

The Role of Ceramics Tiles and Shades in Thermal Treatments and Aesthetic of facades and Interior Space

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Summary:

The environment suffers from thermal changes recently, which has a direct cause of rising temperatures. Reducing the heat transfer through the walls of the building is one of the entrances to environmental design. Since ancient times, man has been trying to adapt to the environment and climate change. There are many and different methods of adapting to the environment. The methods of dealing with architectural facades vary with different techniques and mechanisms, and despite the scientific and technological progress in the treatment of facades, the designer seeks to find solutions from nature to reduce the negative impact of technology and some modern raw materials, while at the same time achieve aesthetic and functional values emanating from the surrounding environment.

Research problems are: Lack of use the possibilities of stereotyping of ceramic tiles in the design of shadows in architectural facades, Ignoring the importance of shade and light as an aesthetic value in cladding facades and interior spaces using ceramic tiles, and lack of reliance on natural environmental treatments in the facade cladding.

Research Goals are: Benefit of shadows design on the architectural facades and interior spaces in reducing the heat transfer of the building, and benefit of shade and light possibilities in Interior cladding design.

Key words: Ceramics - shade and light - heat treatment - architectural facades - cladding - interior design - adaptation to the environment.

1/Facades role in achieving thermal insulation and energy saving

(Through sustainability concepts)

Address the importance of the facades design and materials which used in achieving thermal insulation and energy saving through:

1. Thermal performance of the building's sustainable façade
2. Aesthetic and functional aspect to the building direction.
3. Strategies for dealing with design for hot environments
4. The strategy of living organisms in adaptation.

1-1- Thermal performance of the building's sustainable façade

The building's cover consists of several building materials - different according to the function of each building - each with different physical and thermal properties, in addition to different installation methods, all of which aim to reduce the thermal effect of the external environment on the interior space. Therefore, the thermal performance of the sustainable building's facade is (resistance to heat transfer, reduction of thermal acquisition, reversing sunlight as much as possible), Figure (1.a).

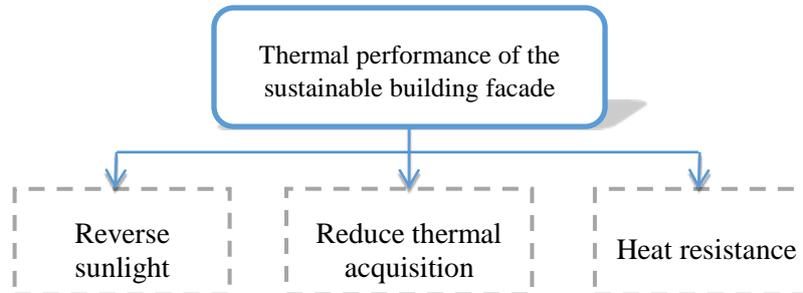


Figure (1.a), Thermal performance of the building's sustainable facade

Environmental natural materials should be used to minimize the negative impact of industrial building materials. The aim of the research is to activate the role of natural materials in the cladding of facades and walls with ceramic tiles, which have high thermal capacity and ability to store the thermal energy falling on it during daylight hours and then lost to the outside during the night, thus achieving the heat balance between heat acquired and lost across the building.

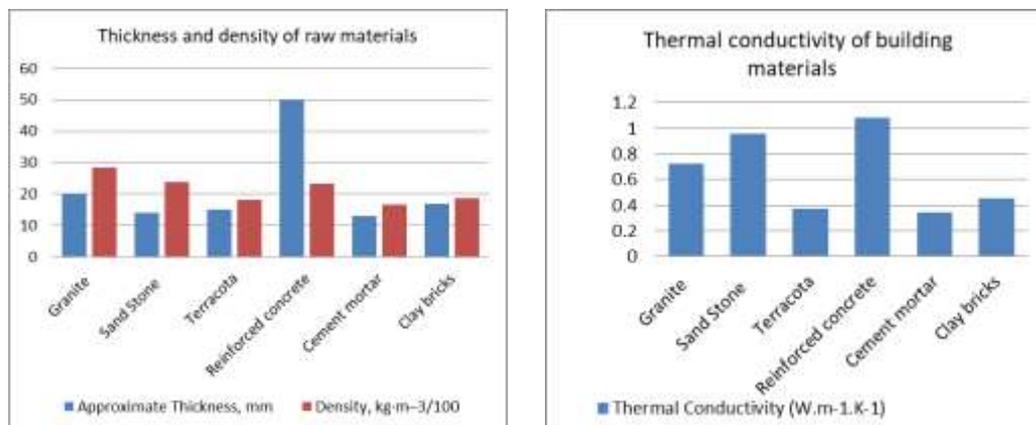


Figure (1.b), a diagram of the thermal performance, thickness and density of some materials commonly used in cladding facades.

1-2 Aesthetic and functional aspect to the building direction.

Building's direction is one of the important points of sustainable design, contributing to more efficient use of both the natural lighting and ventilation of the building. And helps to reduce the thermal loads on the exterior - which also affect the internal spaces, and must take into account the direction of the prevailing wind during the guidance to get the best ventilation. The faulty steering leads to poor ventilation and lighting, which affects the comfort and health of the users.

