

Development of Heat Insulating Paint Using Rice Husks and Kaolin

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The global warming scenario increased demands for the heat insulator material, especially in the construction sector. The present day popular roofing materials are asbestos and metal sheets. These have poor shield to outside temperature, thus have relatively high indoor temperatures compared to clay tile roofs. This study focuses on development of a roofing paint with heat insulating properties to reduce indoor temperature. Here primers paint was modified adding different percentage of kaolin and rice husks. Percentage of kaolin and rice husks added in to primers paint was 5% (w/w) for each. In both cases, particle size of kaolin and rice husk was 150 Rm. A small metal piece coated by the paint that has additives were tested for heat insulating properties with the consistence of silica according to the Fourier law. The loading paint content on a piece of metal square was varied according to the number of coatings applied. The thickness of the paint coat and weight of the paint per square centimeter were recorded for each sample. Each sample was prepared in triplicate for analysis. The temperature difference between top and bottom of the metal sheet was evaluated using a custom made apparatus using thermocouples under insulating conditions from the surroundings. The heat transfer rate was calculated using the Fourier law assuming the thermal conductivity of the metal sheet has the value of steel due to the fact that very thin coating was applied. The results reveal that the average heat transfer rate decreased with the increasing number of coatings applied and relatively faster decay of heat transfer rate was observed for kaolin and rice husk containing paints than primers paint only. However, the greater temperature difference between top and bottom of the metal piece was observed for primer paint with 5% kaolin loading. The average temperature difference of paint with kaolin is 9.67 with 12 number of coatings. This results conclude that addition of rice husk or kaolin to a primer paint can enhance the heat insulating properties.

Keywords: Insulating paint, Fourier law, Heat transfer rate, Kaolin, Rice husk