

## **The technique to glass assembly by the conjunctive molding dalle-de-verre and its design in mural painting**

**Dr. Phoebe Moheb**

**Instructor, Department of Photography, Mural Painting Division, Faculty of Fine Arts - Mansoura University**

[phoebeyoussif@hotmail.com](mailto:phoebeyoussif@hotmail.com)

### **The role of glass and its relationship to the concept of mural painting and architecture:**

The glass was associated with the art of mural painting in many ancient and contemporary artistic eras, through the windows and openings of buildings and architecture, especially places of worship, which usually need lighting of a special nature such as natural lighting, so this glass was like that window. That connects the interior with the outside by employing as a special wall painting adorned with the technique assembly with dalle de verre, in order to satisfy the needs of those architectural buildings functionally and constructively and in planning.

### **The trends Schools and artistic of glass in mural painting:**

Since the beginning of the twentieth century, a new trend appeared with disappearance of the religious role, and rising of the role of science and art. The creation of new styles, hence the appearance of artists working in the media arts and also residing in the field of glass. In addition, designs by artists in the field of glass appeared and its connection with the art of mural painting, creative artists in the field of architectural sculpture, and from, innovations material of three-dimensional glass with mural painting, and the use of stained glass in many new facilities.

### **The technique of dalle-de-verre:**

It is a technique used by cutting blocks of colored glass (slab glass) or using bonds of assembling glass blocks. It is a type of glass slabs, usually about 25 mm (about one inch) thick of concrete and a resin material (epoxy resin), as a concrete material for interlock. It can be used in surfaces decoration. This technique appeared as a result of the presence of some problems in the durability of concrete. Therefore, resin and epoxy materials were added as a binder to reinforce the concrete.

### **The aesthetic elements of the dalle de verre in design of mural painting:**

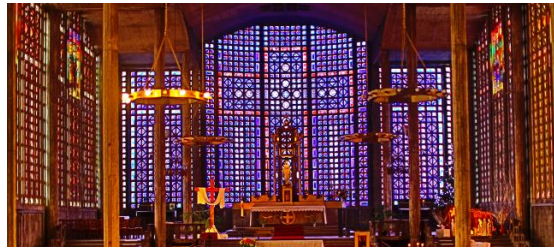
The thick glass tiles used in the technique dalle-de-verre, formed to suit design situation, whether by trimming or breaking them, give more luster, aesthetics and light refractions when faced with natural lighting.

When assembling and cutting blocks of glass tiles, they give off colored light emissions. Glass tiles have strength and aesthetic effects, and they give a moving light density to their thickness and patterns. The used glass has a lower optical density than the technique dalle de verre, which has a higher optical density.

### **The relationship of mural painting with technique dalle de verre:**

The star of technique dalle-de-verre in the workshops L'art Scare in France in 1919 AD, by led Maurice Denis (1870-1943). The work he carried out in the Church of Notre-Dame de Reïnse, it was carried out by Maurice Denis - designed by Auguste Perret and this work in which he

used implementation color, the use of color in religious meanings instead of topic religious and their formulation as abstract subjects as in (Figure 1) has been implemented by many artists, and has spread and developed in many countries around the world, such as Britain, United States of America, and others.



(Figure 1)  
Work in Notre-Dame de Rence, by Maurice Denis - designed by Auguste Perret

