
ORNATE AND COLORFUL WOODEN ELEMENTS BETWEEN ROOTING AND RENEWAL IN INTERIOR ARCHITECTURE

*Ghada Fathy AL-MUSALLAMY*¹, *Rehab Fathy HAMMAM*^{2,*}

¹ Interior Design and Furniture Department, Faculty of Applied Arts, Benha University, Egypt

² Conservation Department, Higher Institute of Tourism and Antiquities Restoration, Egypt

Abstract

Man used the materials available in the local environment in ancient civilizations until the industrial revolution took place and created raw materials and manufactured materials that are not suitable for environmental conditions and resulted in increased human tension and discomfort, and artistic creativity has been linked through successive historical stages with an attempt to devise design solutions in internal architecture compatible with Environmental conditions and keeping pace with scientific and technological developments in the field of interior architecture, this research tries to arrive at a new product of wood so that it is designed in the spirit of the Islamic style to be used in interior and exterior architecture, with treatments against traditional wood defects, and the product's acquisition of new qualities such as its resistance to scratching, ease of cleaning, and its resistance For insects, it can also be decorated by coloring using colors treated with modern techniques, which give them the characteristic of stability and resistance to external factors that lead to their damage and fading, all within the framework of re-using the Islamic style and employing it with modern technological thinking in interior and exterior architecture and the renewal and simplification of decorations by means of (CNC) decoration machines Sculpting and discharging.

Keywords

Ornate And Colourful, Wooden Elements, Rooting, Renewal, Interior Architecture.

Introduction

One of the most important principles on which the normative and design thinking was based at the beginning of the twentieth century was to sever the link with the past and benefit from scientific and technological progress. Despite the advantages of this clear technological progress, we find from the negatives what led to what we are now and what technology threatens man with losing identity And beauty is in design. Therefore, the call was urgent to confront this shift to awaken cultural and artistic awareness, through art, civilizations were embodied and their effects remained.

Submission

Islamic architecture was distinguished by its abundance in wooden elements, and wood played a fundamental role in the interior designs of residential architecture during the various Islamic eras, so we find them forming ceilings, windows, mashrabiya, doors, wall cupboards and furniture, and these woods were rarely used deaf, but they were often decorated either by drilling, grafting, or or By hollowing out or by coloring, especially wooden works with colorful decorations, and they have been used in many ways to achieve the functional and aesthetic purpose, as the Islamic architecture has the characteristic of form stability with variation in

* Corresponding author: fapa@bu.edu.eg

function, because the shape in Islamic architecture is flexible and prepared to accommodate more than one function, provided that the purpose of each of them is fulfilled. For example, we find one element with the same shape and more than one function.

The designer artist has a role in understanding the properties of the material and dealing with its characteristics, and he must formulate it to achieve the goal in artistic design, and that the raw material does not acquire an aesthetic artistic formula until after the designer transforms it into an aesthetic sensible, decoration and coloring are among the ancient Arab arts that characterized Islamic architecture. Where wood in mosques and homes were decorated with plant, geometric and linear decorative units inspired by the Arab artist of plants, flowers, and animals, so that the soul enjoys comfort and tranquility in homes, in addition to tranquility in Islamic religious architecture.

The use of natural wood in interior architecture

It is known that Egypt was and still is poor in wood, so the wood industry in Egypt needs to be imported from abroad, such as ebony, pine, walnut, beech, oak, dear, gargoyles and teak. As for the local wood, it was limited to sycamore, olives, acacia and palm trees, and it was used only in some simple carpentry works. It is noticeable that the wood used in the historic buildings in Cairo ran out of the wood imported from outside.

Mamluk architecture was distinguished by the wooden works that were used on a large scale in making the various roofs of palm trees, which were known as al-imrain, then cladding their visible facades with thin panels of poplar wood and filling the space between each of the two barrels with vertical beams on them that produce shallow grooves of rectangular and square shapes and decorated with carved drawings. Or painted and gilded at times and camouflaged with lapis lazuli and often went under these ceilings, at the top of the walls, thin wooden panels were painted with the same methods, sometimes decorating the ceilings, or engraved with constructional, Quranic or poetic texts, as there was a great development among the Mamelukes in the decorations carved on the wood, which formed in a picture Geometric shapes such as star and political shapes decorated with delicate leafy plant branches. As for the Ottoman interior architecture, wood was used in the implementation of many interior design elements, as well as wooden ceilings such as doors and windows. The wood was decorated with all methods of decoration such as formulas, coloring, slitting, inlaying, interlocking, turning and perforating.

