

The mural design between the richness of the formation and the diversity of materials and techniques with application to (ceramic, glass)

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The first axis: a historical study:

The mural art reflects the heritage and history of peoples, as it carries symbolic, aesthetic and functional values, as murals since primitive man had known them, they have become a documentary work of human life on the walls of caves, the most famous of which are the drawings on the walls of the Lascaux caves and the Timbra as in Figure (1.)

Wall art continued to develop with the development of human civilization, providing a great variety of alternatives to materials and technologies, as it extended across the civilizations of different peoples. Murals in the Egyptian civilization are considered a wealth in the art of wall painting (fresco) and wall sculpture (prominent and relief), the subjects of the drawings were related to religious and worldly aspects or battle scenes and had a symbolic ideological role in addition to its aesthetic role in decorating the walls of temples and tombs. Egyptians were able to reflect the extent of wealth within the mural composition, which varied between painting using color, and bas-relief, and the merging between relief sculpture and painting, which is reflected in figures (2 to 6.)

With the passage of the ages of wall art, the Islamic era came. The art of miniature had its effect in giving a new image of wall art. Among the techniques of mural painting that spread as well, the decoration of stone surfaces with bas-relief and prominent inscriptions, and the Muslim artist adhered to the teachings of the Islamic religion that prohibits the depiction of animate beings. Murals have a decorative character, away from reality and representational scenes.

From here, methods and techniques of wall art varied, including fresco, mosaic, painted glazed tiles, cloth pressed on the wall, and oil colors after mixing them with different pastes and metals of all kinds, and then developed by integrating materials such as ceramics, marble, glass, fabric, printing, wood, reinforced concrete blocks, and what went beyond that to the use of lighting and sound, and maybe movement, and among the techniques that were used in the implementation of mural photography in the past: Tempera - fresco - mosaic



The development of the mosaic passed through several stages until it reached its peak in the Islamic era, as well as the Umayyad Mosque in Damascus and the Dome of the Rock in Jerusalem. Then came the glazed ceramic tiles and their depictions of plant motifs. The researcher believes that Islamic art is one of the most important and greatest periods of ceramics, which is considered a historical interval in the production of ceramics, where technologies, materials, style, ideas, quality of products and employment were developed.

The second axis: an analytical study of contemporary mural design:

1- The most important considerations involved in the wall formation:

Whereas glass and ceramics have the characteristics that have enriched the wall formation; It was necessary to derive some of the important and influential considerations in the process of formation or use.



First: environmental considerations:

The environmental considerations for the murals are related to several determinants that are the same as the determinants of the architectural cladding, are they in the internal space (interior murals) or in the external space (external murals)? As well as the level of visual and perceptual communication between the mural and the recipient, as every architectural context has a number of criteria and determinants that differ according to environmental variables, which are included and reflected in the list of characteristics required to be met, which can be classified and summarized as follows:

1- Erosion factors: sunlight, heat, humidity and wind. We can confirm that porcelain and glass are among the most important materials that have competitive environmental properties and components and achieve the highest levels of environmental compatibility in terms of resisting the influence of natural factors such as heat, sunlight, and humidity, due to its characteristics of porosity and resistance to corrosion and friction.

2- Friction resistance: It is one of the important conditions affecting the shelf life of the mural and its resistance to erosion factors.

3- Porosity: whether or not (depending on the nature of the place or the environmental context) and affects its resistance to the influence of chemicals and humidity, as well as the ability to be cleaned.

4- Moisture resistance: It is one of the main erosion factors and shows the importance of moisture resistance in coastal areas, as well as exterior murals in general.

5- Corrosion. Corrosion is the decay of the material due to its interaction with the surrounding medium (chemical agents) or its erosion as a result of friction or other (mechanical factors), and porcelain varies according to the proportion of porosity and whether glazed or unglazed where the glaze is considered to be resistant to the influence of chemical and mechanical corrosion. It is clear from Table (1) the chemical and mechanical properties of glass.

6- Fire resistance: no rapid reaction of a flammable substance with oxygen. Porcelain and glass are considered fire-resistant materials. Porcelain is classified as a refractory material, as in Figure (19) a diagram showing the thermal behavior, corrosion resistance and bending resistance of glass and porcelain materials.

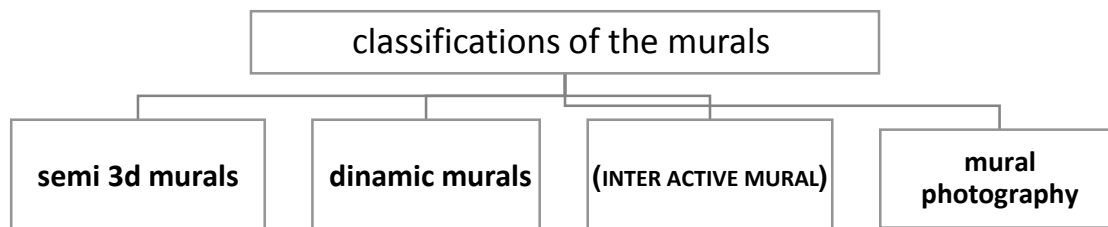
Second: construction considerations:

