ABSTRACT

The design structures in climatic comfort conditions are an important factor to decrease building operating costs. To reduce the building cost one has to use the correct insulation materials on building exterior walls. This study is based on the study of the insulation materials which are used on the building roof to minimize the heat lost in winter and minimize heat gain in summer.

When the building roofs in TRNC are considered, it seems that the heat insulation materials are not enough to prevent heat loses. To reduce the heat losses firstly, the climatic and building parameters must be taken into account and the solar radiation which comes from the Sun should be used correctly and effectively. As it is known, in architectural design spaces that are used the most are directed toward the south. The reason for that is that, the solar radiations at the south facade of the building at the maximum level. Secondly, roof water and heat insulation materials should be appropriate for Northern Cyprus climate.

The experimental study described in this thesis was done in Lefkoşa, TRNC for this reason TRNC land climate, annual heat temperature table and prevailing wind direction was defined. The experimental study consists of two hip roofs called L1 and L2 with sizes 200cm x 200cm. Both roofs were studied at their south facade. The study was done at two stages. At the first stage The L1 roof has yalteks water insulation material on its four sides at the first stage. The L2 roof has yalteks water insulation material on its three sides, excluding the south facade at the first stage. Data was collected for ten days at the first stage. At the second stage the data collection was repeated by covering four sides of L1 roof with polyester foam board heat insulation and three sides, excluding south facade of L2 roof with the same material. Data was collected for twenty one days at the second stage.

Keywords: Roof heat insulation, Roof water insulation, South facade

DECLARATION

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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DEDICATION

I dedicate this humble work to my parents, Yurdanur and Müslüm KIRGIL and to my husband Yavuz Selim KOCAGÖZ for his constant encouragement and support during the preparation of this thesis.

CONTENTS

LIST OF ABBREVIATIONS

CEN	European Standardization Committee
EN 13162	Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification
EN 13172	Thermal insulating products. Evaluation of conformity
FSC	Forest Stewardship Council
GB standards	GB standarts are the Chinese national standards issued by the Standardization Administration of China (SAC)
GSM	Grams Per Square Metre
ISO	International Organization for Standardization
MDF	Medium Density Fibreboard
OSB	Oriented Standard Boards
TNO	Nederlandse Organisatie voor toegepast
VOC	Volatile Organic Compound

LIST OF SYMBOLS

i	Declination angle
ρ	Density (kg/m^3)
k	Measure of heat conductivity of a particular material units
H	Hour angle
h	Hours (time)
N	Latitude
E	Longitude
R-value	Thermal resistance
s	Solar constant
sqm	Square meter
λ	Thermal conductivity (W/mK)
W/m^2	Watts per square meter
Z	Zenith angle
V	Volt
Δ	Pressure probe.

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