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# Investigation on thermal performance of the wall-mounted attached ventilation for night cooling under hot summer conditions

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**Abstract:** In Hot Summer and Cold Winter Climate Zone, the cooling potential of natural/passive night ventilation is limited during summer due to the insignificant difference between the outdoor and indoor temperatures. Therefore, a novel mechanical ventilation strategy, the wall-mounted attached ventilation (WAV) system, is proposed in the present paper to improve ventilation efficiency of night cooling. The idea is that WAV can produce a downward airflow over the internal wall surface that is somewhat similar to a sidewall jet, so as to achieve enhanced heat transfer in the room. This paper starts with a series of experiments in a test chamber, and continues with thermal analysis of the heat transfer characteristics and heat removal performance of WAV. The performance of night ventilation with WAV is further evaluated in terms of ventilation efficiency index and energy performance index. It is shown that the overall average value of the convective heat transfer coefficient at the internal wall surface with WAV is  $10.79 \text{ W m}^{-2} \text{ }^{\circ}\text{C}^{-1}$ . With WAV, the amount of heat removed from the ventilated wall is about five times that in the natural night ventilation case, and the total amount of heat removed from the whole

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