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The Impact and Performances of Controlled Ventilation Strategy on Thermal Comfort and Indoor Atmosphere in Building

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Abstract : Ventilation in buildings is a key element to provide high indoor air quality. Its efficiency appears as one of the most important factors in maintaining thermal comfort for occupants of buildings. Personal displacement ventilation is a new ventilation concept that combines the positive features of displacement ventilation with those of task conditioning or personalized ventilation. This work aims to study numerically the supply air flow in a room to optimize a comfortable microclimate for an occupant. The room is heated, and a dummy is designed to simulate the occupant. Two types of configurations were studied. The first consist of a room without windows; and the second one is a local equipped with a window. The influence of the blowing speed and the solar radiation coming from the window on the thermal comfort of the occupant is studied. To conduct this study we used the turbulence models, namely the high Reynolds k-e, the RNG and the SST models. The numerical tool used is based on the finite volume method. The numerical simulation of the supply air flow in a room can predict and provide a significant information about indoor comfort.

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