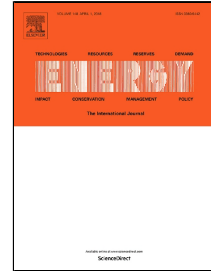


Accepted Manuscript

A life-cycle cost analysis for an optimum combination of cool coating and thermal insulation of residential building roofs in Tunisia

Khawla Saafi, Naouel Daouas



PII: S0360-5442(18)30600-5
DOI: 10.1016/j.energy.2018.04.010
Reference: EGY 12649
To appear in: *Energy*
Received Date: 22 November 2017
Revised Date: 07 February 2018
Accepted Date: 03 April 2018

Please cite this article as: Khawla Saafi, Naouel Daouas, A life-cycle cost analysis for an optimum combination of cool coating and thermal insulation of residential building roofs in Tunisia, *Energy* (2018), doi: 10.1016/j.energy.2018.04.010

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.

A life-cycle cost analysis for an optimum combination of cool coating and thermal insulation of residential building roofs in Tunisia

Khawla Saafi ^{a,*}, Naouel Daouas ^a

^a *Ecole Nationale d'Ingénieurs de Monastir, Unité de Métrologie et des Systèmes Energétiques, Département de Génie Energétique, Université de Monastir, Rue Ibn El Jazzar, 5019 Monastir, Tunisia*

* *Corresponding author:* Tel.: (216) 73 500 244, Fax: (216) 73 500 514

E-mail addresses: k92saafi@gmail.com (Khawla Saafi)

naou.daouas@gnet.tn (Naouel Daouas)

Abstract

The interaction between the roof thermal insulation and the cool roof effects is assessed in order to determine an optimum combination of the two measures. Dynamic simulations and estimation of the annual energy requirements are performed using EnergyPlus. Two roof structures, three insulation materials and three reflectivity scenarios are considered while taking into account the ageing of the cool material. An energy-based optimization shows that the summertime benefits induced by the rise of reflectivity outweigh the winter penalties, and that the optimum value of the roof reflectivity is the highest possible value. Moderate roof insulation levels with cool roof surfaces of as high as possible reflectivity values are recommended in the Tunisian climate. A 20-year life-cycle cost analysis proves the cost-effectiveness of aged and restored cool roof scenarios for uninsulated roofs with a net saving

Download English Version:

<https://daneshyari.com/en/article/8071710>

Download Persian Version:

<https://daneshyari.com/article/8071710>

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