Thermal modeling of Insulator for Energy Saving in Existing Residential Building

Megha Jain, K.K. Pathak

www.elsevier.com/locate/jobe

PII: S2352-7102(17)30517-X
DOI: https://doi.org/10.1016/j.jobe.2018.04.012
Reference: JOBE457

To appear in: *Journal of Building Engineering*

Received date: 26 August 2017
Revised date: 18 April 2018
Accepted date: 18 April 2018

Cite this article as: Megha Jain and K.K. Pathak, Thermal modeling of Insulator for Energy Saving in Existing Residential Building, *Journal of Building Engineering,* https://doi.org/10.1016/j.jobe.2018.04.012

Thermal modeling of Insulator for Energy Saving in Existing Residential Building

Megha Jain[a*], K.K. Pathak[b]

[a]Research Scholar, Department of Civil and Environmental Engineering., NITTTR, Bhopal, India,462026

[b]Professor, Department of Civil Engineering., IIT(BHU), Varanasi , India, 221005

[*]Corresponding author. megha.jain@trubainstitute.ac.in

ABSTRACT

The present work aims to check the energy consumption of typical household buildings located in hot and humid environment using passive energy conservation techniques. The primary tenet of sustainable development is energy conservation. The recent advance in construction technology gives seminal importance to minimisation of energy demand. However, the already built environment, consumes sustained amount of energy hampering sustainability. In this research, thermal simulation is carried out for observing reduction in energy consumption of three residential buildings in the Bhopal city of India. Ambient temperature, surface temperature and Heat transfer has been analysed after using modern insulating techniques, namely ceramic tiles, high reflective coating, aluminum paint on roof, along with rock wool spread on opaque components of the building. The results of the investigation suggest that the use of reflective solar coating in roof and walls of buildings reduces heat gain by as much as 25%. Simulations are carried out using Computational Fluid Dynamics (CFD) tools with fluent software.

Keywords: Energy consumption; sustainability; insulation; residential buildings; computational fluid dynamics.