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An experimental investigation into stratum ventilation for the cooling of an office with asymmetrically distributed heat gains

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Abstract: The performance of stratum ventilation in an office with a glazed façade was investigated.

An electric heating film, hung on a side wall of the test chamber, was employed to simulate the heat gain via a glazing curtain wall. In total, 13 experimental cases were conducted by adjusting the heat generation of the heating film, the temperature and the airflow rate of supply air. The performance of stratum ventilation was evaluated by examining the distributions of temperature, velocity and dimensionless carbon dioxide (CO₂) concentration, effective draft temperature for stratum ventilation (EDTS), predicted mean vote index (PMV), and efficiencies of heat and contaminant removals. The experimental results demonstrated that stratum ventilation performed well in heat removal and contaminant removal. Quality inhaled air for the occupants was provided in all experimental cases. It was found that the glass wall temperature had a significant influence on thermal comfort of occupants.

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