

عنوان مقاله:

Examining removal or reduction of suction on displacement, separation of particles and energy consumption of jig by coupling computational fluid dynamics (CFD) and discrete element method (DEM)

محل انتشار:

مجله بین المللی معدن و مهندسی زمین, دوره 58, شماره 2 (سال: 1403)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

The effect of removing suction on energy consumption, displacement, and separation of particles with different sizes and densities in the jig was investigated by CFD-DEM coupling. Water velocity functions were categorized into four modes: normal sinusoidal, partial removal of suction, complete removal of suction, and optimal. Particles rise to a certain height in the normal sinusoidal mode. Particles rise to a certain height in the normal sinusoidal mode, while their jump height increases in the case of partial or complete removal of suction. The jump was controlled by fluid and added (Hutch) water velocities. Increasing the maximum jump height of particles leads to a decrease in separation, an increase in operational costs, and heightened particle mixing and energy consumption. In both modes of partial or complete suction removal, the fluid velocity should be reduced. The extent of velocity reduction depends on the power required to move the particles. Simulation of coarse particles (7 and 8 mm) revealed that in complete removal of suction, the velocity should be decreased to less than half of the normal sinusoidal mode, and the hutch water velocity should be equivalent to the velocity amplitude. The energy consumption for the optimal mode was significantly lower than that of the other modes.

کلمات کلیدی:

Jigging, Particle Trajectory, Suction Removing, Water Velocity Function

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