Guillermo Barrios del Valle <gbv@ier.unam.mx>

Invitation to review for Energy & Buildings

1 message

Energy & Buildings <em@editorialmanager.com> Fri, Apr 16, 2021 at 10:20 AM
Reply-To: Energy & Buildings <enb@elsevier.com>
To: Guillermo Barrios del Valle <gbv@ier.unam.mx>

Manuscript Number: ENB-D-20-00680R1

Numerical Simulation of a Night Cooling Strategy in an Office Room

Miguel Lança; Pedro Coelho; João Viegas

Dear Dr Barrios del Valle,

I would like to invite you to review the above referenced manuscript submitted by Mr Miguel Lança , as I believe it falls within your expertise and interest. The abstract for this manuscript is included below.

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Kind regards,

John Zhai

Associate Editor

Energy & Buildings

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Abstract:

Night natural ventilation systems have been receiving increased attention in recent years because of their energy saving potential and environmental protection when used in passive instead of active cooling. A novel system recently proposed for cooling the building concrete slab is studied numerically in the present work. The system relies only on night ventilation as a means for cooling down the structure of the building. It consists of a new type of suspended ceiling with a peripheral gap between it and the walls combined with the positioning of the air supply and extraction grilles between the ceiling slab and the suspended ceiling. This study focuses on the use of Computational Fluid Dynamics (CFD) to predict the airflow and thermal performance of this strategy for an office room. Ansys-Fluent is used to perform the calculations both for a reduced and a full-scale room. Transient simulations were performed for a period of 24h and the predictions for the reduced-scale
model were validated by experiments under different operating conditions. The results show that the mathematical and numerical models provide satisfactory predictions of the temperature evolution in the reduced-scale model, allowing the analysis to be extended for full scale. The predictions for the office room at full scale confirm the effectiveness of the proposed cooling technique, revealing that the air peak temperature during the day is lower, as well as the temperature of the slab and the temperature of the air in the plenum during the night.

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