

Abstract Submitted
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Pulling rigid bodies through granular material RYAN KUBIK, EMILIE DRESSAIRE, NYU Tandon Sch of Engr — The need for anchoring systems in granular materials such as sand is present in the marine transportation industry, e.g. to layout moorings, keep vessels and docks fixed in bodies of water, build oil rigs, etc. The holding power of an anchor is associated with the force exerted by the granular media. Empirical evidence indicates that the holding power depends on the size and shape of the anchoring structure. In this model study, we use a two-dimensional geometry in which a rigid body is pulled through a granular media at constant velocity to determine the drag and lift forces exerted by a granular medium on a moving object. The method allows measuring the drag force and recording the trajectory of the rigid object through the sand. We systematically vary the size and geometry of the rigid body, the properties of the granular medium and the extraction speed. For different initial positions of a cylindrical object pulled horizontally through the medium, we record large variations in magnitude of the drag and a significant lift force that pulls the object out of the sand.

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