

Fragmentation mechanism of collided rock blocks within high-speed rockslides

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The fragmentation and disintegration evolution of collided rock mass has a significant control effect on the motional characteristics of large-scale rockslides, which also affect the geological structure characteristic and the stability of deposition. Taking Tangjiashan rockslide induced by 5.12 Wenchuan earthquake as the research object, the movement process of the rockslide are interpreted by analyzing the characteristics of deposition. Through free-fall experiments of the cylindrical rock blocks drilled from the parent rock, the variation of some mechanical parameters of collided rock blocks, the weight loss before and after impacting was quantified and the microcosmic morphology of fragments was analyzed. The result shows the collision make the mechanical indexes of rock masses reduced greatly. According to the concept of momentum transfer and stress concentration, a one-dimensional collision mechanics model of brittle rock under uniaxial crushing strength was established to reflect the local breakage of the impacting domain while the stress wave propagating through the whole material. Considering the macroscopic condition, the simple physical collision model experiment along a designed flume was conducted to give an insight into how the collision affects the runout of rockslides. The conclusion could provide some reference for the scope prediction of high-speed rockslide.