
PRODUCTION AN EXTERNAL CLADDING UNITS USING RUBBER MOLD AND POLYESTER

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Abstract

The works of the cladding are considered heritage works. Ancient civilizations were characterized by the decoration of the buildings with a variety of natural materials, especially palaces and houses of worship. All types of cladding like tiles & Panels or decorative units are used to decorate architectural facades by using natural and industrial raw materials, whether in the whole building or parts thereof. Modern technologies, equipment, materials and technologies have enabled the development of the artificial materials. Among these technologies is the manufacture of rubber molds. This industry offers many economic and industrial advantages that can be utilized in the production of cladding units. The manufacture of molds depends on the manufacture of the mold and the extraction of the formulations through the material inside it. Silicone rubber is one of the best raw materials used in the manufacture of molds. The substrates are made of polyester reinforced with fiber glass, and other industrial features offered by this technique can give effects similar to the appearance of natural materials such as stones, marble and the effects of various metals. The process of production depends on many materials and tools through successive stages to reach the final product and follow some instructions when dealing with the materials used, so as not to be subjected to the product of many manufacturing defects, which may appear during the stages of manufacturing, which are done manually. The quality of the production is depending on the craftsmanship, experience and aesthetics of these industries.

Keywords

Production, External Cladding, Rubber Mold, Polyester.

Introduction

The cladding works are considered from the heritage works, as the ancient civilizations were distinguished by beautifying the buildings with a variety of designs from natural cladding materials, especially palaces and places of worship.

The cladding of all kinds is considered from the applied works that are used in the form of tiles, fillings or as cosmetic units in the treatment of architectural facades using natural and industrial materials, whether in the whole building or parts of it. Modern technology in terms of equipment, materials and technologies has enabled the development of the coating industry, and among these technologies the manufacture of rubber molds. This industry provides many economic and industrial advantages that can be used in the production of outdoor cladding units. The manufacture of molds depends on the manufacture of the mold and the extraction of copies through the material formed inside it. Silicon elastomer is one of the best materials used in the manufacture of molds, as it allows you to produce the required number of copies with high quality. As for the clones, they are made of polyester reinforced with glass fibers (fiberglass). Another industrial advantage provided by this technology is the possibility of

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giving effects similar to the appearance of natural materials such as stones, marble, and the effects of various metals. The production process depends on many materials and tools through successive stages to reach the final product with following some instructions when dealing with materials | And so that the product is not exposed to many manufacturing defects, which may appear during the manufacturing stages, some of which are done manually, so that the quality of the work produced shows the craftsmanship, experience and aesthetic sense that characterizes these industries. Research problem: the need to develop traditional industries and keep pace with the times. The high prices of natural materials and the possibility of substituting them for alternative materials with a similar effect. How to produce high quality exterior cladding units while saving time and effort.

The cladding works are one of the works that gain uniqueness and value for buildings, as well as perform a utilitarian and aesthetic role, especially in its integration with the art of architecture. The cladding works are numerous, including: hayla, al-karez, cornices, and cladding tiles, and are considered as cosmetic units that complement the construction work, and their origins are due to religious considerations. Wall coverings are affected by a number of factors, including the function of the place and its appearance, especially when the cladding works are compatible with the style of the building, and it is also affected by the natural factors of the site (such as heat, rain, wind and humidity). The external cladding is that which is done on the outer surfaces of the mini, such as cladding the facades of buildings with various cosmetic units of carved designs, whether throughout the building or parts of it, and cladding works are carried out from natural cladding materials such as stones and rocks. As in the Egyptian, Greek and Roman civilizations, a form was also made from synthetic materials such as polyester and fiberglass.

The cosmetic units of all kinds are pre-fitted, that is, implemented in advance in the workshop or factory, and then transferred to the site to be installed in specific places in the building, by installing them above the facade and appear in the form of decorations on the facade or at the same level and become part of it, with the technological development, the production of cladding works has become used for many From industrial raw materials, in order to reduce the high cost of raw materials and natural materials, as they are considered alternative raw materials to natural raw materials and give an effect similar to those raw materials according to a specific technique that depends on the technology of the molds and the material formed within. In addition to saving time and effort compared to the time and effort expended in implementing these units of natural raw materials, the manufacture of molds is considered one of the industries that develop rapidly and are manufactured either mechanically or manually,

but still maintains the position of the handicraft and its mastery and the skill of the craftsman in producing the work in an elaborate and high manner. the quality.

The basis for the production of external cladding units is the production of rubber molds, due to its suitability in terms of good industrial properties for the production of artworks and reproductions, the variety of materials formed inside the molds, as well as the ease of producing the required number of copies. Silicone elastomer is one of the best materials used in the manufacture of molds due to its high efficiency in recording real details, and the ability to produce many copies of a single artwork without affecting the mold. This allows the ability to produce the required number of copies in the same shape and accuracy as the original. Many products used in cladding work are produced using rubber molds, including column molds, motifs, cornice molds, tiles molds and friezes and others

Silicone rubber molds have other natural advantages that make them the best in mold making, including:

- 1- Flexibility with good degree.
- 2- Resistance to deformation.
- 3- Withstand high temperatures.
- 4- Acid and alkali resistance.
- 5- Resistance to shrinkage.

