www.elsevier.com/locate/jobe

EXPERIMENTAL ANALYSIS ON THE ACTIVE AND PASSIVE COOL ROOF SYSTEMS FOR INDUSTRIAL BUILDINGS IN MALAYSIA

Ming Chian Yew, Ming Kun Yew, Saw Lip Huat, Ng Tan Ching, Chen Kah Pin, Rajkumar Durairaj, Jing Han Beh

PII: S2352-7102(17)30793-3
DOI: https://doi.org/10.1016/j.jobe.2018.05.001
Reference: JOBE478

To appear in: *Journal of Building Engineering*

Received date: 11 December 2017
Revised date: 30 April 2018
Accepted date: 1 May 2018

Cite this article as: Ming Chian Yew, Ming Kun Yew, Saw Lip Huat, Ng Tan Ching, Chen Kah Pin, Rajkumar Durairaj and Jing Han Beh, EXPERIMENTAL ANALYSIS ON THE ACTIVE AND PASSIVE COOL ROOF SYSTEMS FOR INDUSTRIAL BUILDINGS IN MALAYSIA, *Journal of Building Engineering,* https://doi.org/10.1016/j.jobe.2018.05.001

EXPERIMENTAL ANALYSIS ON THE ACTIVE AND PASSIVE COOL ROOF SYSTEMS FOR INDUSTRIAL BUILDINGS IN MALAYSIA

Ming Chian Yew[1]*, Ming Kun Yew[2], Saw Lip Huat[1], Ng Tan Ching[1], Chen Kah Pin[1], Rajkumar Durairaj[1], Jing Han Beh[3]

*[1]Department of Mechanical and Material Engineering, Lee Kong Chian Faculty of Engineering and Science, Universiti Tunku Abdul Rahman, Cheras 43000 Kajang, Malaysia

[2]Department of Civil Engineering, Lee Kong Chian Faculty of Engineering and Science, Universiti Tunku Abdul Rahman, Cheras 43000 Kajang, Malaysia

[3]Department of Architecture and Sustainable Design, Lee Kong Chian Faculty of Engineering and Science, Universiti Tunku Abdul Rahman, Cheras 43000 Kajang, Malaysia

yewmingchian@gmail.com;

yewmc@utar.edu.my

*Corresponding author.

Abstract

This piece of research presents the capability of active and passive cool roof systems, which is designed to reduce the heat transmission into an attic through the metal deck roofing for industrial buildings in Malaysia. In this study, an ideal cool roof system focusing on utilizing solar energy, cavity ventilation and thermal reflective coating (TRC) were employed and investigated. This technique is one of the most innovative and sustainable practices at reducing the energy consumption that provide buildings with comfortable indoor conditions through natural means. The four cool roof models were designed and built in active and passive systems to examine the effect of attic temperature reduction. Application of TRC can significantly reduce the heat absorption of the metal roof. The roof and attic temperatures of the roof models were measured to determine the performance of cool roof system. The roof design (d) results indicate a great reduction at about 15 °C in the attic air temperature compared to normal roof. The outstanding performance is due to the cool roof system that integrated TRC, improved moving air cavity (MAC)-solar powered fans and opened attic inlet comprise the ability to reflect the sunlight and circulate the hot air efficiently.