

Using Manipulating Urban Layouts to Enhance Ventilation and Thermal Comfort in Street Canyons

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Abstract : High density of high rise buildings in urban areas lead to a deteriorative Urban Heat Island Effect, gradually. This study focuses on discussing the relationship between urban layout and ventilation comfort in street canyons. This study takes Songjiang Nanjing Rd. area of Taipei, Taiwan as an example to evaluate the wind environment comfort index by field measurement and Computational Fluid Dynamics (CFD) to improve both the quality and quantity of the environment. In this study, different factors including street blocks size, the width of buildings, street width ratio and the direction of the wind were used to discuss the potential of ventilation. The environmental wind field was measured by the environmental testing equipment, Testo 480. Evaluation of blocks sizes, the width of buildings, street width ratio and the direction of the wind was made under the condition of constant floor area with the help of Stimulation CFD to adjust research methods for optimizing regional wind environment. The results of this study showed the width of buildings influences the efficiency of outdoor ventilation; improvement of the efficiency of ventilation with large street width was also shown. The study found that Block width and H/D value and PR value has a close relationship. Furthermore, this study showed a significant relationship between the alteration of street block geometry and outdoor comfortableness.

Keywords : urban ventilation path, ventilation efficiency indices, CFD, building layout

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