شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

TOWARDS DEVELOPING A DESIGN APPROACH FOR OPTIMIZING ENERGY PERFORMANCE IN BUILDINGS

By

Azza Saeed Abd El-Hay Wahba

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY
in
Architectural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Approved by the
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Title of Thesis:

Towards developing a design approach for optimizing energy performance in buildings (Effects of Roof Shapes and New Treated Materials on EM Energy Levels).

Key Words: **(must be 5 words only)**
Building Energy Simulation, Architectural Design Parameters, New Treated Building Materials, Multilayered Wall, Electromagnetic Energy Indoors.

Summary:

The research presents a scientific approach for analysis of EMR levels indoors. A MATLAB program was created to evaluate the transmission, absorption and reflection through a model five-layered wall. Curves illustrating the effect of brick size on transmission and reflection were constructed. The effect of replacing regular cement in the wall render layers with four types of new treated cement mixtures was first investigated on the model wall. The EM environment of a square room with the model five-layered walls was evaluated. CST-MWS software was adapted to simulate EMR behavior within the model room with high precision. Five roof shapes were analyzed and compared. The effects of openings, height change, and orientation on EMPD were analyzed. The full pictures of the EMR distribution patterns were presented by taking sections along the lengths and widths of the studied buildings, constructing EMR density curves at different heights, as well as evaluating EMP intensities at four selected points within the utilized regions of the studied buildings. An optimization for the wall layers thickness was achieved through extensive simulation.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Azza S. Wahba Date: 5/8/2021

Signature:

Dedication

You may include this section if you wish to dedicate your thesis to someone.

Acknowledgments

First of all and foremost, the unlimited thanks to "*Allah*" (A.J) for helping me to fulfill this work.

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