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THERMAL COMFORT AND VENTILATION CONDITIONS IN HEALTHCARE FACILITIES - PART 2: IMPROVING IEQ THROUGH VENTILATION RETROFITTING

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Abstract

The basic purpose of a hospital is to provide a cure to the ailing patients. Since the patients are already suffering from ailments, the hospital must be a place for comfort and mental peace. Indoor Environmental Quality plays a vital role in maintaining that comfort. The hospital building must be designed on the standards to provide the required thermal comfort. If the building is already built and operational, retrofitting techniques are used to maintain the standard values of indoor environmental quality. In this study, three indoor environmental quality parameters (temperature, relative humidity, and CO₂) are identified after quantitative analysis. Each of the parameters correlates with ventilation rates of the selected location. Based on that relation, the required range of ventilation rates was calculated by simulation of equations, identified from the literature. AnyLogic7 was used for the modeling and simulation of the equations. For the required ventilation rates, retrofitting techniques providing optimum cost and efficiency were identified for each location. It was concluded that the existing indoor environmental quality of hospital buildings can be improved with suitable retrofitting techniques, which can increase the efficiency of the HVAC system, resulting in overall reduced energy consumption.

Key words: AnyLogic7, hospital building ventilation, HVAC system, indoor air quality, retrofitting

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