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Entitled

EVALUATING THE IMPACT OF HYBRID VENTILATION STRATEGIES ON REDUCING THE COOLING LOAD AND ACHIEVING THERMAL COMFORT OF BUILDINGS: REGARDING ARID CLIMATE OF UAE BY

By
Sheikha Mohammed Alsalami Al Niyadi
Faculty Advisor
Dr. Mohamed Mahgoub, Architectural Engineering Department
College of Engineering

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F1 Building – Room 1124

Abstract
The hybrid ventilation system has demonstrated significant promise in controlling indoor thermal comfort, maintaining indoor air quality, and using the least amount of energy possible. It accomplishes this by combining natural and mechanical ventilation. When natural ventilation is not possible, this system seamlessly switches to mechanical ventilation to maintain the best possible indoor thermal comfort levels. However, implementing this method in extremely dry regions is challenging due to the high energy consumption associated with air conditioning and cooling consume during the summer. In these regions, air conditioning and cooling alone account for approximately 60% of the urban energy use. The aim of this study is to evaluate the feasibility of the hybrid ventilation setups in an office building, located in hot, dry climate of Dubai. The main objective is to reduce energy consumption without compromising the thermal comfort of the occupants. A dynamic energy simulation was carried out using the Energy Plus simulation engine, and the outcomes were verified over a period of a year against actual consumption data. The results indicated that a 23% annual energy reduction might be achieved with the hybrid system. During cooler seasons, the system's efficiency increased to 29%, while during hot seasons, it only managed to reduce energy use by 13%. Furthermore, the hybrid system contributed to reduce carbon emissions by 20%.

Key words: Energy Efficiency; Hot Climate; Hybrid Ventilation; Indoor Thermal Comfort.