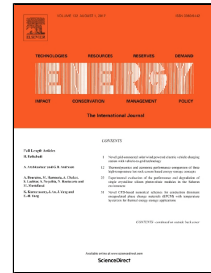


Accepted Manuscript

Heat Transfer Analysis of a Trombe Wall with a Projecting Channel Design

Mehran Rabani, Vali Kalantar, Mehرداد Rabani



PII: S0360-5442(17)31060-5
DOI: 10.1016/j.energy.2017.06.066
Reference: EGY 11074
To appear in: *Energy*
Received Date: 02 March 2017
Revised Date: 22 May 2017
Accepted Date: 10 June 2017

Please cite this article as: Mehran Rabani, Vali Kalantar, Mehرداد Rabani, Heat Transfer Analysis of a Trombe Wall with a Projecting Channel Design, *Energy* (2017), doi: 10.1016/j.energy.2017.06.066

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Heat Transfer Analysis of a Trombe Wall with a Projecting Channel Design

Mehran Rabani^{a,*}, Vali Kalantar^b, Mehrdad Rabani^c

^a Assistant professor, Department of mechanical engineering, Ardakan University, Yazd, Iran, m.rabani@ardakan.ac.ir

^b Associate professor, Department of mechanical engineering, Yazd University, Yazd, Iran, vkalantar@yazd.ac.ir

^c Ph.d. student, Department of mechanical engineering, Oslo and Akershus University College of Applied sciences (HIOA), Oslo, Norway, mehrdad.rabani@hioa.no

*Corresponding author: Tel.: +98 353 2248171; fax: +98 353 2248384; E-mail address: m.rabani1367@gmail.com

Abstract

This work presents an analysis on heat transfer process occurred in the Trombe wall system with a new channel design in Yazd (Iran) on the coldest and warmest days of winter. The primary objective was to investigate the impact of heat transfer types on the temperature variation of the Trombe wall back and absorber throughout the day. For this reason, the variations of Rayleigh number, convective heat transfer coefficient, and the rate of convection, conduction, and radiation heat transfer exchanged with the Trombe wall have been studied. The analysis of Rayleigh number variations for the channel inside revealed that there is a noticeable decrease in the early hours expressing a discernible decrease in the temperature difference between the absorber and the channel space. At night time, the absorber and channel temperatures drop approximately to the same value. Furthermore, the role of conduction transfer is more sensible than that of convection in the early and late hours. However, the convection dominates at the midday. It should be noted that due to new channel design, the radiation heat transfer rate is maximum in the early and late hours. The heat transfer is more significant on the coldest day because of higher temperature difference between the different parts of the Trombe wall system.

Keywords: Trombe wall - Heat transfer - Rayleigh number - New channel design

Download English Version:

<https://daneshyari.com/en/article/5475887>

Download Persian Version:

<https://daneshyari.com/article/5475887>

[Daneshyari.com](https://daneshyari.com)