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Mass flow rate induced by combined roof solar collector and vertical stack in a hot humid climate (Article)

Yusoff, W.F.M.^a , Sapian, A.R.^b, Salleh, E.^c, Adam, N.M.^d, Hamzah, Z.^a ^a Department of Architecture, Universiti Kebangsaan Malaysia, Malaysia^b Department of Architecture, Kuiliyah of Architecture and Environmental Design, International Islamic University Malaysia, Malaysia^c Solar Energy Research Institute, Universiti Kebangsaan Malaysia, Malaysia [View additional affiliations](#)

Abstract

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This paper presents the investigation of **solar induced** ventilation that utilizes **roof solar collector** and **vertical stack**. Three prototypes, namely A, B and C, were developed based on preliminary experimental work. They were then used in simulation study with the objective of determining the prototype that was able to induce the highest **mass flow rate**. The validation of simulation modelling against experiment indicated a good agreement between these two results. The findings showed that prototype A **induced** the highest **mass flow rate**. However, prototype C, which had obstructions at the **stack** outlets, was more appropriate for application in Malaysia due to various prevailing wind directions. In addition, the findings also indicated that besides **solar** radiation, the **mass flow rate induced** by the prototypes was also influenced by the local wind direction, the inlet and outlet positions as well as the outlet design. In summary, the findings highlighted the potential application of the proposed **solar induced** ventilation in a **hot and humid climate**.

Author keywords

Hot humid climate; Mass flow rate; Roof solar collector; Simulation modelling; Solar induced ventilation; Vertical stackISSN: 15526100 **Source Type:** Journal **Original language:** EnglishDOI: 10.3992/1943-4618-9.1.166 **Document Type:** Article**Publisher:** College Publishing

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