

Thermal behavior assessment of two types of covers of the Dominican vernacular housing

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ABSTRACT

The Dominican vernacular architecture, based on the indigenous bohío with Spanish influence, is built with natural materials, such as the Royal Palm (*Roystonea Hispaniolana*) and the Cana Palm (*Sabal Dominguisis*). This model of housing has remained practically unchanged for five centuries, responding adequately to the Caribbean tropical climate. In the twentieth century, start to replacing the traditional palm leaf roof by a corrugated sheet zinc, significantly affecting the temperature inside these houses and altering the conditions of living comfort. For this reason, the aim of this research is to evaluate the thermal behavior of two roof types of vernacular housing. One type is a Cana Palm leaf roof and the other is a corrugated sheet zinc roof. The houses are located in the towns of Villa Sombrero and Sabana Buey, Peravia Province, in the southwest of the Dominican Republic, a region with a Tropical savanna climate (Aw) according to the Köppen-Geiger climate classification. The climate is characterized by temperatures from 25°C up to 37°C, with rainfall below 500 mm per year.

The technique and tools used for this research are: Infrared Thermography (IRT) and digital thermometer for measure of thermal properties of roof materials, a thermometer and hygrometer to measure the relative humidity and temperature inside and outside of the houses, and carbon monoxide (CO) and carbon dioxide (CO₂) meter. Passive IRT is used to measures the temperature differences of a structure that are generated under normal conditions. The results indicate that there is a difference in temperature between one type of roofing material and the other. Finding that houses with palm leaf roofs have lower temperature than corrugated sheet zinc roof, and present a temperature difference between the interior and exterior.

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