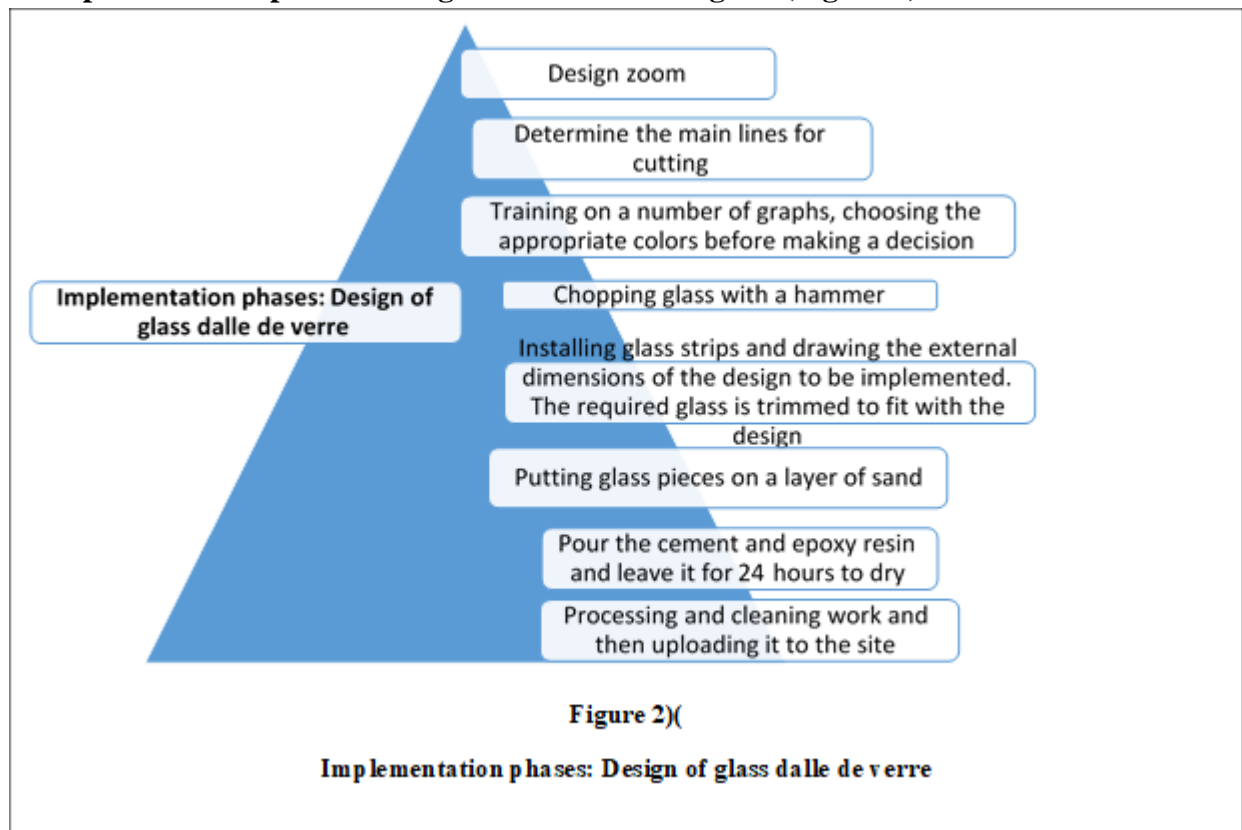
After the Second World War, this technique was widely spread, it is the pioneer Jean Barillet, Jacques Duval and Gabrielle Loire, Henri Matisse, Fernand Leger, Eorge Braque, George Rouault, Jean Bazaine, Alfred Manessier, Marc Chagall and George Devallieres and they all worked on producing dalle de verre designs.

**The first: Materials, tools and stages of implementation of the dalle de verre technique:**

**1 -Materials and tools:**

This technique requires glass tile sheets from 20 cm (7.9 in) to 30 cm (12 in) square or rectangular, and usually up to 3 cm (1.2 in) thick. It is either broken with a carbide hammer or cut with a water-cooled diamond blade as per the design lines shapes.

**2- Implementation phases: Design of dalle de verre glass (Figure 2)**



- The selected design is drawn, then the pattern required for each piece of the design is prepared.
- Preparation Patron to cut the glass required in the design. If the glass panels are of a large size, this requires cutting the main lines with an electric water saw. Then each piece is cut more precisely with a hammer, with precision determining its shape using a slicing machine (fixed to a wooden block). Unlike lead stained glass, the texture of the glass and the hardness of each tile determine the final shape. One of the advantages of this technique when cutting is that the resulting cutting edges or shapes and their faces increase the effects of refraction and reflection on the surface of the glass.
- After the completion of the cutting, the work frame is prepared, the complete design is placed, the pieces are placed on a layer of sand, surrounded by a wooden frame of the required work size, and a layer of mud is placed and installed over each piece of glass so that the epoxy resin does not stick to the surface of the glass while casting, then cement and epoxy resin are poured in the gaps between glass pieces and left to dry, it usually requires about 24 hours to harden. When the epoxy is hardened and cured, the visible surface is cleaned well, then the visible glass faces are cleaned and the resulting solid plate can be moved, combined or hung as needed, and then the work is lifted on site.

### **The second: The alternatives and solutions to the design problems of the technique dalle de verre in mural painting:**

- When designing glass dalle-de-verre, accuracy, organization and training are taken into account when designing the appropriate design. A series of small designs are made with pencils, sketches, and quick drawings with a correct scale. The initial design is made on paper sketches with plans to help modify or develop the idea by placing glass pieces. Taking into account the difficulty of modifying it, the design must be compatible with the nature of the building, taking into account the network of the connecting material Glass in design with this technology, it is a part that cannot be separated.
- Notice the design that is inappropriate, complex, or difficult to implement, and avoid excessive design space. The required areas must be taken into consideration in all design stages.
- Taking into account the shapes of the glass pieces, the damaged parts, and taking into account the use of sanding in the design, as it can contribute to cutting the glass inappropriately.
- The role of the background is important and must be studied clearly with shapes and colors. Focusing on directions and curves and their relationship to the visual vision of spaces in design.
- Seeing the design direction with a background view that is clearly linked to the topic.
- Developing counter shapes and design constraints, study the maximum void and how to visualize it on the whole surface or in a specific manner and the void in the space.
- Study the visual vision of a design as being just a vacuum or transparent glass. Taking into account thinking about design and technical problems that are difficult to modify in the design, and from the drawing scale.

