalized using a Weber number based on the grain diameter. These results provide insights on the energy transfer and dissipation processes that occur during the impact of the aggregate.

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