The Muslim artists left us many wooden masterpieces that adorned their buildings, which they excelled in decorating and decorating with plant and engineering units, writings and animal shapes that they created as decorative units, and they used several artistic methods, including:

- 1- **Engraving:** the art of engraving on wood flourished, and the Muslim artist devised a method and carried out engraving in more than one way: the simple graving, the deep cut and the relief.
- 2- **Incising:** what is meant by shallow drilling to implement delicate decorations.
- 3- **Turning work method:** This method is evident in what is known as mashrabiyyas.
- 4- **Piercing method:** This method is based on excavating and emptying some narrow areas of wood so that the light penetrates according to a specific design. When confronted with lighting, it distributes the shadows and lights resulting from the hollow and non-hollow parts on the interior spaces, giving impressive shapes.
- 5- **Painted and colored decorations:** These decorations were implemented on wooden artifacts in Islamic architecture since the first century AH and they continued to be implemented with the development of their technical methods to this day, and before they are decorated, painted and painted on them, they must be treated against moisture and block their pores with a layer of resin mixed with (oil or alcohol), followed by a layer or more of white paste that often consists of one of the white powders (lime, gypsum, zinc, and squid) with glue as an adhesive, until it is prepared for drawing, and I have used color materials with a medium either animal glue or oil Linseed, as for the distinctive woods such as walnut, mahogany, and pear, it was sufficient to paint it with a layer of galaxy (resin mixed with alcohol) so that its fibers appeared with beautiful divisions, and decorated with some simple decorative units, and the decorative designs executed on the ceilings and the wooden elements used in the interior architecture reached a degree Its high beauty and perfection testify to the prowess of the Muslim artist.

Physical properties of natural wood

- **Color:** It may change as a result of wood exposure to weather conditions, and there is a positive relationship between the color of the wood and its hardness.
- **Gloss and woody texture:** The luster and texture of the texture differ depending on the wood cells.
- **Moisture:** affects the hardness of the wood and the wood cells absorb water from the moisture obtained.
- **Hardness and Weight:** The hardness of wood is affected by its weight, so heavy woods are more solid.

Applied study

To find out the most important materials and techniques used in woodworking in the Islamic

interior architecture, an analytical study was conducted on models and samples of archaeological wooden elements in order to provide a database that contributes to the production of new elements in contemporary architecture inspired by Islamic styles while trying to avoid the factors of damage that the original models may be exposed to. Samples of the wooden elements employed in the interior designs were taken from several sites in Historic Cairo, represented by some houses belonging to Mamluk and Ottoman architecture, namely:

)Al-Suhaimi Group, Zainab Khatoun House, Abd Al-Rahman Katkhda House, Al-Sitt House) were carried out on which the procedures of laboratory examination and analysis were carried out to discover the types of used wood, the techniques of decoration and coloring, the materials used, manifestations of deterioration that may affect that wood and its causes, then suggest the best modern scientific methods. To avoid these problems, maintain old and new wooden elements.

As for the ceilings, most of them were executed using wooden hoses, which are boards and wooden hoses from palm groves. The space between each hose is filled with vertical beams on them that produce shallow grooves called (pallet), over which a pallet of mats is applied above it is stacking municipal bricks, debris and lime mortar And mud, on different levels.

Study the results of the examinations and analyzes:

A- Examining wood and identifying its types:

Two samples of wood were examined in the laboratories of the Department of Wood Trees and Wood Technology at the Faculty of Agriculture, Alexandria University, Fig. (4, 5, 6) and it was found that the two samples were from pine wood. B - Examination using X - Ray Diffraction Samples were taken from the color layers and layers Preparation under the colors, in order to examine them using radiation diffraction, and based on the examination the compounds and their approximate ratio are cleared in each sample, and after extrapolation and interpretation of the results, the following became clear: - Preparation layers for the sample of Bayt Al-Sit, Wassila and Al-Harawi are mainly composed of two samples of the gypsum mineral mixture Gypsum $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ with Calcite CaCO_3 . As for the house of Al Suhaimi sample, it was noticed that the preparation layer was mainly composed of lime due to the presence of calcite, and the results also demonstrated the presence of a percentage of clay due to the presence of the mineral Ca Mg SiO_4 Monticellite calcium and magnesium silicate.

