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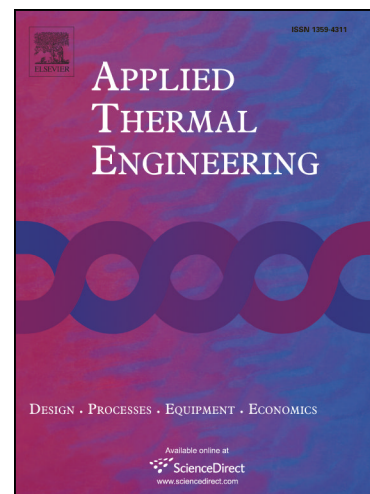
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Air Flow Simulation of HVAC System in Compartment of a Passenger Coach

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Abstract:

In this study, numerical simulation of airflow in the compartment of a passenger coach was carried out in summer. An experimental measurement was also conducted to verify the performance of the numerical model. The turbulent air flow in the compartment was supplied by the HVAC system of the coach. The numerical simulation in the compartment was performed in two cases: seated and slept manikins. The manikins were considered as heated manikins in all the simulations. The turbulent air flow was modeled using v^2f turbulent model. Two conditions in the compartment, including temperature and velocity comfort criteria were assessed in the compartment with and without the presence of the manikins. Moreover, some modifications were implemented in the compartment design to improve the comfort conditions around the manikin in the two cases. Results showed that due to the inappropriate design of the compartment, the thermal comfort conditions do not evenly distribute in the compartment and this issue makes the passengers uncomfortable. The outcome of the modifications showed that the air flow symmetrically enters to the compartment and provides better thermal conditions for the passengers seated/slept in the compartment.

Keywords: Passenger coach, HVAC, Heated manikin, comfort

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