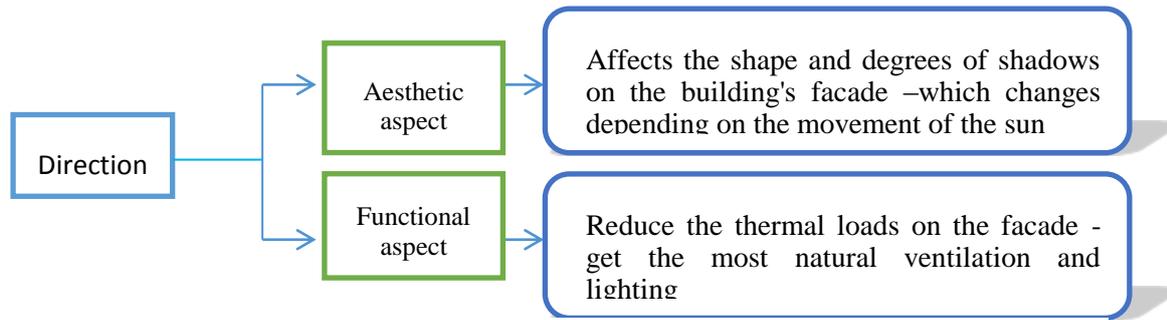


Figure (2), Aesthetic and functional aspect to the building direction.

1-3 Strategies for dealing with design for hot environments

The designer should be aware of the building facades design - especially in hot areas - and must adopt the sustainable design strategies that the world is currently facing in dealing with the environment due to the problems resulting from the lack of respect for the environment and sustainability in design. He must try to devise new strategies in his ongoing dealings with the environment.

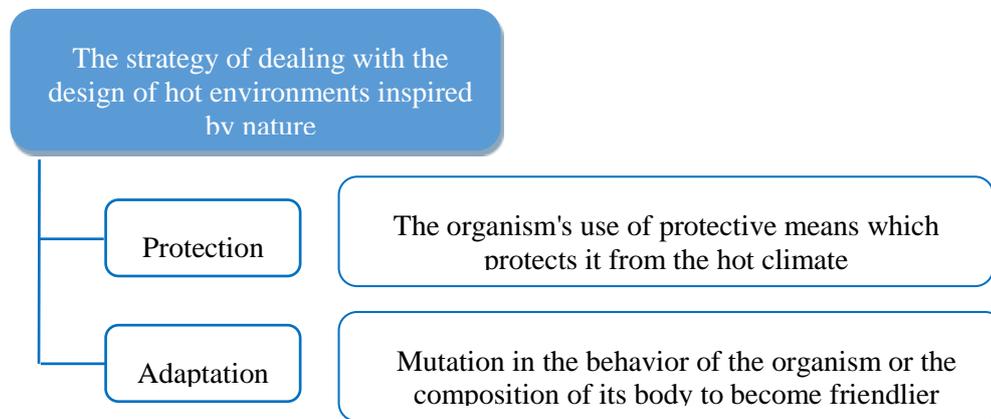


Figure (3), Strategies for dealing with design for hot environments.

1-4 The strategy of living organisms in adaptation

Nature has its own principles and laws to preserve the ecosystem, through which it can draw appropriate design solutions for some design problems. The design thought that combines biology and architecture in order to achieve the full unity between the building and nature - called the science of nature simulation – biomimetic- Is a renewable source for the bio-simulation of new energies in order to reach sustainable design technology - a sustainable design strategy that relies on the use of solutions in nature. Types of adaptation of the living organism are divided into three types: (structural adaptation, behavioral adaptation, functional adaptation).

2/ Design of shadows and their role in achieving thermal comfort

Presenting various studies dealing with the design of shadows in the architectural space, its role in thermal insulation, treatment of architectural openings, the design of shadows and computer - and representing alternatives digitally on the computer.

For example, it is known that "optimal sun breakers of the southern façade are horizontal breakers that can block direct solar radiation in summer, while allowing it to enter in winter. For the western (and eastern) facade, the usual sun breakers are vertical breakers.

Results

1. The use of ceramic tiles in the wall cladding flexibility and ease of use and diversity of design and durability and efficiency in addition to the aesthetic appearance and thermal insulation
2. Understanding the interior designer for the possibilities and techniques of materials and architectural alternatives the process of innovation supports the thinking behind the processors.
3. There are no unified design theory and general environmental solutions. But we have to provide studies on the environment to a specific environmental context. Due to the diversity of each system and its components, it is not possible to generalize or direct simulation of techniques, materials or systems without considering the environmental context.
4. The designer has the ability to transform stereotypical patterns into a new horizon of diversity and dynamism that in turn creates renewable solutions from the stereotypical pattern.

Recommendations:

1. The use of moving shading in eastern, South-Eastern, western and southwest facades. Where the angles of the sun are changing rapidly.
2. The use of external moving shading works to reduce the effect of direct heat and solar radiation, and increase the aesthetic values through shadows, whether externally or internally.
3. The state and the research centers should encourage designers to achieve sustainable design by inspiration from the natural environment and its structural systems.
4. The need for institutions and researches centers for combined researches in different disciplines to achieve integration and intellectual diversity and the comprehensive planning and thinking in the work, which will identify research priorities that support cooperation.

Discussion of results:

The use of terracotta in the architectural cladding of the facades and internal space reduces the thermal transfer through the walls of the building and the environmental value increases with the systems of installation of the double walls - or ventilated facades, And the design of the shadows through the formation of surfaces in ceramic units. Not only the role of ceramics in architectural cladding to conform to environmental standards, but it is rich in aesthetic that promote aesthetic values in architectural design - we find that the buildings are covered with ceramic tiles are buildings of high value Or influential artists such as Sydney Opera, museums or airports ... etc.,

The architect and interior designer's understanding of the potential of each architectural material, its substitutes and related technologies opens up the prospects for creativity and optimal employment for each material. Despite the wide variety of architectural raw materials and the continuous development of treatments and technologies and the importance of this to the designer, each ecosystem system has its components and the perfect adaptive mechanisms that it provides, which is the main guiding factor in the creativity of both interior and architectural designers to achieve environmental adaptation. Here, we cannot present environmental determinants as a barrier to creative design. On the contrary, we can consider the determinants of design (raw material, technique, cost, environment, etc.) to be motivated by creativity and innovation.

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