

# **The development of interior design materials in light of the intellectual and technological progress of the contemporary architectural form**

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## **Introduction :**

The research examines the developments that have occurred in the architectural design thought and within the space, especially after this technical development that coincides with the development of digital technology for drawing programs, and what these changes have brought about the development of the contemporary architectural form with complex design and implementation treatments. In the past, the designer had only his scientific imagination to express because of the humility and limitations of the tools available to him and his ideas came out on paper through drawing with a pen.

While choosing raw materials to address the aspects of dressing and furnishing interior spaces, it has been facing difficulty due to the types of materials and their specific capabilities. But with the amazing technological development that was accompanied by a change in all branches of science and disciplines, especially the fields of architecture that benefited greatly from this development, and the architectural forms have developed with it.

As architecture was confined to the traditional design, unfamiliar and more sophisticated designs emerged, characterized by rounded edges, streamlined shapes, and intricate interfacing between lines, in addition to changing the pattern of internal space to match the external appearance and meet the needs of users in an appropriate and contemporary nature. The emergence of modern materials and their accompanying technology were credited with completing the link between design and implementation, it has become easier to implement what was designed in the world of virtual reality to become a tangible reality in the light of intellectual and technological progress.

The technological development that has been witnessed by the materials technology has resulted in modern materials and raw materials have developed, aimed at improvement and preservation of the environment and energy, in addition to the creative aspect in the design and implementation process to achieve a modern design idea that matches the requirements of contemporary society, and the main goal of the architects and designers has become to utilize and exploit the available technology to serve the architecture and its purposes, through design, implementation and compatibility between them, and some designers have used these booms to find a new architectural language that suits the era including innovation and creativity that was not easy to find in previous eras.

## **Key words:**

Modern materials - developed materials - implementation technology - contemporary architecture - architecture technology.

**Research problem:**

- The big gap with regard to the technology of modern raw materials used in contemporary architecture and the need to identify the raw materials for the internal design of these buildings, and the need to track the technological development of raw materials technology and the modernization or emergence of new ones.
- The need to know the types and characteristics of modern materials, and the technological aspects related to them, and to expand the exploitation and employment of this technology in the field of interior design.

**Research importance:**

- It is noteworthy that new global trends have emerged in the world of construction and interior design, accompanied by the innovation and development of modern materials and raw materials, to be compatible with the contemporary shape and design, and are rapidly developing with high technology and accuracy that must be studied by specialists and those interested in interior design, considering it a revolution in the world of materials and materials.

**Research aim:**

- The research aims to try to monitor the newly innovative materials used in the interior design of contemporary architecture, to use them properly in our architectural environment, because today they have become essential materials in interior design work.
- Emphasizing the complementary relationship among shape, material, and the technological development that has made a great leap in the world of materials used in architecture, externally and internally. Hence the resulting creativity and speed of implementation.
- Emphasizing that materials and the technology that follow from them are greatly reflected in the design and implementation process.

**Research methodology:**

The research follows the descriptive and analytical approach.

**Research hypothesis:**

Identify the characteristics of modern raw materials technology that contributed to the emergence of contemporary architecture.

**Research limits:**

Modern materials used in the internal space of contemporary architecture.

**The reasons that helped in the emergence of contemporary architecture:**

In recent times, new features of the arts of architecture have appeared, characterized by strength and innovation features in design and function, whether internal or external architecture, and the idea of dealing with architectural design as a product that many interested in the field of modern architecture considered it as a great boom and development of architecture, and in 1988 AD, the architect Patrick arrived Schumacher for Zaha Hadid's design philosophy, which calls for the abandonment of straight architectural design lines and right angles used by designers and architects in architecture, and adopting a new philosophy based first on the direct translation of the curved lines with which you draw fast architectural sketches, and converting them into drawings by computer drawing programs.

The second thing is that the spaces that arise between the curved lines can be considered the architectural spaces that contain building components, and they are liquid spaces that do not impose barriers or partitions between them to separate the components from each other, then the components come to be placed inside these spaces that the lines contain in a way that determines the extent of the relationship or connection of each component with the rest of the components in a smooth and soft way, and if you look at these shapes from any side, you will find that they are in harmony with each other despite the richness and different shapes.

This contributed to the introduction of sloping and sloping shapes in the lexicon of architectural design during the last period of time. The intellectual and design attitudes of architecture have changed, which is represented in the development of technical and construction skills in both external and internal architecture, and modern materials have appeared with specifications that could not be obtained before. Because of the emergence of these modern materials, a great development occurred in the architectural design, and at the same time the technology of mechanization and machines developed to become digital, and this in turn contributed to the speed of development and change and the completion of the contemporary architectural form.

