

[1] P.-G. de Gennes, Granular matter: a tentative view, *Rev. Mod. Phys.* **71**, S374 (1999), relevant because it provides a foundational conceptual introduction to granular matter and clarifies why granular systems defy classical continuum descriptions. This helps frame your study within the broader physical context of non-equilibrium, non-linear materials.

Link: <https://link.aps.org/doi/10.1103/RevModPhys.71.S374>

[2] I. S. Aranson and L. S. Tsimring, Patterns and collective behavior in granular media, *Rev. Mod. Phys.* **78**, 641 (2006), relevant because it develops theoretical frameworks for understanding emergent structures such as vortices, waves, and segregation patterns. This is directly connected to interpreting organized flow or clogging-related pattern formation.

Link: <https://link.aps.org/doi/10.1103/RevModPhys.78.641>

[3] F. Radjai, J.-N. Roux, A. Daouadji, Modeling Granular Materials, *J. Eng. Mech.* **143** (2017), relevant because it synthesizes micromechanical insights with continuum approaches, showing how force networks translate into macroscopic behavior. This is useful when linking DEM simulations to measurable engineering parameters.

Link: <https://www.researchgate.net/publication/312640058>

[4] Q. Zheng, Q. Luo, A. Yu, A unified theory for granular matter, *Powder Technol.* **434** (2024), relevant because it presents a theoretical model that captures both solid-like and fluid-like regimes, which is central for describing flow–clog transitions. It also introduces constitutive elements that help justify modeling assumptions in bottleneck flows.

Link: <https://www.sciencedirect.com/science/article/pii/S0032591024000123>

[5] S. Ostojic, E. Somfai, B. Nienhuis, Scale invariance and universality of force networks, *arXiv* (2006), relevant because it shows that granular force-chain networks exhibit universal scaling, suggesting deep structural regularities even in disordered packings. This underpins the statistical nature of arch formation during clogging.

Link: <https://arxiv.org/abs/cond-mat/0601047>

[6] L. Papadopoulos et al., Network Analysis of Particles and Grains, *arXiv* (2017), relevant because it introduces graph-theoretic tools to quantify connectivity, community structure, and mesoscale organization in granular assemblies. Such tools are valuable when interpreting DEM output or identifying structural precursors to blockages.

Link: <https://arxiv.org/abs/1708.08080>

[7] O. Dauchot, D. J. Durian, M. van Hecke, Dynamical Heterogeneities in Grains and Foams, *arXiv* (2010), relevant because it discusses intermittency, cooperative rearrangements, and non-uniform relaxation—phenomena that appear near jamming and clogging thresholds. This helps explain irregular discharge statistics observed in bottleneck flows.

Link: <https://arxiv.org/abs/1010.0873>

[8] J. H. Snoeijer et al., Force network ensemble: a new approach to static granular matter, *Phys. Rev. Lett.* (2003), relevant because it formalizes a statistical ensemble description of force networks, offering a predictive way to analyze stability and arch formation. This framework is valuable for interpreting static configurations that lead to clogging.

Link: <https://arxiv.org/abs/cond-mat/0308225>

[9] N. Brodu et al., Spanning the scales of granular materials through microscopic force imaging, *Nat. Commun.* **6**, 6361 (2015), relevant because it experimentally resolves grain-scale forces, validating DEM-like simulations at the microscopic level. It bridges simulation results with measurable experimental evidence — highly relevant for model justification.

Link: <https://www.nature.com/articles/ncomms7361>

[10] M. Massoudi, Remarks on constitutive modeling of granular materials (2023), relevant because it surveys key constitutive principles including yield behavior, dilatancy, and frictional laws under slow flows. These concepts are important when analyzing bottleneck flow regimes or defining input parameters for simulations.

Link: <https://www.mdpi.com/2673-4117/4/4/161>

[11] G. Buscarnera et al., Mechanics of brittle granular materials, *Proc. R. Soc. A* (2021), relevant because it investigates how grain breakage and evolving particle morphology modify bulk mechanical response. This is important when considering systems where compaction, crushing, or degradation may influence clogging stability.

Link: <https://royalsocietypublishing.org/doi/10.1098/rspa.2020.1005>

[12] Experimental confirmation of secondary flows within granular media, *Nat. Commun.* (2025), relevant because it reveals hidden internal circulation patterns that affect transport and mixing in granular flow. Such internal structures can influence how force chains develop near constrictions.

Link: <https://www.nature.com/articles/s41467-025-62669-y>

[13] Experimental models for cohesive granular materials: a review, *arXiv* (2025), relevant because it describes modern laboratory techniques for studying cohesive grains, which behave differently from dry systems. This is particularly helpful if friction or cohesion plays a role in clog stability.

Link: <https://arxiv.org/abs/2501.10830>

[14] Comparative analysis of granular material flow: DEM vs SPH, *Phys. Fluids* (2025), relevant because it systematically compares numerical approaches, highlighting strengths and weaknesses of DEM relative to mesh-free continuum methods. This helps justify the simulation method chosen for your project.

Link: <https://pubs.aip.org/aip/pof/article/37/5/053309/3346707>