Implementation of the silicone rubber mold The mold is the reciprocal of the origin and is responsible for producing clones through the casting and emptying processes to reach the required number of copies. It can also remain valid until it is needed to be used again. The process of implementing the silicone rubber mold depends on many tools and materials used, as well as on the skill of the craftsman in the implementation, starting from the preparation, molding and output of the final product:

The mold is manufactured to produce flat-back cladding units according to a specific manual technique that is done as follows:

- 1- The original form (form) shall be prepared and finished to ensure that there are no defects or impurities attached to it.
- 2- Forma should be insulated with appropriate insulation material (Vaseline or insulation wax) and in the appropriate quantity.
- 3- The form is surrounded by a suitable container to be installed and isolated and placed on a flat surface.
- 4- The silicone elastomer is mixed with the stiffener, stirred and mixed well.
- 5- Pour the mixture over the form until it is completely covered.

- 6- Leave to dry for 24 hours or more, depending on the temperature, in a dry, well-ventilated place.
- 7- The mold is slowly peeled off the original, finished and smoothed.
- 8- The mold is washed and dried well and to ensure that it is clear of any debris before use.

After completing the implementation of the mold, the required stains are executed by pouring the resin material inside it, polyester resin is one of the most popular resins used in the casting processes and the production of many cladding designs due to its good physical and industrial properties, including torque strength and moderation costs, as well as cohesion and hardness in degree Standard room temperature (20 ° C). Polyester is also characterized by the ability to give the effects of natural materials such as stones, marble and rocks, so that it gives its effect and appearance similar to those of natural materials, and it is available in the local markets. Polyester resin needs to add catalysts to be added to it in its first liquid form, which results in chemical heat upon reaction, after which the resin matures from the liquid state to the solid state, where it solidifies at room temperature, and once it solidifies it becomes permanently insoluble. Polyester resin is used in the production of many coating products. It can also be formed manually or automatically, and its external form depends on the raw materials applied in the manufacture, and the production technology used.

Raw materials and tools used in the production of the clone:

- 1- **Insulating material:** the insulator isolates the mold from the formed duplicate by using insulating wax so that the surfaces are painted with a brush until the surface of the mold is completely polished, or it is sprayed with insulating polyvinyl alcohol, or varnish and wax insulation.
- 2- **The gelcoat material:** it is the first soft layer, which is the approach to the paint layer, and usually the gelcoat is white or transparent, and it can be colored, based on a very concentrated polyester material. The gelcoat is painted on the surface of the copy to be poured or the template from which a copy is to be extracted, and left until it solidifies and takes the form of the form, the gelcoat paint is characterized by full coverage of the surface and the used glass fibers, as well as giving a smooth surface and a smooth colored layer at the same time, which gives the reproduction a good appearance.
- 3- **Polyester:** a resinous substance, which is a petroleum product, produced at a concentration of 60 to 65%, and is prepared by adding both a hardener, an accelerator, which is cobalt, and other materials that fill in the Filler material, and colored dyes, which are from metal oxides mixed with the resin at a ratio Up to 10%, depending on

the desired color. It is necessary to know the date of production and validity of the resin, its nature, type, manufacturing life, and the temperature required for it to harden inside the mold. Polyester is poured into the mold using a wide brush, with care during casting to show the fine details in the copy. When the cast resin reaches the gelatinous state, the parts of the mold are collected. A long brush is used to weld the parts of the copy from inside the mold.

- 4- **Hardener:** or hardener, which is a peroxide, has a specific standard ratio, the product spoils in the event of decrease and increase, so the hardener must be measured and calibrated, and it must be mixed well with polyester in a separate container, this is done by taking an appropriate amount of polyester and then adding the hardener And titrated with a standard scale, or with a standard dropper, then mixed with the resin for 10 minutes.
- 5- **Fiber Glass:** It is considered one of the best materials and materials used as reinforcing materials with polyester. The product gains the required bladder in addition to bearing the pressures and loads. The use of glass fibers varies in their shapes and densities, whether stacked in a random or mesh fabric, according to the required application. It is possible to put more than one layer of glass wool in the clone to achieve the required durability, especially in the work of exterior cladding exposed to various weather factors.

Results:

- 1- Elastomer silicone is one of the best materials used in the manufacture of molds.
- 2- The polyester resin reinforced with glass fibers has good properties that must be taken into account and used in exterior coatings.
- 3- Polyester is an alternative material that can replace the natural coating materials and be shaped by their appearance.
- 4- Some defects caused during work can be avoided through the correct method of use.
- 5- Avoiding the impact of raw materials on the environment, and following health guidelines while working.
- 6- Professional skill, experience and aesthetic taste control the quality of the works produced.

Recommendations:

- 1- Producing local industrial resins and improving their properties and impact on the environment.
- 2- Avoid bad and harmful materials from all the materials mentioned.

- 3- Writing the instructions, methods of use and expiry date for resins in general clearly on the packages.
- 4- Optimal economic use of all resin materials.
- 5- Conducting periodic maintenance after installation.

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