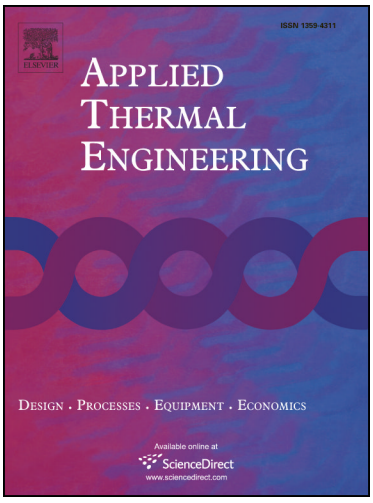

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NOVEL AIR CONDITIONING SYSTEM CONFIGURATION COMBINING SENSIBLE AND DESICCANT ENTHALPY WHEELS

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ABSTRACT

There is a great importance of studying various solutions to reduce energy consumption. The energy consumption in the air conditioning systems became remarkable in the recent years. This paper addresses a retrofit for improving the thermal performance of air conditioning systems in buildings with large energy consumption. Intensive care units in hospitals are one of the most energy consumption units due to all fresh air utilization. An existing hospital building was used for this study, targeting the retrofit of air conditioning system having 100 % fresh air for the intensive care unit (ICU). In the proposed new system, an arrangement of two energy wheels is studied for the first time to retrofit existing system through exhaust air energy recovery. Simulation model has been developed on the basis of the building energy simulation program (EnergyPlus). An hourly simulation has been performed for an entire year and the proposed retrofit air conditioning system was found to be more energy efficient. The results show a significant decrease in the cooling coil capacity with zero heating load capacity and hence a saving in power consumption up to 87.15 % in winter (February) and lowest saving of 13.53 % in summer (August).