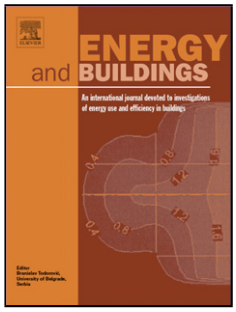

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Demand Controlled Ventilation Indoor Climate and Energy Performance in a High Performance Building with Air flow Rate Controlled Chilled Beams

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Abstract

Indoor climate and energy performance of Finnish low energy office building were studied to determine optimal control and operation solutions of demand controlled room conditioning and ventilation system with airflow rate controlled active chilled beams. Onsite measured temperature, CO_2, occupancy rate were used to calibrate a dynamic simulations model. The results showed an average occupancy rate of 0.55 during office hours (OH) offering a good energy saving potential for Demand Control Ventilation (DCV) system. DCV system used 7 to 8% less total primary energy compared to Constant Air Volume (CAV) system depending on control and operation strategy used. DCV system saving was 33 to 41% if only heating, cooling, fans and pumps primary energy were considered. Supply air temperature controlled according to extract air temperature instead of outdoor air temperature minimized overheating problem which occurred with design solution during both seasons and systems. DCV system with active chilled beam complied at least 94% and