### **Contemporary architecture is one of the products of artificial intelligence:**

Architecture is one of the fields of science related to the computer, which has come to control all areas of life, through what is known as the digital revolution that changed the shape and pattern of life, and thus had its effects on architecture, which benefited from it in its external and internal parts, which had a direct reflection on contemporary architecture, and with what it represents in terms of new architectural creativity, so that modern architectural trends appear in a way not previously known, as the designs "digital shapes" came out through the computer with three-dimensional imaginary models that simulate reality and show the interior details accurately (Figure 1) and detail all aspects of implementation and materials with high accuracy, These innovative treatments of these forms aimed to achieve various goals and objectives, which in turn ranged from activating the functional efficiency of the building.

### **Modern materials development:**

The importance of studying modern materials for interior design comes as the interior design is concerned with studying the elements that make up the interior space in buildings, from formal and functional treatments to ceilings, walls and floors, as well as the contents of furnishing, as the science of interior design is concerned with researching the physical composition of the materials that make up these elements and their quality, Its perceptual effects, such as color, texture and shape, determine the relationship of these elements to each other, as the interior designer interacts with the interior design that achieves an aesthetic and functional performance that corresponds to the architectural design with all its straight and curved lines and other lines, hence the importance of using appropriate materials to achieve this. Modern materials in achieving a link between architecture and interior design in contemporary buildings and in a functional style, modern materials are an infinite source of inspiration for the designer, as the colors of the materials, their surface value and other qualities of the designer suggest many and varied innovations of the interior spaces, which drives the designer to discover modern technical treatments in an easy way.

**Technical qualities:**

Modern technology and the advanced technologies it brought, have eliminated many aspects of manual skills, which in the past decades produced valuable works and designs that are still recorded among the books of history and heritage. High-capacity, multi-capacity digital (CNC). The machine is no longer driven by the hand as it was in the past, but it was connected to the computer that took over the command to move it based on orders and coordinates stored by the designer (programs), to perform drawing, engraving, sculpting, forming, bending, welding and other implementation tasks, and it is carried out with an accuracy up to the degree of miracle compared to by manual work, entering the engineering drawing software gave the opportunity to form an accurate conception of the designer's ideas that are compatible with contemporary materials and some of the traditional materials, and the interior and architectural design designer was able to overcome operational obstacles with the speed of implementation, and this in turn developed the designer's thought due to the rapid technical development.

The use of modern materials requires a creative designer who possesses contemporary technical capabilities, which opens the door for designers to enter this new world to break the large gap between traditional and contemporary technology.

**Characteristics of material properties:**

The plasticity of modern materials is evident in comparison with the old and traditional ones, with the ease of dealing with those raw materials in terms of the plastic and structural aspects of the raw materials, which are characterized by light weight, accuracy of manufacture, small thicknesses, durability in construction, and great potential for linking them, whether it is between pieces of similar type and shape. Polymer products such as plastics and others, and aluminum and titanium in particular, have a growing role in the construction and cladding process, due to their light weight and ease of formation.

In addition to what happened to all contemporary materials in terms of plasticity that were not known before, and the process of various coatings and dyes that resulted from modern materials became compatible with all materials in easy ways, and what happened to the formation of metals and their surfaces, as well as glass and methods of shaping and zigzag and being able to implement those which bend easily, and with all precision and welding processes that take place between its parts with an innovative technology.

**The most important newly developed materials:**

The object is the material before the designer creates it and turns in his work into an aesthetic material, and it includes everything that is material and has a survival characteristic of natural or industrial materials, and many of the architect used raw materials as an element of the interior design, including (Richard May) as a process of cladding materials with metallic chips (Metal coating process) for other materials, including:

**Titanium:** With the advent of digital technologies, new employment of many ores, including titanium, has appeared to play an effective role in architecture and interior design, and it is a lightweight, strong, glossy and rust-resistant metal, and one of the most important features of titanium is that it is used in the manufacture of alloys with metals. Others, such as iron and aluminum, thus became one of the basic materials in the world of interior design, and one of the architects interested in metallic materials, "Frank Jerry", where he was interested in the

metal material in our time because it produces the possibility of forming free shapes that cannot be provided by other materials.

