A passive cooling system of residential and commercial buildings in summer or hot season

Abstract

The increasing number of high rise buildings may contribute to lack of natural ventilation in modern buildings. Generally, fans and air conditioning are used in the modern building for cooling and air ventilation. Most of the energy in tropical regions are consumed by heating, cooling and ventilation appliances. Therefore, solar power appliances for cooling, heating and ventilation will be a suitable option for saving energy from the household sector. A modified-structure building is designed and constructed with solar chimney to enhance ventilation rate that increases cooling performance and ensure thermal comfort. An evaporative cooler is introduced with a newly designed room to enhance the temperature reduction capacity. The room temperature is compared with a non-modified room as well as with ambient temperature. The results show that passive cooling system with evaporative cooler was able to reduce temperature by 5°C compared to the ambient temperature and about 2°C to 3°C below the reference room temperature.