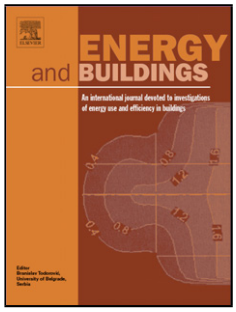

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Investigation of cooling load reduction in buildings by passive cooling options applied on roof

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Highlights

1. Performance of three types of passive cooling systems is assessed.
2. Performance of each method depends on the time of the day.
3. Best cooling performance was achieved by application of water pond on roof.

Abstract

Performance of three passive cooling systems; namely, water pond on roof, water jacket on roof and radiation shield on roof are assessed here experimentally and numerically. In each case a mathematical model of the building was developed by taking into account the time-varying conduction, convection and radiation heat loads as well as infiltration heating load, aiming to provide both an acceptable accuracy and reasonable computational time. The numerical results were then validated against the experimental data taken from a model house, which was build and tested in Shiraz, Iran. The experimental and numerical results indicate that the application of these passive cooling methods can reduce the cooling loads

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