

Abstract Submitted
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Large Eddy Simulation of Motion-Induced Contaminant Transports in Room Compartments¹ JUNG-IL CHOI, Dept. CSE, Yonsei University, JACK EDWARDS, Dept. MAE, North Carolina State Univ. — Large eddy simulation (LES) of contaminant transports due to complex human and door motions is conducted for characterizing the effect of the motion-induced wakes on the contaminant transports in room compartments where a contaminated and clean room are connected by a vestibule. We utilize a LES technique with an immersed-boundary method for moving objects (Choi et al., JCP 2007; Choi and Edwards, Indoor Air 2008) and extend the technique to include Eulerian descriptions of gas-phase contaminant transport as well as thermal energy transfer. We demonstrate details of contaminant transport due to human- and door-motion induced wake development during a short-duration event involving the movement of a person (or persons) from a contaminated room, through a vestibule, into a clean room. Parametric studies that capture the effects of human walking pattern, door operation, over-pressure level, and vestibule size are systematically conducted. The results of parameteric studies will be shown in the final presentation.

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