

The covering technology for the building as a design parameter for interior space

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Introduction:

The internal environment requires a complement of several functions and systems in the building as keeping up this environment requires putting a full design. The development of architectural ideology has resulted in spreading of designs for buildings with glass facades, which have the technical and aesthetic aspects, while they lacked an important and essential aspect which is provision of healthy and suitable internal environment for users. The designer can contribute in achieving rest for the internal space by using technological design terms. In the recent years, a new architectural aspect appeared calling for getting profit from modern technicals and progression in digital information technology, sensors, and electronic control systems. This paper handles the development of innovative technological styles for these buildings covers, that have deeply contributed in providing users with internal healthy environment and achieving thermal comfort for internal space. The shadowing means for the building external cover are designed in many ways that allow the entrance of different levels of light, especially in the most developed smart shadowing systems. These smart systems contain means through which we can protect the internal environment, as they resist changeable climate circumstances by complying (sensor technology).

Key words:

Flexibility- adaption- motional technology- glass facades- internal space- thermal comfort-complied- shadowing.

Paper issue:

Decreasing in living standard quality for the internal space in buildings that have glass facades because of over heating from Sun, which resulted in an internal environment that does not achieve the healthy requirements for users.

Paper importance:

This paper interests in studying the internal environment adaption methods with external climate change through the technological aspects and different ways that are summed up in flexibility and adaption in several innovative models for the external cover of buildings. As these methods help the building change its attitude or its shape, in responding to that changes in order to provide thermal comfort for the internal environment.

Paper cores:

First core: Provide a healthy internal environment for human and suitable for the contents of interior design

Physical comfort, such as thermal and lighting comfort, is one of the most important environmental needs of the users. It is considered one of the most important environmental

international issues because its importance to maintain the health of users especially in hot areas. Many of the health risks are caused by over heat activities that cause high levels of emission of pollutants. It is possible to improve the efficiency of the internal environment by designed methods that achieve the quality of the internal environment away from the industrial alternative.

Effect of heat on the internal environment of buildings: The heat directly affects the facades of the buildings, which in turn move to the internal environment of the buildings, as they affect the person first and then all the buildings inside. In view of the importance of this, the United States Environmental Protection Agency (EPA) commissioned the Institute of Medicine to form a committee of the experts to determine the scientific facts of the effects of heat on the internal environment of the buildings in terms of health and quality of the internal climate of occupants ,and protection of furniture from pests and insects, and identified the five main points of the problems caused by heat change within buildings:

- Thermal stress.
- Internal air quality.
- Humidity.
- Pests, insects and infection factors.
- Energy consumption rate.

Effect of the building cover on the interior environment: The building cover is defined as the intermediary between the external environment (ie, the climatic variables) and the interior (the required thermal comfort conditions within the built environment). The building cover consists of a group of materials and structural elements and compounds that meet to form the internal space. The building and surrounding environment through the various elements and components of the structural cover, where the building is exposed daily to all types of heat transfer throughout the day, causing changes in the internal environment. The building cover has a key role in the protection of the internal environment from external climatic effects, and providing thermal comfort for occupants.

Damages of thermal climate to the internal environment :The negative change of air in the internal environment affects the quality, and may show some pests and insects as a result, causing damage to the human and all the contents of the internal environment, and the percentage of pollutants in the internal environment of 2: 5 times more than the percentage in the external space of building. The air may contain pollutants at a concentration that is more than permissible and thus show some of the symptoms that have been observed and known as the " sick building syndrome ".This is due to the presence of buildings with glass facades that have spread widely.

Duties of the interior designer to provide a suitable and healthy environment for users : It is a priority creative treatments to find solutions to provide a healthy environment and appropriate use of the tools of expression in innovative ways to overcome the problems facing users.

Shading importance: Shading is a way to avoid direct solar thermal gained by many means and methods. The holes are the most visible elements of the building's cover in terms of the

possibility of direct solar radiation from access, for some of the properties of the glass usually used, which causes free gain. These holes in the hot period with the use of shields and solar breakers are important factors in achieving climatic control of the interior of the building.

Heat and sun rays and their impact on the contents of interior design: The internal environment can be transformed into a harmful environment that carries many pollutants from chemicals ,organic materials and particles. The furniture and interior design components are free of chemicals and industrial materials, most of which contain urea formaldehyde resin, polystyrene and other harmful substances.

Volatile Organic Compounds: (VOCs)

There is no building free of these materials ,they interact with increased temperature in the interior space, these materials are found in paints, adhesives ,furniture coatings, and some furnishings. These materials affect human health significantly. Many health risks can be avoided by increasing the use of technology and tools that ensure adaptation and maintain a safe internal environment.

