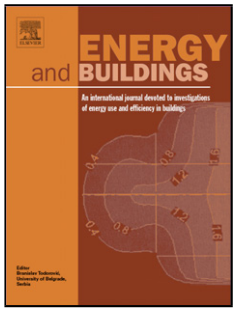

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THERMAL PERFORMANCE ASSESSMENT OF PASSIVE TECHNIQUES INTEGRATED INTO A RESIDENTIAL BUILDING IN SEMI-ARID CLIMATE.

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HIGHLIGHTS

- Studied passive techniques lead to an increase of the minimum indoor temperature by 5°C.
- Studied passive techniques reduce the indoor temperature maximum by 9°C.
- Indoor temperature amplitude is attenuated to 1-3°C thanks to high thermal inertia.
- The studied passive systems reduce the annual thermal load of the house by up to 81%.
- The house discomfort hours are reduced by 62% relatively to the reference case.

Abstract

This paper aims at investigating the effect of combining thermal insulation with high thermal inertia on building's thermal performance in a hot semi-arid climate. The impacts of these passive techniques on the cooling/heating loads and the indoor comfort are analyzed by means of dynamic simulation as well as on-site monitoring of a two floor detached house located in the Green City of Benguerir in Marrakech region (Morocco). This house, mostly built using local materials, integrates many other passive and hybrid systems. The present study focuses on the hemp-gypsum, the double slab technique for thermal insulation, the double glazing and the high thermal inertia of the walls. Thermal performance of these techniques are assessed by comparison to a hypothetical reference case of the house lacking the considered techniques and built with regular classic construction materials. The results show that the investigated passive systems have a remarkable effect on the indoor air