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EVALUATING ENERGY RETROFIT STRATEGIES FOR ENHANCING OPERATIONAL PERFORMANCE OF MOSQUES BUILDINGS

By

Maryam Ahmed Walid Abdel-Fattah El-Maraghy

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
INTERDISCIPLINARY - MASTER OF SCIENCE
in
**INTEGRATED ENGINEERING DESIGN IN CONSTRUCTION
PROJECTS**

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
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Evaluating Energy Retrofit Strategies for Enhancing Operational Performance of Mosques Buildings

Key Words:

Sustainability; Evaluating Energy Performance; Retrofit Strategies; Decision Making; Mosques.

Summary:

The construction sector is considered as the main contributor of both energy consumption and carbon dioxide emissions. As a result, governments tend to create various standards and policies for developing sustainable buildings. However, mosques buildings are not given the same attention. Mosques are unique in their characteristics and operational performance compared to other types of buildings. As a result, it is necessary to investigate the thermal characteristics of these buildings to enhance their performance. This research enhances the operational performance of mosques by examining different retrofit strategies on existing mosques. It is divided into four sections: data collection, which includes site investigation and laser scanning; development of a simulation model using Revit and IESVE; examination of the impact of various retrofit strategies; selection of a retrofit strategy using a multi-criteria decision-making model using AHP and TOPSIS techniques; and finally, implementation of this framework on Imam El-Hussein Mosque in Cairo, Egypt.

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.

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