

Technical Employment of Cement Paste in Contemporary Mural Painting

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Abstract:

Mural art has been associated since ancient times with the human conscience and its expression of its secrets, fears and motives. It was the only means by which a person sought shelter and recorded his victories and the events of his daily life. The primitive man used the yellow color to paint artistic paintings on the walls of caves; This ochre or yellow color is extracted from hematite mixed with clay, and this explains the importance of the material in mural painting since the dawn of history.

The materials differ among themselves in terms of their nature and plastic capabilities. Clay is different from wood, metal, glass and other materials that can be used in the implementation of the mural. The nature of the material is determined according to the artistic design and the performing style of the artist; Who deals with material in multiple ways and works on experimenting and integrating many materials in his desire to reach the optimum processing of his artwork.

Cement paste is one of the old materials that the artist resorted to in the treatment and restoration of mosaic murals, but the modern artist began to reuse this technique, but with a contemporary vision, and worked on searching for new materials derived from cement to be inserted into his mural and mixing them with materials and chemical compositions that give him the appropriate thickness and viscosity. The paste is like acrylic paste that is used in modern murals, and Cyttox paste, which is part of the artwork or can be used as an adhesive for mosaic cubes, as well as cement grout that is used in restoration, it was used by the contemporary muralist in the modern mosaic painting.

Research problem:

The problem of the research is to clarify how the optimal use of cement paste in mural painting, and the extent of the development of its functional plastic capabilities that added to mural painting works having the spirit of modernity and contemporary, in addition to achieving aesthetic and economic goals and helping the artist to complete his artwork in huge areas in less time, while ensuring resistance, these doughs are subjected to various environmental and atmospheric factors.

• Definition of cement material:

Hydraulic (*) is the hydraulic bonding material used in the formation of mortar and concrete. It is also the soft bonding material that hardens and hardens, thus having cohesive and adhesive properties in the presence of water, which makes it able to bind the components of concrete to each other, and the most important use of cement is mortar and concrete, where it binds

synthetic or natural materials to form strong building materials that are resistant to normal environmental influences.

Cement consists of a mixture of several materials and elements, including limestone for extracting lime, clay for extracting silica and bauxite, and mudstone consisting of iron oxides, bauxite and sand.

Eight basic elements are involved in the formation and manufacture of cement, namely (calcium) which is obtained from limestone, (silicates) which is taken from sand or clay, (alumina) which can be extracted from iron ore, magnesium, and iron oxide is used as a solvent to reduce temperature resulting from chemical reactions. Cement also consists of calcium sulfate and sulfur trioxide, in addition to 1% of alkaline or base materials.

Cement types:

There are several types of cement, up to 27 types, taking their name from the purpose of their use, but their basic components remain the same, even if their percentage varies from one type to another. The most important of these types are:

1. Ordinary Portland cement.
2. Rapid hardening Portland cement.
3. Low-temperature Portland cement.
4. White Portland cement (mixed with water, color oxides or acrylic colors).
5. Salt and sulfate resistant cement.
6. Alumina cement.

The use of cement in mural painting:

It is used in contemporary mural painting, as it is applied to large areas and flats, and it has been classified as mortar of various colors that serve as a colored wall surface.

In the past, cement or concrete was used on huge areas, then the artwork (mosaic mural) was applied to them, mainly on walls. It was used to paste the artwork on the surface.

The industrial development in the modern era had the greatest impact on mural photography, as modern materials helped the muralist to implement his mural works in a manner that kept pace with the times, and then easily and freely accomplished, so the muralist used modern cement pastes (such as acrylic, ctox H, poly grout) as modern materials that reflect the vision and thought of the era.

First: Acrylic Paste:

“Ancient humans used Natural Resin as glues and adhesives for thousands of years, such as (starch and cellulose), and resin was used in ancient Egypt as an adhesive, as well as in mummification. The ancient Egyptians also developed pastes based on starch to bind papyrus paper to clothing and to paste a bare-like substance made of sintered gypsum.

As for synthetic resins, they include a wide range of products that the artist can use in his artworks. In 1880 AD, the Swiss chemist George Kahlbaum carried out the first experiments in which acrylic resin was used.

Acrylic is manufactured from thermoplastic materials, which are materials produced by polymerization, and they are the most prevalent in various industrial processes, due to their

hardening upon cooling and heat plasticizing without any change in their chemical composition, making them reconfigurable many times. By molding methods, acrylic polymers are prepared from (ethylene) and (propylene) resulting from the distillation of petroleum crude.

Acrylic physical properties:

1. Hardness: The modified varieties of acrylic are characterized by resistance to shock, as they are modified using a substance (butadiene) (***) , but this affects the degree of transparency, but it resists weather conditions better.
2. Electrical properties: Acrylic is a good electrical insulator.
3. Stability: Acrylic can be exposed to various weather conditions and sunlight for years without changing.
4. Relative Density: The specific density of acrylic is about 1.8, which means that it has a heavier texture than water.
5. Weather conditions: Acrylic can withstand changes in the atmosphere for a long time, and does not cause any changes in its physical properties. It is also poorly absorbent of moisture. Acrylic has a low melting temperature ranging between (71°C to 93°C) approximately. At low temperatures, the acrylic polymer freezes in the form of bright, colorless crystals.

