

Investigation of Thermal Conductivities of Waste Materials for Building Constructions in Destinations with Warm Weather

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Abstract

Investigation of thermal property is an important study in material physics and engineering. In this study, experimental data obtained from Lee's disk method we investigate thermal conductivities of a few samples obtained from waste material in order to find suitable material as the roofing material in building construction for destinations with warm weather. In this regard, pure waste samples such as rice dust, wood dust, rice husks and rigifoam and a few different combination of the waste samples were prepared for the investigation. This detailed experimental studies illustrated that thermal conductivities of the pure waste materials rice dust, wood dust, rice husks, and rigifoam were, $0.2278 \pm 0.02412 \text{ Wm}^{-1}\text{K}^{-1}$, $0.1720 \pm 0.02336 \text{ Wm}^{-1}\text{K}^{-1}$, $0.1417 \pm 0.02291 \text{ Wm}^{-1}\text{K}^{-1}$ and $0.1126 \pm 0.0227 \text{ Wm}^{-1}\text{K}^{-1}$ respectively. This study revealed that rigifoam was the best pure sample that had the lowest thermal conductivity. In addition to the result, the experimental outcomes revealed the combination obtained from equal amount of rice husks and rigifoam samples had lowest thermal conductivity, $0.0580 \pm 0.0084 \text{ Wm}^{-1}\text{K}^{-1}$. These results can be adapted for building constructions in destinations with warm weather.

Keywords - Lee's disk method, Thermal conductivity, Waste materials