

Assessing Residential Building Energy Efficiency in the Caribbean Environment: A Case Study of Trinidad and Tobago

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Abstract: *The energy performance of building is closely linked to the energy performance of the building envelope. Buildings in the Caribbean countries are experiencing high heat, humidity, rainfall, and extreme weather events. Compared with “Temperate Regions”, humid tropical climates can affect buildings through higher rates of deterioration and uncomfortable conditions for the occupants. The transfer of building technology and policies developed in temperate regions that are sometimes irrelevant and often inappropriate for hot and humid regions, therefore there is acute need to initiate rigorous models in order to develop typical sustainable buildings for warm humid regions such as in the Caribbean countries. As such, the current research was undertaking to investigate and recommend effective passive strategy for achieving sustainable building energy efficiency in warm humid regions. In order to achieve this aim, an investigation was conducted on the impact of building envelope systems such as roof and wall design solutions on the building energy efficiency through experimental approach using three building physical models attached with air-conditioning system each. Subsequently, the performance of the building envelope physical models in terms of energy consumption, cooling load, indoor temperature, indoor relative and humidity was monitored through Lascar EasyLog USB-2-LCD data logger sensors and Multifunctional Mini Ammeter. The findings derived from this study have proved that, the short term strategies could be applied for achieving sustainable building energy efficiency for humid warm climatic zones. Specifically, it was found that, the insulated galvanised and standing seam roofing systems are more energy efficient and cost effective, while in the longer terms, flat slab concrete roofing system is more energy efficient and cost effective.*

Keywords: *Energy Performance; Building Envelope; Cooling Load*