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Author: Amr Sayed Hassan Abdallah

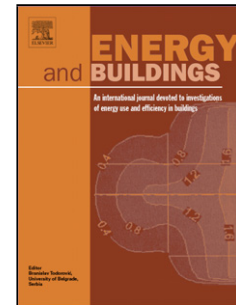
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Experimental Study of Passive Air Condition System Integrated into a Single Room in Assiut, Egypt

Amr Sayed Hassan Abdallah^{a,1}

Assistant Professor, Departement of Architecture, Assiut University, Assiut, 71516, Egypt

* Corresponding author. Tel.: +201002021565; fax: +020882332553.
E-mail address: arch_amrsayed@yahoo.com, Dr.amrsayed@aun.edu.eg

Abstract

Cooling of buildings is an essential target for engineers and builders in the hot arid climate of Egypt. Performance of inclined solar chimney with passive cooling tower (SCPC) was studied. The system was integrated into a single room built in Assiut University (El-Gorib site) in Assiut, Egypt. Testing of indoor environment for the room with passive cooling was done during August and September 2015. A passive cooling technique was integrated inside a short wind tower made from expanded paper (wet pad) 0.1m thick. A water tube was installed on the top of the expanded paper with small nozzles. Water is recirculated through the system using water pump. A reduction of room indoor temperature was observed with the integrated system (SCPC). There is a significant reduction of indoor temperature between 6~7 K due to passive cooling with surface temperature 19.4°C for the cooling pad. The relative humidity didn't exceed 57% most of the time. The maximum air speed inside the solar chimney was 3.5 m/s under the effect of a high solar radiation of 890 W/m². The findings show that SCPC system achieves comfortable thermal conditions with a significant improvement in building energy conservation. The result of development this new cooling system helps to develop building code for low energy houses in Egypt and propose a new system to be integrated in the housing project of people with low income .

Keywords: Inclined solar chimney, passive cooling, thermal comfort, Carbon dioxide concentration

- **Performance of inclined solar chimney with passive cooling tower.**
- **A significant reduction for indoor temperature between 6~7°C due to passive cooling.**
- **The relative humidity didn't exceed 57% most of the time.**
- **The maximum air speed inside the solar chimney was 3.5 m/s.**

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