Second core: The development of solar breakers technology to maintain the quality of the internal environment

There are different types and shapes of kinetic systems. It has developed over the ages and civilizations, and with the potential of modern systems, these systems have developed a remarkable development, which led to the expansion of their applications to meet the different architecture requirements, where the holes are designed not only take into account how to enter the daylight from the holes but also how to prevent the entry of direct sunlight.

Evolution of shading design and technology:

The shading devices can be designed with internal building holes in different internal design methods, or external using both fixed or movable shading. The most advanced shading systems contain controls that can automatically reduce the levels of electric lighting .The Islamic also has a large share in the creation of methods to protect the users of buildings from the risks and damages of solar radiation and heat, as evidenced by the use of Mashrabiya and domes with their curved surface, as well as the use of submersible blocks in the entrances of buildings and stained glass that carried multiple innovations for the means of transferring light into the interior space, and the aim was to preserve the internal environment.

Impact of daylight on life, efficiency and productivity:

Daylight has many aesthetic and health benefits, so designers and researchers alike seek to provide this aspect of the interior environment. The Light Research Institute (LRC) in New York emphasises the importance of natural lighting and its health impact on all aspects of life. As for the field of education, a study entitled "Daylight in Schools: An Investigation into the Relationship between Daylight and Human Performance" was conducted in 2002. The study found that students in classes with natural lighting and ventilation achieved better results than students in classes by nonnatural lighting.

The buildings are static blocks, the success of them is to make them characterised by a context of movement or flow. This context can be achieved only by keeping up with the sun's daily

journey across the building's facades, dropping it into different angles and intensity, and the way the light falls on the building confirms the designer's thought of how to reduce the sunlight on the building. Hence the kinetic systems of the facades of different types and forms developed over the ages and there is no building without the treatments of the sun, which is consistent between the function and the architecture. Attempts were made to take advantage of natural ventilation and sun protection to preserve the internal environment. These mechanical methods began in early 1935, when the building, known as Villa Gerasol, was built by the architect Angelo Yvernizzi, who used both the mechanical engineer Romulo Karabashi "And the interior designer" Vasto Sakorti "in the suburb of Verona in northern Italy, and the building revolves completely in the center 360 ° and thus change the position between the different chapters and then rolled out the various innovations and designs that are mechanical in the animation.

Third core: Smart technology used in building facades

The design of the external facades of the buildings is one of the most important creative trends adopted by many designers and architects ,making benefits from the development of intelligent technology, allowing them to create more sophisticated models of the building's cover. This came in a variety of dynamic designs, through which the natural lighting is seen from suitable spaces that are variable and responsive to surrounding factors without any harming for the environment and users. This is a part of an integrated architectural design. Due to the importance of the subject, many studies and researches have attempted to find practical solutions using different strategies. Their role is limited to reduce the thermal flow to the interior and support the practical thermal loss within the building cover and its ability to respond to and adapt to external environment variables ,using advanced technology as a mean of integrating these techniques with the mechanical systems of the building and in harmony with the construction technology.

Adaption with external space:

Biology is a source of inspiration for designers, because of its complex systems that are compatible with the environmental space ,which is called environmental adaptation or adaptation, which is known as" adapting to technological building systems that respond to changes and mitigate harm ,"which designers are seeking to achieve in the architectural field with a design. A building that simulates the living organism in its adaptation to the environment and its ability to respond to climate change.

The development of smart technology for building cover:

Some technological ideas emerged in the seventies. It was from Charles Eismatten where he devised a new method called Conditional Architectural Adaptive, in which the sensors record the incident change and then the control mechanisms induce the mechanical operator to work. With the amazing development of computer software, it has become easier to process this operation with dedicated digital software, which can respond more directly and faster than traditional methods.

The kinetic systems in the buildings are technological systems that work together to adapt to the environmental changes surrounding the building. Therefore, they improve the

performance and comfort of the users. These systems work by responding to solar radiation, daylight, air movement, temperature, or other climatic conditions. The building is from outside and inside. These kinetic systems are used in different aspects either to enhance the building's aesthetic characteristics, to respond to climatic conditions or to perform other functions that are available in systems, and may be "folding" or "transforming" in size and shape, The most obvious examples of this system are the following buildings:

The Kiefer technical building in Australia, the Royal Institute of Technology in Melbourne, the Australian state of Victoria, the Abu Dhabi Sea Towers Hotel, the Arab World Institute building in Paris, the Henning Larsen University building in Denmark.

Results:

- The technological covering of the buildings, which works in response, is more suitable for environmental fluctuations. They are intelligent technological systems that give the system the ability of environmental changes sense, providing the system with a signal of the ability to change its behaviour automatically.

Recommendations:

- Physical comfort ,such as thermal and lighting comfort, is considered one of the most important necessities of internal environment users ,and designers should pay attention to improve the interior environment by using the appropriate design means to achieve a healthy environment.