University of Bahrain  
Deanship of Scientific Research

Economic and Environmental Impact  
of Thermal Insulation in Residential Building  
in Bahrain

By

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ABSTRACT

The main objective of this study is to estimate the electrical energy saving due to using thermal insulation in residential building in Bahrain and studying the effect of this conservation on the consumer, the national economy as well as the environment.

The study investigation includes the use of different insulation materials, widths and different walls and roof construction commonly used in Bahrain. This investigation was done by using the computer simulation technique "Energy-10 Software".

The simulation results show the energy use, cooling load and life cycle cost for the insulated standard houses and the best condition standard houses. These results are then, compared to the result of the actual standard houses.

From this comparison the energy and cost saving were calculated for the different walls and roof construction and the use of different insulation materials and thicknesses.

The analysis of the results obtained from the simulation showed that, the energy performance of the polyurethane insulation was the best and the optimum thicknesses for wall and roof were 50mm and 100mm respectively. The result also, showed that the energy performance of the best condition house (insulated cast in-situ reinforced slab roof and insulated double block wall constructions) were better than the actual standard houses. It reduces the electricity consumption and the cooling load by about 34%, 30% and 32%, 28% for types E and 3A houses. It also reduces the life cycle cost by BD 3878.36 and BD 4117.8 for types E and 3A houses. In addition it reduces the Carbon dioxide (CO₂) by about 26%, 29.8% for type E and type 3A respectively.

The study also, emphasized the importance of the use of insulation in building, due to its high energy saving, economical and environmental benefits.