**Steel:** Architecture has emphasized throughout the ages its capabilities in absorbing the technological development of raw materials, investing them to generate their products and to achieve a state of innovation and creativity. In contemporary architecture, this modern pattern is represented in the use of steel instead of reinforced concrete in constructing the "skeleton" for construction. As researchers have reached in this on materials that combine plastics and steel, as they are used in many areas, including construction, and with the development of this technology it added what distinguishes modern architecture, as it relies heavily on geometric shapes and asymmetric designs, in design, creativity and innovation.

**Aero-Aluminum material:** Aero Formed Aluminum, which is one of the latest raw materials technology, which is a thin corrugated sheet that is flexible and easy to form. It is considered one of the unique materials and is ideal for a wide range of interior applications. Flexible material, which makes it foldable, and is widely used in cladding walls and ceilings in a variety of configurations according to design.

**Polymer raw materials:** It is a versatile and flexible compound that can be used in a wide range of purposes, and with technological innovations driving the physical capabilities forward, polymers are now taken seriously as a major part of the most important architectural materials, and plastic material is considered one of the important materials in internal treatments as it is easily distinguished. Formation of curved surfaces that lead to innovative new and unusual shapes such as PP, polypropylene (PE), polyethylene, PVC (thermoplastic), polyvinyl epoxy, PU and polyurethane elastomers.

### **The effect of the technological development of building materials on the shape of the block and the internal space:**

The role of modern and contemporary technology was not only limited to adapting software to draw new vocabulary for the architectural formation, but the role of technological development extended to the areas of construction and the development of materials for interior architecture, and it made a great development in multiple industries as mentioned above to play a large and effective role to push designers to creativity and integration between the architectural cluster and its interior design, according to the trends of contemporary global architecture. The technology used in many buildings has become the main driver of design thinking, as the implementation requirements and the new materials and raw materials needed and the resulting configurations have led to the emergence of renewable ideas in terms of forming the building block.

Through the presentation of some of the following architectural models of contemporary architecture, in which the method of harmonization and adaptation between the external form of the building and the interior design is evident, thanks to the technology of modern materials that have made a great leap in the field of design, and these models are:

#### **Guggenheim Museum, Spain:**

The Guggenheim Museum Bilbao is a museum of modern and contemporary art, designed by the architect Frank Gehry, and is located in Bilbao, Basque Country, Spain.

**Heydar Aliyev Center:**

It is one of the world-famous cultural centers of architecture, Zaha Hadid, located in Baku, Azerbaijan. Through the design, the flexibility of the materials and the continuity of the creative language between the external form and the interior design is noted, and the materials have played a prominent role to achieve compatibility between the outside and the inside, and a group of modern materials have been used in the building Whether on the construction side or internally.

**King Abdul-Aziz Train Station in Riyadh:** It is one of the service buildings designed by architect Zaha Hadid, and the design is evident from the contemporary language of modern architectural thought, the method of using steel materials covered with PVC material in the external structure and interior design treatments.

**Changsha Meixihu international culture and art center:**

It is one of the contemporary landmarks in China, the center is built on an area of 115,000 square meters, and it was designed in the form of separate unique ripples befitting the edifice of culture and arts, the museum consists of a huge theater with a capacity of 1,800 seats, a museum of contemporary art and a multi-use hall in separate and adjacent buildings. Flower shape with three petals and each perform its own function.

**Results:**

- The technological developments in raw materials and the development of modern technology methods, whether in architectural design or interior design, represent a new stage that confirms that materials have a role of great importance that has a direct impact on the development of the architectural form.
- The digital technology represented by computer drawing programs has greatly influenced the emergence of new vocabulary for interior design and architectural formation, which made the design process a creative process without hindrances, which resulted in unprecedented formations and designs.
- The developed modern materials have technological characteristics that enable them to be able to form and adapt to all lines, due to their wide capabilities in free formation, to show contemporary architectural trends.

**Recommendations:**

- With the increasing role of modern materials, it is expected that a radical change will occur in the design of the interior space, thus changing the traditional design philosophy as well as the development of various performance and functions, which requires designers to re-study and understand the types of modern materials.
- The necessity for the interior designer to seek to benefit from all aspects of the technological development of raw materials and their operational technology, and what is related to the architectural design of renewal in new and modern vocabulary of contemporary architectural formation, and to employ modern materials in line with these vocabulary, so as not to deviate from the architectural technological development that has occurred in our time.

- The technological development and the spread of the global style in interior design and architecture has become a reality, so it is necessary that the interior designer searches for the renewed intellectual trends and the effects that followed in changing the architectural style, and does not neglect the technological aspects that express the spirit of the times.

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