

Expectations of an Inner Shophouse Atmosphere: The Influence of Courtyard on Air Flow Comfort

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Abstract

Providing a central source of central air and light, courtyards play an important role in many traditional shophouses in Southeast Asia. At the same time, people in this region instinctively knew that the temperatures in their courtyards felt cooler, more comfortable than outside temperatures. This paper discusses a reassessment of the inner environment in the context of changing life styles with some current examples; such as single-storey, double-storey and three-storey building types. We review and examine how spatial advantages of the courtyards may be influenced by culture and climate and associated issues of air flow, expectation and adaptation. Finally, we discuss how incorporating these factors into future comfort standards might yield further improvements to this specialized internal environment.

This paper explores the capabilities of DesignBuilder CFD as simulation software to model these features; especially in hot humid climatic conditions. Thus establishing a knowledge base and understanding of software available for the study of urban microclimates and for evaluating courtyard performance. The simulation results are compared with short-term on-site wind speed measurements; wind comfort and wind safety are assessed; and potential design improvements are evaluated. The case studies are intended to support and guide future studies of wind comfort with CFD and, therefore contribute to improved environmental quality in historical areas.

Keyword : Courtyard; Traditional Shophouse; Air Flow; CFD