

AIR MOVEMENT & VENTILATION CONTROL WITHIN BUILDINGS

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Numerical Prediction of Airflow Patterns and
Ventilation Effectiveness in an Open Office
Environment.

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ABSTRACT

Numerical modelling is performed to predict air movement, thermal comfort level and contamination distribution within an open office space. The office located in the building interior has a concentrated thermal load at its center and is conditioned by cool air delivered from a ceiling-mounted linear diffuser. The air velocity and temperature distributions and contaminant dispersion in the office are calculated for three different cooling loads and air exchange rates with a three-dimensional turbulent finite difference model. Calculations of ventilation effectiveness based on the time variations of contaminant or tracer gas concentrations in the supply, exhaust and occupied space are performed for the condition of constant injection of tracer gas into the supply air stream. The calculated values of the Air Diffusion Performance Index (ADPI) and ventilation effectiveness in the occupied zone for different supply airflow rates are presented.