



Fayoum University
College of Engineering
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Analytical Study for the Effect of Outer Envelope on Buildings Energy Consumption

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ABSTRACT

The building envelope has a great ability to reduce energy consumption rates by creating effective boundaries between the interior of the building and the surrounding environment, and by integrating all its elements with each other, such as natural lighting with electric lighting, and achieving natural ventilation with air conditioner, which works to control the internal climate and improve The level of thermal and visual comfort at the lowest rate of energy consumption.

Thus, the aim of the study was to reach a set of design strategies for the building envelope to achieve energy efficient.

so, an analytical study was made on a group of international buildings and evaluate the strategies followed in them to achieve energy efficiency, to end with an evaluation form for each project in which the most important strategies used in the envelope elements (mass - ceilings - walls - openings) to achieved energy efficient.

This analytical study concludes with **four strategies** for energy efficiency in the building envelope, (high performance of the envelope - negative design - positive design - design adapted to the climate).

Through the practical study, the design builder program was used to improve the energy consumption efficiency of the student services building at Fayoum University, as an example of the administrative buildings in Egypt, by comparing the existing status of the building envelope design with the various energy optimization considerations that can be implemented on the existing building to get results from the reduction rates. In the cooling and lighting loads and evaluating the impact of these optimizing alternatives for the design of the envelope in reducing the rate of energy consumption.

The study developed an evaluation approach to design the administrative buildings envelope in Egypt, which ranges from 600 to 800 square meters in a hot and dry climate.