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The effects of void on natural ventilation performance in multi-storey housing (Article)

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Abstract

Abstract: Enhancing natural ventilation performance in multi-storey housing is very important for the living environment in terms of health and thermal comfort purposes. One of the most important design strategies to enhance natural ventilation in multi-storey housing is through the provision of voids. A void is a passive architectural feature, which is located in the middle of deep plan buildings. It is very crucial to consider the configurations of voids in the buildings for enhancing natural ventilation, especially for multi-storey housing. In this study, Malaysian Medium Cost Multi-Storey Housing (MMCMSH), which is an example of multi-storey housing located in a suburban area, has been selected in this study. This study aims to investigate the potential of void for enhancing natural ventilation performance in multi-storey housing by the comparison of two different void configurations. Field measurement of MMCMSH has been conducted to validate Computational Fluid Dynamic (CFD) model and Atmospheric Boundary Layer (ABL) is an important parameter for setting up the CFD Model's domain. Ventilation rate (Q), which is necessary for comfort and health reasons, is an important parameter for the comparison of the different void configurations. This study revealed that the provision of void can enhance natural ventilation performance in multi-storey housing with an increase in the value of Q, from 3.44% to 40.07%, by enlarging the void's width by 50% compared to the existing void. © 2016 by the authors.

Author keywords

Computational Fluid Dynamic (CFD); Field measurement; Malaysian Medium Cost Multi-Storey Housing (MMCMSH); Natural ventilation; Ventilation rate (Q); Void

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