### **1 -Utilizing the aesthetic values of the dalle de verre technique in reviving the artistic heritage:**

The technique of dalle de verre had an important role in rehabilitating and employing the glass murals that were lost, especially after the First World War. Attention was paid to the restoration of old paintings, such as what happened in the windows of Remi's cathedral, and there were

studios that moved away and took care of the responsibility of restoring old paintings with contemporary paintings such as the Church of Saint Rim and the Cathedral of Reims after the demolition, as a result of the bombing of the First World War.

**2 -The role of dalle de verre technique in reviving the aesthetic problems of architecture:**

Artworks appeared for the first time in France without religious themes within religious buildings by Alfred Manessier (1911-1993), which reflects a variety of tones, such as cold blue in the center of the design. The warm red color is used and the edges design of eight shapes of della de verre windows. 1959 in the dome of the Crypt of Essen Cathedral. In 1948-52 he produced seven windows for the "Church of Les Breseux" (Doubs), a small country church dating back to the late 18th century. The design was implemented by Manessier.

Dom Charles Norris implemented the eastern window in the Church of the Blessed Sacrament in 1965 (Fig. 3), and several windows were executed in Backfast Abbey, one of the most famous examples in England. Its windows were all made in the 1960s, which went on to make windows for many other Catholic churches across the UK.

One of the most important works in which he made use of dalle de verre glass designs, and the use of concrete-streaked walls was in the first Presbyterian Church, Stanford, Connecticut, in the United States 1956-1957 (Figure 4). Its work was done by Gabriel Loire (1904-96).



Figure 4( First Presbyterian Church, Stanford, Connecticut, built 1956-1957 Gabriel Loire,in



Figure No. 3( The eastern window in the Church of the Blessed Sacrament. 1965 at the back of Backfast Abbey, England. Performed by Dom Charles Norris

**3 -The role of design in glass solutions using dalle de verre technology in space:**

Among the artists who tried to replace the void in the building through glass designs Georgy Kepes (1906-2001), by glass designing dalle-de-verre in Saint Mary's Cathedral, San Francisco in 1970, the artwork can replace the void of the surrounding environment and spaces and use it in the work of design, for example Suzy Hendrix worked in the health center of the Church and also benefited from the business to benefit from the surrounding environment

**The artistic impact of glass design dalle-de-verre on mural painting:**

**1 -The artistic impact of the use of color in the design glass technique dalle - de verre in mural painting:**

One of the main factors that affect color is the optical properties of texture. Transparent glass differs in its texture (visually) from frosted glass, with the study of the surface grain size of the material. The use of thicker glass produces deeper color effects than tinted glass that comes from traditional lead, especially when illuminated by bright natural light or artificial light. Color

has an important role in describing the artistic vision, especially with the excess diversity determined by the various shades of color for a material such as glass, so strong colors can create a specific void, so the color is related to the designs of the space, so different effects of colors arise, as it happens due to the presence of more attractive shades of colors than other colors and this creates homogeneity that catches the eye attention.

## **2 -The artistic impact of the Tactile on the surface of the glass in the glass design executed by the technique of dalle de verre in mural painting:**

There are two types of touches, they are physical contact and optical contact, the physical contact is real contact on the surface of the glass that can be carried out during production with prominent touches and engulfed in the molding mold or after it, by mechanical methods or by drilling and sanding, and optical contacts are contact arising as a result of a change in the appearance of the surface by color surface treatments. One of the most famous artists to use balance in design to color and texture is Georges Rouault.

## **3 -The impact artistic of calligraphy and its role in the design of glass by technique of dalle - de verre in mural painting:**

The role of the effective line is determined through the different proportions of lines or surfaces and volumes with the study of the golden sector and the proportionality of the coordinated structural triangle, its construction and contrast. The use of calligraphy has emerged as the rest of the design elements, as in the window of the city hall of Chartres, executed by Jacques Loire. Also from the artists who benefited from the feature of calligraphy Jean-Jacques Duval Short Hills, New Jersey, and in parallel, Held's (1928-2005) and David Wilson's interaction with the architecture and density of fine lines in the harmony of glass, we find the intersection of thin lines. Contrasted with the bonding material network is the mainstay of the design as lines within the boundaries of the painting or the space with the design elements. The bonding material can change its color to black or any degree by means of colored materials. It does not only have a structural role, but it has a role as part of the predominance of lighting.

