A new design of passive air condition integrated with solar chimney for hot arid region of Egypt

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Abstract:

Housing in Egypt consumes high energy for cooling. Bioclimatic building design is one of the strategies of sustainable development. This study aims to investigate the thermal performance and indoor air quality of solar chimney with passive cooling wind tower (SCPCW) on occupant's comfort. Thermal performance of a full-scale SCPCW was experimentally investigated. The passive cooling design is integrated on the ceiling of 30m² test house. Monitoring of indoor environment was carried out over a period of 2 months in the summer season (August, September and early October) with a 2-min interval in order to calculate thermal comfort sensation, Predicted Mean Vote (PMV) and Predicted Percentage of Dissatisfied. The results show that outlet air temperature from the wind tower is 27.3°C. Also, the calculated PMV is within the recommended range (-0.5

Keywords:

Passive air condition· Solar chimney· Occupant comfort· Thermal sensation

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