Of the important structural considerations in the wall formation are the structural systems used in the installation, including:

- 1- Adhesive to adhesives such as cement and moisture-proof materials (for fixing ceramic tiles or mosaic tiles) or with silicone and epoxy for glass panels.
- 2- Some mural works may require supports from metal frames to be fixed in the wall to carry the mural or be part of the plastic work, especially if it has a sculptural formation as in Figure (21) a sculptural glass mural by the coastas artist.
- 3- In some mural works he designs network systems of cables to carry the forming parts of the wall

2- Contemporary trends in wall formation:

The classifications of the murals varied according to the nature of their employment (internally or externally), or according to the architectural function or the architectural context (spatial space), and what the research can add is the classification of the murals according to the plastic trends, constituents and technical determinants. The figure shows the classification of the murals according to the plastic structure.



3- Analytical study of the relationship between mural design and technical and material determinants:

The architectural context imposes its considerations and requirements on the formative aspect of the architectural mural, especially if it is associated with public places and service facilities, and each has its context, then we find that there are some spatial contexts that assume a specific nature of a material and impose the technique used in shaping, and given that one of the research objectives is to combine techniques between glass and ceramics for what they have of rich, differentiated and complementary artistic values, as they combine transparency and opacity, between bright glossy and dark matte, so some similar and different techniques between the two materials of glass and ceramics have been summarized for the possibility of their merging between them.

Analysis of murals at airports, train stations and metro stations:

Perhaps the most public places employing wall art with porcelain and glass are the airports and train stations around the world so that we can say that wall art has become crowned property of train stations, especially tunnel stations, and this may be due to the nature of the materials and their resistance to many natural factors such as humidity and pressure and are characterized by an average life but it is very long compared to other materials. The following are examples of which the two studies were keen to reflect the great diversity in dealing with techniques and methods in the plastic treatment of the mural as well as the topics that are usually related to the cultural and political contexts.

The third axis: the applied study:

Design ideas went in one of two directions through technical and raw determinants, the first direction depends on photography. The mural photography should be designed using one of the following techniques: Water jet technology, mosaic, or digital printing. As for the second trend, it depended on interactivity in design, for which it was assumed an approach determined by it, which we will discuss in detail later.

• The first trend: mural photography: Murals with digital printing technology:

One of the most important features of this technique is the great diversity in the unlimited plastic possibilities in the two dimensions at the level of shape and color, which gives the designer a wide scope for creativity and expression of different ideas and usually distinguishes them by the color formation of the mural, which is the main tool for expression in printed walls in both ceramics and glass.



Both designs of wall covering of the front of the luggage area and the receipt of airline tickets at one of the airports in the southern region of the Kingdom of Saudi Arabia.

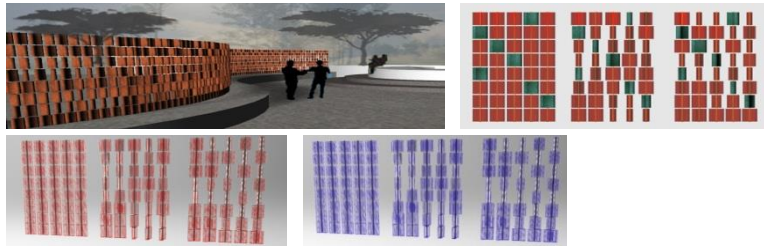


Suggested materials: 1- 60 * 60 cm ceramic tiles with matt jaggy coating applied to the decoration with direct digital printing technology.

2- Glass panels size 120 * 70 cm, thickness of 12 mm. Paint is applied on one of the glass layers of the proposed raw materials

• **The second trend: Interactive mural: (change in shape and background)**

The design was based on the use of a module with a fixed shape and rotating around its axis, thus resulting in a change in the shape of the unit and the void resulting from the juxtaposition of the units, and the combination of porcelain and glass materials was also possible.



Interactive mural design (chromatography):

The idea was based on the use of the cube and its features in the possibility of using the four faces to apply different colors to each face with the possibility of rotating around the axis, thus changing the color. The choice of the color group is related to the proposed context for employing the mural, which is widely considered suitable for public gardens and places for mental games in the gardens, as it gives the attendants enthusiasm and group interaction.



Results:

The combination of glass and ceramic walls is considered as one of the alternatives in coordinating the interior spaces of public places such as airports, train and metro stations, as well as open places such as public parks.

- The plastic richness in the design of murals, in porcelain and glass, for public places.
- Determine the most important design considerations that the designer must take into account in the wall formation of glass and ceramics and their effect on the mutual relationship between the design of the mural, the technique, the materials used and the proposed context for implementation.

Recommendations:

- Supporting cooperation between different disciplines (ceramics and glass) at the level of scientific research, academic work and student projects, which has an effective impact on the plastic enrichment of internal and public spaces and reflects the richness that exists in every material through the diversity of materials and their different plastic values.
- The trend towards interactive murals, the interactive process that takes place between the user and the mural work manually or automatically generates a kind of joy and interaction in the recipient.

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