As for most of the colors used in color decorations on wood, the examination confirmed the presence of iron red and reddish brown due to the presence of iron oxides represented by Hematite $\text{u-Fe}_2\text{O}_3$ and Maghemite $7\text{-Fe}_2\text{O}_3$, black color due to the presence of Magnetite Fe_3O_4 , and the brown color of iron hydroxide Fe (OH) _3 , bernalite - it appears through the

results to be the beige color of Goethite FeO. OH mixed with white zinc zincite

-I found in the results some salts soluble in water such as thenaredite aqueous sodium sulfate
c- Examination using infrared FTIR An infrared spectroscopy was performed to find out the type of organic medium and the dyes used of organic origin, the resulting shapes show the infrared pattern, and it turns out The mediator used to color the decorations on the wood in the house of Sitt Wassila, the house of Zainab Khatun and al-Suhaimi, and the analyzes of three samples proved that it is animal glue. Examination of two samples of Al-Suhaimi and Al-Harawi proved the presence of madder dye on untreated wood with preparation layers, which is the cause of the scarlet red color, and the presence of an organic medium, which is animal glue. D- Examination using the U-V spectrum. The examination was performed on samples from the house of Al-Sutas, Wassila and Al-Hawi, to ascertain the type of medium used for coloring, the type of wood, and the dyes. The following was found:

-The intermediate material is animal glue.

The type of wood used may be juniper or pine.

Examination of one sample of Kurdish-colored wood in the summer seat of Al-Harawi's house showed that there was a layer of linen weaving as a secondary carrier of the color motifs.

Manifestations of Islamic wood damage due to moisture, heat and environmental pollution:

Through a visual examination of all cases of study and other Islamic buildings, the deterioration of the wooden elements used in interior architecture was observed, due to the nature of the wood material, which has the hygroscopic characteristic, which leads to its severity being affected by the factors of humidity and drought that are damaged, and this can be summarized the manifestations of wood damage that have been observed in the following points:

-Biological injuries such as insect and fungal infections, and among the most common insect infections is what is known as (woodworm beetle) and another type of beetle known as (house necrosis). In addition to termites, wood may be affected by fungal damage. FUNGI: Fungi are the most common organisms. The microorganism has an effect on wood damage because it contains cellulose, lignin and hemicellulose, which are the substances that fungi feed on, and among the types of fungi that commonly grow on wood we mention Lacrymans Meruius that causes dry rot of wood DRY - ROT, and this mold weakens the mechanical strength of wood, Which exposes it to breakage, as the fungi of the type of Pullarian Pullulans attack the wood and cause great damage to it, and one of the most important manifestations of infection with fungi, the wood becomes fragile and weak and crumbles upon touch, the wood loses its distinctive smell and becomes stinky, giving a muffled sound when knocking on it with the

finger.

-Splitting and cracking has been observed in many ancient woods and this is due to the nature of the wood material, which is strongly influenced by moisture, and it is called the hysteric characteristic, as it swells when absorbing water, and shrinks when it is lost, this change between swelling and shrinkage is called "play movement and as a result of that." Movement that is not stable in one direction, the wood may crack and split

-As it was noticed that some woody elements were worn out and some were weak and fragile, and this often occurs as a result of wood exposure to high temperatures. This leads to a loss of its water content, as the basic components of wood, represented by cellulose - hemicellulose - lignin are affected by this change and lead This leads to a loss in the weight of wood, and the longer the exposure to heat increases, the effect increases and follows a loss in the natural properties of wood, and the wood becomes weak and brittle with the passage of time and its hardness decreases and is easy to scratch and break and its fibers separate easily, Figure () shows the cracking and splitting of the wood fibers used in architecture Interior of Islamic homes, examined through the digital optical microscope, the transformation of wood to what is known as the appearance of wool as a result of chemical decomposition, which occurs by the action of air pollution gases and their interaction with the wood components represented in the form of cellulose, lignin and hemophilus, and it is known that air pollution gases transform in the presence of moisture into Acids, attacking acids Wood components Its components consist of pectin materials that bind the fibers, and sulfuric acid is one of the strongest acids that wood is exposed to and is made up of Sulfur dioxide is oxidized as an air pollutant in humid weather, and when this acid attacks wood, its surface degrades and gives a surface similar to that of Wooliness.