## **4 -The artistic impact of using light and shadows in the design of glass dalle - de verre in mural painting:**

The effect of light interference and the path and direction of light are major factors in designing with meshes of the bonding material and colored lines as brightness or luster through the glass. Tunes have different shades from maximum shade to extreme light.

Analytical studies of the values of light and darkness and their potential for composition and expression are a highly sensitive means of expression, so it became a contemporary trend, especially in France, as developed by Henri Guerin and Job Guevel, an innovation of light in the architectural unit, and he moved in a close relationship with design with color modes with the design. Contrast was used as a constructive element in the design as if it were an important element, for example in the Church of San, focusing on colored light moving through the visual play of shapes and color.

### **5 -The artistic impact and the role of formation in the design of glass by technique dalle - de verre in mural painting:**

The composition takes into account all the design elements such as texture, color, rhythm and expressive shapes such as light and darkness, color and body, shape, location, dimension, proximity, movement, silence indicating and has set a task for itself, to take a closed space with specific dimensions and give infinite dimensions such as the Church of the Rosary in Medina Vince the chapel at Venice designed by Henri Matisse.(1954-1869)

And taking into account the proportions of the space in which the composition is made, for example, the exploitation of the boundaries of the space in the design, the window of glass, the window of Johann Thorne Brikker, in St. George, Cologne (Germany), by Jean Bazaine, John Thorne Becker, and Johan Thorn Prikker. The artists took advantage of the design relationship with the space frame, what he did Robert Pinar of Holy Cross Abbey Church in New York and California, George Rouault (1871-1958) designed windows in Assy. They excelled in the relationship of design to composition, but he never made the glass itself.

### **6 -The artistic impact of the shape in the design of the glass by dalle - de verre technique in the mural painting:**

Exercising shapes to develop the idea abstractly. The four different directions of the three shapes are square, triangle and circle. The nature of the square, the nature of the triangle is tilted, and the nature of the circle is circular. Focusing on the circle as a shape produces a strong sense of it, enhanced by movements when using the square in the design, gives a movement of tension from every corner to the angle, Carlo Roccella analyzed the shapes in his work.

### **7 -The artistic impact of the design by exploiting the reflections of the glass executed by technique of dalle - de verre in the mural painting:**

The reflection of light is used in the designs of the dalle de verre glass, and the lighting falling on the surface of the glass varies between natural and artificial. Natural lighting penetrates into the interior space through windows overlooking the outside or overlooking the outside, but industrial lighting passes from the interior space or by shining light on the work itself.

One of the advantages of glass is its familiar transparency, as it creates a change in the natural scene, gives the reflection optical flexibility in the interior design to provide for a number of colors and shades, and helps to improve the cooling system, and improve the comfort of residents from inside the building.

The visual difference in the texture of the glass is due to several main factors of the extent of reflection or absorption of light, there is a difference between the method of absorption and reflection of light from a rough surface and a smooth surface, and this feature was exploited by Gabriel Lowell, who worked at the Church of Saint-Lazare de Levis, France, by Gabriel loirle.

### **8 -The artistic impact of refraction in glass design of dalle - de verre in mural painting:**

The speed of light in a space or vacuum is greater than its speed in any physical medium in the building from the inside, which results in a faster reflection from outside the building than from inside it, and from the glass blocks used in the dalle de verre technique and the glass panels used about 20 cm, which is what distinguishes it for the multiple occurrence of reflection, which helps on the occurrence of more reflection and multiple lighting, which gives the aesthetic

character of the artistic work while highlighting the network of the connecting material that distinguishes this technique, taking into account the colors and lines, the refraction of light on the surface of the glass is the direction of shining the light from the outside to the inside of the building, this technique activates the reflection of light on the surface of the glass.

Manessier Alfred in the cathedral of Fribourg in Fribourg, Switzerland, between 1976 and 1988, this aesthetic characteristic of the bulk glass surface was exploited, by making use of the refraction of light by making use of the design with different shades of color with the presence of the space that contributes to the multiplicity of refraction, which diffuses the glass tones. In a larger number that contributes to highlighting the artistic work.

In that period, new models appeared. The technique, dalle-de-verre Alfred Manessier, as a feminine crypt in Essen anessier's crypt at Essen. Pieces of glass, repeatedly refracted at the edges to enhance refraction, are placed in a concrete or epoxy grid. Refraction occurs with the presence of the bonding material network and the wall barriers, which helps to repeat the light at the edges and take advantage of the use of the building wall to highlight the aesthetic side of the design. Refraction occurs as a result of the interference of light and results from the interference strengthening in the intensity of light in some places and the lack of light intensity in other places. Design of reflections and glass colors by Carlo Roccella.

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