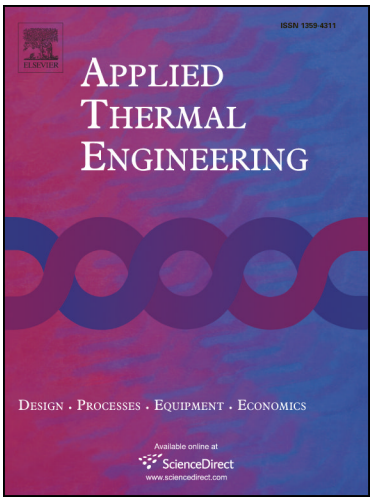

Research Paper

Experimental study of the influences of board size and position on smoke extraction efficiency by natural ventilation through a board-coupled shaft during tunnel fires

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Experimental study of the influences of board size and position on smoke extraction efficiency by natural ventilation through a board-coupled shaft during tunnel fires

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Abstract

In order to improve the smoke extraction efficiency of natural ventilation with vertical shaft, a new method named board-coupled shaft (BCS) is introduced. A set of experiments were conducted to investigate the influences of board size and position on the extraction efficiency of the BCS. The mechanisms of the BCS are deduced and the flow fields inside both of the BCS and the traditional shaft are visualized and compared in this paper. The results on validation and optimization of the BCS and the corresponding suggestions for using this kind of shaft are given. Furthermore, a model to predict the volume flow rate in the BCS is deduced based on the experimental results, which agrees well with the experimental data.

Keywords: Toxic gases; Smoke extraction efficiency; Stack effect; Shaft; Tunnel fires

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