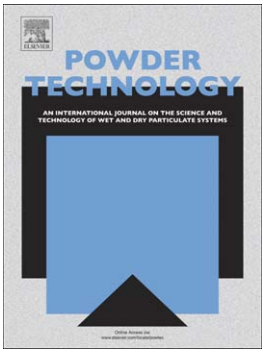

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Inter-orifice distance dependence of flow rate in a quasi-two-dimensional hopper with dual outlets

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Abstract

We have experimentally investigated granular flow through a quasi-two-dimensional hopper with two symmetric outlets on a flat bottom. The relationship between the flow rate and inter-orifice distance, namely the spacing between two outlets, for the whole range of outlets studied, is well described by an empirical equation we have presented. We have also measured the velocity and packing density profiles in the flow of particles above the outlets. We find that the packing density has a small fluctuation with respect to the inter-orifice distance, which may be considered as a constant based on zero order approximation. On the assumption of continuous flow and a constant packing density, we prove that the relation between the flow rate and the inter-orifice distance is mainly attributed to the velocity above each outlet, which is affected by a repulsive interaction between two outlets.

Keywords: Granular flow, flow rate, two-outlet hopper, inter-orifice distance

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