

The Impact of Window Opening Occupant Behavior Models on Building Energy Performance

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Abstract : Purpose Conventional dynamic energy simulation tools go beyond the static dimension of simplified methods by providing better and more accurate prediction of building performance. However, their ability to forecast actual performance is undermined by a low representation of human interactions. The purpose of this study is to examine the potential benefits of incorporating information on occupant diversity into occupant behavior models used to simulate building performance. The co-simulation of the stochastic behavior of the occupants substantially increases the accuracy of the simulation. Design/methodology/approach In this article, probabilistic models of the "opening and closing" behavior of the window of inhabitants have been developed in a separate multi-agent platform, SimOcc, and implemented in the building simulation, TRNSYS, in such a way that the behavior of the window with the interconnectivity can be reflected in the simulation analysis of the building. Findings The results of the study prove that the application of complex behaviors is important to research in predicting actual building performance. The results aid in the identification of the gap between reality and existing simulation methods. We hope this study and its results will serve as a guide for researchers interested in investigating occupant behavior in the future. Research limitations/implications Further case studies involving multi-user behavior for complex commercial buildings need to more understand the impact of the occupant behavior on building performance. Originality/value This study is considered as a good opportunity to achieve the national strategy by showing a suitable tool to help stakeholders in the design phase of new or retrofitted buildings to improve the performance of office buildings.

Keywords : occupant behavior, co-simulation, energy consumption, thermal comfort

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