

A Comparison between Modelled and Actual Thermal Performance of Load Bearing Rammed Earth Walls in Egypt

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Abstract : Around 10% of the world's CO₂ emissions could be attributed to the operational energy of buildings; that is why more research is directed towards the use of rammed earth walls which is claimed to have enhanced thermal properties compared to conventional building materials. The objective of this paper is to outline how the thermal performance of rammed earth walls compares to conventional reinforced concrete skeleton and red brick in-fill walls. For this sake, the indoor temperature and relative humidity of a classroom built with rammed earth walls and a vaulted red brick roof in the area of Behbeit, Giza, Egypt were measured hourly over 6 months using smart sensors. These parameters for the rammed earth walls were later also compared against the values obtained using a 'DesignBuilder v5' model to verify the model assumptions. The thermal insulation of rammed earth walls was found to be 30% better than this of the redbrick infill, and the recorded data were found to be almost 90% similar to the modelled values.

Keywords : rammed earth, thermal insulation, indoor air quality, design builder

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