World Academy of Science, Engineering and Technology
International Journal of Mechanical and Industrial Engineering
Vol:9, No:06, 2015

Thermal Comfort and Energy Saving Evaluation of a Combined System in an Office Room Using Displacement Ventilation

Authors : A. Q. Ahmed, S. Gao

Abstract : In this paper, the energy saving and human thermal comfort in a typical office room are investigated. The impact of a combined system of exhaust inlet air with light slots located at the ceiling level in a room served by displacement ventilation system is numerically modelled. Previous experimental data are used to validate the computational fluid dynamic (CFD) model. A case study of simulated office room includes two seating occupants, two computers, two data loggers and four lamps. The combined system is located at the ceiling level above the heat sources. A new method of calculation for the cooling coil load in stratified air distribution (STRAD) system is used in this study. The results show that 47.4 % energy saving of space cooling load can be achieved by combing the exhaust inlet air with light slots at the ceiling level above the heat sources.

Keywords : air conditioning, displacement ventilation, energy saving, thermal comfort
Conference Title : ICTAM 2015 : International Conference on Theoretical and Applied Mechanics
Conference Location : New York, United States
Conference Dates : June 04-05, 2015