The use of glass non-woven fabrics with cobalt polyester fluids in the production of partition walls and floors with high Resistance properties

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Introduction:

There are many experiences about adding textile fibers to materials for the production of glass fibers reinforced plastics, or carbon fiber reinforced metals. The mechanical behavior of these mixtures depends on the addition of high strength fibers such as glass fibers to the work of ceilings and floors mainly on the ability of the relative stress ccapacities strain of the composite materials.

The vehicles are usually divided into two parts as follows:

- Compounds added to the mixture increase the ability to strain the textile fibers.
- Compounds in which textile fibers are used, the ability of which is greater than the ability to stress the mixture.

Statement of the problem

- The inefficiency of some types of ordinary concrete in bearing stress in special constructional and climatic conditions.
- Partition walls and floors are affected by stress, pressure and bending stresses during implementation.
- The high economic aspect in the production of concrete walls or floors.

Study Significance:

The importance of the research is evident in the following points:

- Producing dividing walls and floors using reinforced textile materials and Egyptian technology.
- Production of bending-resistant sections of glass fiber panels and cobalt polyester fluids, to ensure their suitability for casting as partition walls and floors.
- Shedding light on the economic aspects after the proposed production processes.

Research methodology:

- The research is based on the methods of practical application and statistical analysis.

Research objective:

- Forming green sheets of glass fibers and cobalt polyester fluids into the proposed units "Partition Walls and Floors".
- Making sections of glass fiber panels and cobalt polyester fluids to resist bending to ensure their suitability for casting as separating walls and floors.

Practical experiences

- In this study, the effect of different layers of glass fibers on stress was studied in the case of using different quantities of cobalt polyester fluids.

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- These experiments were carried out in a laboratory at the Textile Industries Division, Department of Industrial Education, Faculty of Education, Helwan University.
- All results were measured by the laboratories of the Housing and Building Research Center - affiliated to the National Research Center in Dokki.

Procedural steps for the research

Four sets of samples have been produced:
- The first group: (samples of 1 kg polyester, added to ..) (3, 6, 9 layers of glass fibers)
- The second group: (samples kg of polyester added to ..) (3, 6, 9 layers of glass fiber)
- The third group: (samples kg of polyester added to ..) (3, 6, 9 layers of glass fibers)

In this paper, hybrid polymer-based materials were prepared by manual casting and using a container made of Stainless Steel, where ½ of the specified amount of the liquid containing the cobalt polyester is placed in the floor of the container, and then we put non-woven glass fiber layers and then put on it the other half of the liquid contained in the cobalt polyester, and the mixture is being left for 60 minutes at a temperature of about 30° C, in order for the layers of glass fibers to be saturated with the liquid polyester- cobalt, and then hardened by the action of the hardener added to the liquid.

Research results:

(1 - 1) Effect of increasing the layers of glass fibers on the tensile stress in the samples.

From the statistical analysis of the results of the tensile stress test, the results shown in table (1) showed the increase in the stress fatigue of the sample (1 kg polyester / 6 layers of glass fibers) compared to other samples. This is due to the coverage of the entire sample area with the amount of polyesters internally and externally, which leads to an increase in the cohesion between the layers of glass fibers that make up the panels under study, and thus increase the tensile stress of the stresses affecting them.

(1-2) Effect of increasing the layers of glass fibers on pressure stress in samples.

From the statistical analysis of the results of the pressure stress test, the results shown in table (2) showed the high pressure stress of the sample (1 kg polyester / 3 layers of glass fibers) compared to other samples. This is due to the coverage of the entire sample area with the amount of polyesters internally and externally, which leads to an increase in the cohesion between the layers of glass fibers that make up the panels under study, and consequently, the pressure stress affecting them. While it does not mean increasing the layers of glass fibers to obtain better results, because it is possible to separate the layers of glass fibers and not to penetrate the polyesters into them.

(1-3) Effect of increasing the glass fiber layers on the bending stress in the samples.

From the statistical analysis of the results of the bending stress test, the results shown in table (3) showed that the bending stress height of the sample (1 kg polyester / 9 layers of glass fibers) compared to other samples. This is due to the covering of the entire sample area by the amount of polyesters externally in one part, which leads to an increase in the partial cohesion between

the layers of glass fibers that make up the panels under study, and thus the increase in the bending stress affecting them.

(1-4) Effect of increasing the layers of glass fibers on the samples hardness.

From the statistical analysis of the results of the hardness test, the results shown in table (4) showed the increase in the sample hardness (1 kg polyester / 9 glass fibers) compared to other samples. This is due to the covering of the entire sample area by the amount of the polyester externally, completely and partially internally, which leads to an increase in the cohesion between the layers of glass fibers that make up the panels under study, and consequently, the hardness of the affected influence.

Given all the samples and their components and all previous results:

- The researcher believes that the third sample in the third group (¼ kg cobalt polyester / 3 layers of glass fibers) is considered the best sample due to its great advantage in stress, pressure, bending and stiffness. Considering the less glass fiber and the less cobalt polyester. Therefore, it is considered the triangle economically sample.
- The researcher also believes that the third sample in the third group (¼ kg cobalt polyester / 9 layers of glass fibers) is the worst among all samples, as the amount of glass fibers is large and uneconomic while the small amount of cobalt polyester is never sufficient to achieve any chemical or Physical between it and the glass fibers.
- The researcher also believes that these four stresses, whose tests were measured, represent great importance in determining the extent of the need for separating walls and floors to achieve the best ones, as the stresses of the walls are sometimes less than the stresses of the floors.

Recommendations

• Studying the possibility of forming glass fiber panels and pre-prepared polyester fluids and forming them into sectors for manufacturing interior architecture components.
• A deeper study of the cohesion between glass fibers and polyester fluids to achieve the highest rates of joint action between them until the point of collapse.
• Increasing the efficiency of glass fibers and polyester fluids by transferring the joint work between it and concrete later.
• To study the use of other textile fibers as alternative to glass fibers, and the possibility of using them in the internal architecture of the facilities.
• Study the use of different resins with higher efficiency than cobalt polyester.

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