Wood Plastic composite:

It is an environmentally friendly manufactured wood that does not emit toxic gases, and its manufacture depends on special mixing of plastic components with natural fibers from wood or secondary agricultural products, after being specially treated and prepared in order to blend strongly with the plastic by innovative mixing methods. In order to obtain the double advantages of the new product (as it combines the properties of plastic in addition to the properties of wood), the plastic components protect the wood from water and insects, while the wood protects the plastic from ultraviolet rays and extends the new product with the texture and toughness of plastic and the durability of wood together. And wood plastic composites, WPCs consist of several elements, the most important of which are "natural or synthetic" plastic polymeric materials, with organic fillers most of cellulosic materials and enhanced with

chemical additives. Characteristics of plastic wood: WPC is preferred by plastic wood over regular wood because it is characterized by:

- 1- Extreme stiffness is characterized by being 3 to 5 times stronger than wood (depending on the type of wood or fiber used, in addition to being free from natural wood defects such as knots, curvatures, etc., in addition to the new fabric fibers that give it strength, durability and withstand stress and loads.
- 2- Stability: a physical constant whose dimensions do not change with time. Withstands direct sunlight, and is resistant to ultraviolet rays. Resistant to chemicals and does not rust, so its resistance to organic and inorganic chemicals is excellent and effective due to its safe, healthy and environmentally friendly properties.
- 3- Resistant to chemicals and does not rust. Its resistance to organic and inorganic chemicals is excellent and effective due to its safe, healthy and environmentally friendly properties. Its resistance to weather and climate is much better than solid wood.
- 4- Water resistant: It has a high resistance to moisture and water because its surface is covered with a plastic layer that does not absorb water or moisture, and it is not subject to expansion and contraction due to laboratory tests and therefore it is ideal for tourist resorts, water bodies, bathroom doors and others.
- 5- Resistant to pests and insects: Including termites and all rodents, insects and fungi.
- 6- Ease of coloring, decoration and engraving: It is characterized by ease of coloring, ease of forming and emptying: by pulling or injecting it into molds, as well as recycling.
- 7- Maintenance, treatment and recycling: it does not need to be maintained, it is recycled.

Areas of use of new WPCs raw materials:

- It can be used as a substitute for all wooden products because of its strength, quality and insulation.
- Making ready-made panels of custom sizes or sizes to be executed.
- Doors, doors, windows, floors, suspended ceilings, and wall claddings.
- Manufacture of parquet wood, taking into account the resistance to earth and water.
- It can be used as an alternative to aluminum partitions for making windows, kitchen and bathroom units by casting them into molds according to the designs and sizes specified.

How to benefit from processed wood:

It is possible to take advantage of the properties of processed and treated wood and control its properties, shape, color, shape and texture by specialists in dealing with components and mixes of new compounds and producing mixtures with specifications according to demand and

functional purpose, and the shape of the product and the final product shape options differ due to the variation in the proportions of the mixture elements of wood and cellulose, the different forming process.

Results:

- 1- The necessity of conducting more studies related to design innovation stemming from product functionality and comfort.
- 2- The wooden elements in the interior architecture were manufactured from natural wood imported from outside Egypt. Examination of the study samples proved that they are most likely from pine wood.
- 3- The study of samples taken from historical buildings proved that the colors used on the wood are color oxides, the medium is animal glue, and the preparation layers were of gypsum and lime with animal glue, and it was also concluded that sometimes the linen fabric was glued over the wood and formulated before drawing the decorations.
- 4- Through the results of the examined samples, the designers are required to treat natural wood from the recognized defects, and to develop the wood product to reach types of wood that are free from defects and can be used in different shapes, colors, sizes, and garments, accepting the processes of pumice, coloring and printing for decorations.

Recommendations:

- 1- It is recommended to use natural wood in the elements of contemporary interior design and to work on wood maintenance to protect it from moisture, heat and biological injuries, and to use the latest materials that have been tried in protecting wood, namely ParaloidB 72 in the nano size with the use of nano fiber cellulose (NFC) as a filler, and in Layered textured woods can be strengthened with Primal C33 Nano Primal.
- 2- It is recommended to use environmental wood by chopping or cutting it and using it in the manufacture of solid wood. The plastic has a variety of lengths and shapes, gives it the required colors and textures, and the quality of the new wood is treated against the defects of natural wood and gives it new qualities such as hardness and durability. It is also possible to dig and empty the decorations and color them to root the Islamic character in the interior architecture with modern technology and an appropriate economic cost.
- 3- Islamic decorations are central to Islamic art, which is concerned with surface treatments, such as its interest in form that reaches the point of creativity in the decoration of interior architecture, where the walls and ceilings are transformed into decorative panels because of their distinct visual effect resulting from the fluidity of

space as a result of the continuity of decorations and the diversity in texture between roughness in the hollow And the smoothness of coloring, producing that artistic equation, is the goal of the research of rooting these arts in a modern technological method at appropriate economic costs, and this is what the research study recommends:.

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