Chemical properties of acrylic:

The field of acrylic contains many products that consist of stable, dense chemical molecules called polymer, and the field of polymers is considered one of the important fields in the modern era, and the word polymer is a Latin word consisting of two parts (Poly) meaning multiple, and (Mer) meaning part, i.e. it means multipart.

Chemically, polymers are classified into organic and inorganic. An organic polymer is one that is prepared from an organic basis, such as various waxes and others. The inorganic polymer is prepared from an inorganic basis such as silicone and acrylic.

Among the chemical properties of acrylic is that it is not affected by weak acids or alkalis, and it dissolves easily in chlorinated hydrocarbon, and it is not affected by a large number of degreasers, detergents, liquids of mineral acids, and aliphatic hydrocarbons.

Acrylic features:

Acrylic colors are not like any other color, but they have connections with all other colors, as most colors with water media contain one color; It is a pigment (dye) that has the same quality, brilliance, sustainability, and care of manufacture, and the essential and fundamental difference between one color and another is not the pigment, but in the bonding material. Therefore, to know how to use acrylic, we must understand the nature of the bonds, and then we will understand half of the acrylic material, as the bonding material in particular determines, the nature and characteristics of this technology, as the binder plays a role in the quality of performance and speed of drying, as well as the type of solvents and varnishes that can be used with it.

Acrylic Thinners and Thickeners:

They are media that act as links, and can be described as additives of color to make it flowy, dry or thick to varying degrees, to produce different results for a particular type of work, namely:

1. Acrylic Liquid.
2. Acrylic Gloss Medium.
3. Acrylic Matt Medium.
4. Acrylic Gel.
5. Acrylic putty (paste or putty).

The contemporary muralist uses acrylic paste of varying thicknesses, according to the requirements of his artwork.

Acrylic Texture Paste:

Acrylic putty is known as Templin, and it comes in different types and densities, although water can be added to it without losing its cohesion, and it is used to make a thick paste.

How to prepare the thick paste: (Impasto)

1. To prepare acrylic emulsion, acrylic powder is mixed with titanium white, or mixed with calcium carbonate and diluted with a little water as required.
2. Then use the glossy or matte thinner as desired to dilute and dissolve the paste.
3. To increase the cohesion strength, sand and powder (marble powder) can be added to strengthen it.

And then the texture turns into what is known as (material modeling), which means the ideal texture of the material.

Acrylic Gesso:

It is a white material with a thick porous texture, as a preparatory surface for acrylic colors, oil colors or any other colors, and it is used in any number of layers according to the required point, and it may have a fine or coarse sandy texture.

One of the information that must be emphasized is that acrylic gesso is not the same as white acrylic (plastic), although they have the same appearance, acrylic gesso is more porous than white.

Use of acrylic paste:

Although the technique of mixing dough with mosaic was used since ancient times, it has developed today with the development and increase of colors, as in the past it was limited to placing mortar only in its natural color, but this technique developed and became containing white cement, color oxides and water, but in the old time it relied on Gravel, sand and cement without the use of color oxides.

There are two ways to make acrylic pastes:

1. The first method: Kneading the white cement with water and then applying it to the desired area, then coloring it with acrylic colors using the brush, water and colors, so the paste absorbs the color.
2. The second method: It is the same as the previous steps, but it differs in that the color is added with water and cement and then placed directly on the surface without the need for coloring again, and glue can also be added to the dough.

Second: Cytox-H paste:

It is an adhesive paste for ceramics, used for multiple purposes based on special resinous materials. It is also possible to stick mosaics or stones to wooden surfaces by using this paste by spreading it on the wooden surface and then it can be worked on.

It is also known as a ready-to-use and easy-to-apply material as it is similar to cement mortar, and it can be mixed with cement and used to treat wall works and internal and external wall surfaces before painting works - and after mixing with cement and sand.

How to use Cytox H in mural imaging:

- Surfaces can be dry or wet, but they must be clean and free of dust, loose parts, oil, fat and any foreign matter.

The stox H paste is mixed with cement in a ratio of 1: 1, then water is added until it reaches the appropriate consistency, then it is poured into molds or wooden beams of the required size and it is worked on, whether it is wet or dry according to the technical work plan, as a high-efficiency mortar and as part of wall artwork and restoration work.

- In the case of mixing the paste (Cytox H) with cement and the plan is to implement the work on a wet surface, the mixture must be used in a period not exceeding 6-10 hours at the most.

Third: cement grout paste:

Grout: It is a highly viscous material that can easily flow into cracks in walls or between ceramic and stone tiles. It is also based on cement in its composition, it is made of cement, water, sand and some additives, and there are different types of grout such as resin and epoxy. It is a cement-based adhesive, and it is characterized by high resistance, as it is used to repair cracks, defects of concrete and places of water leakage.

It can be used in contemporary mural painting treatments after mixing it with white cement and colors or chromatic oxides, and the artist prepares the paste consisting of grout, cement, water and oxide for each part separately, in order to control the shades of colors required by the artwork.

The following things must be kept in mind when using grout materials:

1. Ensure the cleanliness of the area or surface to be filled.
2. Using air pressure to clean the area from dust, as well as using a water cannon in case of grease or oil presence. Water is sometimes replaced with grease cleaning materials.
3. The use of mechanical mixing in the case of processing large quantities because it is a quick-drying and cracking material.
4. Pouring from one direction and filling the voids once and not in stages.
5. It is possible to re-color the surface of the dough after it dries, because it may sometimes be subjected to fading and tarnishing after drying.

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