

Evaluating the thermal performance of the external walls in the residential houses at the dry and hot areas

Dr. Samah Sobhy Mansour

Lecturer at architecture department- October high institute of engineering and technology at 6th October city.sameh.mohamed

nagiub2017@gmail.com

Abstract:

The research represents the circle of communication among architecture, environment, economy and the integrated relation of that system- as the design of most of the buildings ignoring the surrounding climate effect in performing the internal spaces of the building and realizing the thermal comfort for the users, as most of the time mechanical means have been relied on as they use non-renewable energy sources, which cause high pollution percent, so there have to be ways and solutions to assist the architect to provide energy at the buildings relying on mechanical means. As the landscape sector is the second most electric energy consuming sector in Egypt, where it consumes 38.6% of the whole electricity consumption ratio in Egypt. External walls are one of the most important element of the external cover of the building that consume energy. So the research is aiming to improve the thermal performance of the external walls of the building based on studied criteria to reduce the consumed energy and realize thermal comfort for the users.

By adding certain methodology of the thermal performance of the external walls in the residential houses at the hot, dry areas and calculating the energy saving depending on mathematical ways to evaluate the thermal performance through analyzing the thermal performance and calculating the saving in energy in the external walls in building block in Aswan city with area 90 m² that relies on mechanical means.

By following the mathematical steps, the external walls are designed as one of the most significant elements making the external cover of the building with thermal performance convenient to the hot and dry areas' climate and ease the designing decision of choosing the type of external walls based on studied criteria of the thermal performance and the energy saving.

We can calculate the energy saving through mathematical ways by applying that on various types of rocks, the effect of the wall thickness on the energy saving and determine the resistance of each type and each thickness of the different walls and calculating the energy saving, so as to study the effect of the thermal isolators thickness and determine the effect of the resistance on the energy saving, the effect of the finishing materials on the energy saving.

Key words:

Thermal performance- the external cover of the building- calculating methods- energy saving- thermal isolation.