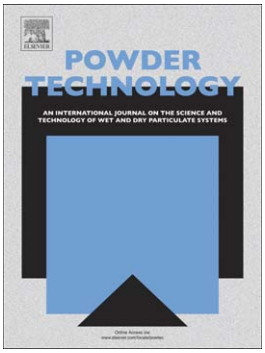

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Discrete element investigation of process models for batch screening under altered operational conditions

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Abstract

For the design and improvement of operational parameters of screening processes the particle-based discrete element method (DEM), as well as phenomenological screening models are available. Due to their simplicity and low calculation costs, the latter can be applied efficiently for industrial applications. So far, both DEM and phenomenological screening models were only used to provide information about screening processes with constant operational parameters neglecting transient changes. To overcome this, in the investigation here, DEM simulations applying spherical and non-spherical particles are used to benchmark process models extended for batch screening under altered operational conditions. For this purpose, different particle characteristics such as size, shape and size distribution are taken into account in the DEM simulations. Operational parameters including vibration frequency, amplitude and stroke angle are permanently changed after a specific time. Based on the data obtained from the simulations, the overall fraction retained on the screen over time is analyzed and compared to DEM results of screening under constant operational conditions. Predictions of phenomenological screening process models, which were adjusted to the outcome of DEM simulations under constant operational conditions in terms of the fraction retained on