

Students' Annual Webinar

Optimising 3D Granular Flow with Obstructions

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We investigate the effect of strategically placed obstacles on clogging in cylindrical hoppers with conical outlets, extending prior findings from 2D (Zuriguel et al., Phys. Rev. Lett., 2011) to 3D geometries. Our experiments reveal non-monotonic variations in flow rate and clogging probability as the height of the obstructing rod above the outlet is adjusted, with significant clogging suppression observed at an optimal height. This suppression is particularly pronounced even with minimal obstruction size (2% of outlet area). We also examine the influence of rod diameter, rigidity and clamping mechanism on flow facilitation, highlighting the critical role of the rod tip in destabilising clogs, leading to the formation of jamming arches near the end of the rod at the optimal height.

Thursday, Feb 22nd 2024

11:00 Hrs

