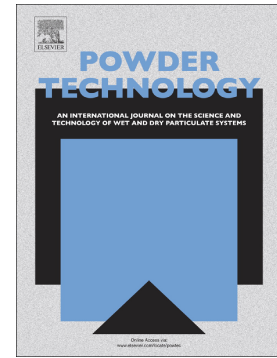


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Yongfu Xu

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Fractal dimension of demolition waste fragmentation and its implication of compactness

Yongfu Xu^{1,2}

1 Department of Civil Engineering, Shanghai Jiao Tong University, Shanghai 200240, China; yongfuxu@sjtu.edu.cn;

2 Department of Civil Engineering, Wanjiang Institute of Technology, Maanshan 243000, China

Abstract: After demolition of old buildings, the removed solid waste was often considered useless and disposed of as demolition waste. Recycling demolition waste not only reduced project costs and saved natural resources, but also solved the environmental threat caused by demolition waste disposal. By collecting and systematically checking the demolition waste, a highway embankment filling was created. During embankment compaction, the particle (crushing) fragmentation was observed in the demolition waste from Haimen, Jiangsu Province, China. Extensive screening tests were carried out to analyze the particle size distribution (PSD) of demolition waste after compaction. The fractal dimension of demolition waste was calculated by fitting PSD curves into the fractal model for particle fragmentation. The fractal dimension of demolition waste was found to nearly be 2.50-2.60. The maximum dry densities of demolition waste were measured by vibrating hammer tests for three specimens with the fractal dimensions of 2.0, 2.5 and 3.0, respectively. It was found that the PSD curve with the fractal dimensions of 2.5 led to the highest maximum dry density of demolition waste. The fragmentation fractal dimension of demolition waste was first suggested as an indicator of compactness.

Keywords: Demolition waste, particle fragmentation, fractal dimension, compaction

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