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Maximum angle of stability of a wet granular pile SARAH NOWAK, UCLA & MIT, AZADEH SAMADANI, MIT, ARSHAD KUDROLLI, Clark U. — We investigate the impact of liquids on the maximum angle of stability (θ_m) using a rotating drum apparatus. The angles are measured by imaging the surface. The maximum angle of stability is observed to increase and saturate as a function of the volume fraction of the fluid. We first show that the angles are affected by the side walls and higher angles are observed unless a wide drum that is a few hundred times the grain diameter is used. We present a new model that predicts θ_m of the wet pile in the saturation regime. Our model considers the stability of the beads along planes with slopes between θ_m for dry beads and the pile's surface. We claim that while these planes are not geometrically stable, they are stabilized with the additional cohesive forces between the grains due to liquid bridges. The model is able to reproduce the grain size, surface tension and system size dependence observed in our experiments.

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