

Comparative Analysis of the Thermal Performance of Three Test Buildings

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Abstract:

There is no doubt that the burning of fossil fuels produces CO₂ emissions and that this leads to an increase in global warming. A significantly large part of this energy results from activities relating to the built environment and any reduction in this area would be significant.

“It would appear that, for the industrialized countries, the best chance of rescue lies with the built environment because buildings in use or in the course of erection are the biggest source of carbon emissions generated by fossil fuels, accounting for over 50% of total emissions” (Smith,2001)

In most counties therefore a concerted effort is being made to reduce both the embodied energy and the operating energy (heating and cooling) required in housing and energy rating systems such as the BASIX system in NSW are being developed and refined to quantify energy usage. Attention is being focussed on various types of housing construction in an effort to establish their energy usage and to see whether any particular system can provide significant energy savings.

The study presented in this paper is an effort to facilitate comparison between three housing construction systems, or more particularly to compare the thermal performance of three different walling systems. To this end three small test buildings were constructed at the UTS campus at Yarrowood near Richmond in NSW. The walling systems chosen were brick veneer, insulated Hebel Panels and mud brick. Temperature and humidity sensors were installed in each building as well as externally to record data.

Keywords: Thermal Performance, Sustainable Buildings, Mud Brick, Hebel, Brick Veneer, Thermal Monitoring

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