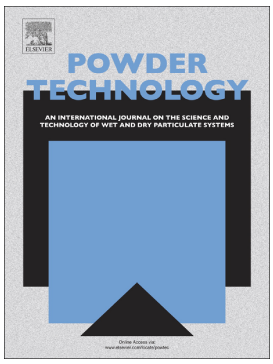

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Influence of particle-size segregation on the impact of dry granular flow

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ABSTRACT:

Even though dry granular flow can cause well-known impact hazards to retaining structures, studies rarely have been conducted to determine the influence of particle-size segregation on the impact of dry granular flow. Based on the existing experiments concerning the impact of dry granular flow, we calibrated a code of the Discrete Element Method and designed three numerical simulations. Two types of degree of particle-size segregation N_s and N_l were defined to show the extent of particle-size segregation in the depth and flow directions. The results of the simulation indicated that a dry granular flow initiated with different degrees of particle-size segregation (N_s) could develop into very distinctive conditions in terms of the relative positions of different groups of particles in the depth and flow directions. The initial deposition with a higher N_s could make it easier for the coarser particles to be located in the front and top of a dry granular flow, with the finer particles being in the tail and bottom of the flow. In the impact process, the greater the values of N_s and N_l are, the more the coarser particles impact the retaining wall at a higher position at an earlier time during the impact. However, a higher degree of segregation of the particle sizes does not necessarily correspond to a higher impact