

# INCREASING ITS STRENGTH BY USING FIBER AND DISPERSE FILLERS IN THE COMPOSITION OF BUILDING GYPSUM

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## Abstract

Scientific and technical development in the field of construction envisages the use of new and effective construction materials with different characteristics and different functions. In this article, in order to improve the properties of construction gypsum, changes in its strength limits are studied by adding several types of fillers to alabaster.

**Keywords:** Gypsum, alabaster, filler, dispersion, composite, polyester fibre.

## Introduction

Long time during main construction materials - this oil, ceramics, steel, concrete and reinforced concrete was Scientific and technical and construction in the field development because of the 20th century second in half construction to practice new materials - composite construction materials intensive currently be done it started without materials present in the day industry, citizen and of residential complexes many objects construction done increase it is difficult. Composites to our lives come in ways and construction, energy, transport, electronics and other activities in the fields traditional construction materials occupy [1,3,7].

Composition materials - one in volume two, three and from him more than different are phase (substance) materials. They are on a macro scale of one gender, but on a micro-scale are heterogeneous. A few starts drinking of components rational union as a result of, given characteristic create new material will be, his feature initial to components applicable not, but that's it with together, that's it to each of the components characteristic individual characteristic save maybe the rest [4,8].

Usually, composites represent a single material base (matrix) reinforced with fibres, layers, and other material fillers with dispersed particles. In this case, the durability properties of both components are combined. By choosing the composition and properties of the filler and matrix, their ratio, and the direction of the filler, it is possible to obtain a material with a set of required operational and technological properties [9].

Two molecules of water have been calcium sulphated sedimentary rock - gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) and without water so-called gypsum anhydride stone ( $\text{CaSO}_4$ ) and some industry waste cook gypsum binders are taken. By default, it is shown that in the first type of gypsum work release of  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  in the composition the amount is 90%, for the second variety less than 65% didn't happen natural gypsum -stone is needed [9].



At a temperature of 150-170°C burned gypsum-stone feeling grind received product construction it is called gypsum [10].

Two molecules of water become calcium when the sulphate is heated at 65 °C, it is feature changes and contained water little by little lost and dehydrated starts In this gypsum - stone 1.5 molecules the water, half molecule watery to plaster becomes, the following reaction with is represented by:



Gypsum -stone at a temperature of 140-170°C a lot of the water lost, half juicy, fast hardener ( $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ ) to plaster becomes Such binder sometimes also called alabaster [5,11,12,13,14].

Construction gypsum in the air stiffening binder substance is the main raw material gypsum, ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) at 150-180°C burnt in the composition half molecule water has been calcium to sulfate ( $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ ). Twist and grind the way with is taken. Construction from gypsum construction details, moulds and items preparation in order to also plaster in their work is used.

### Materials and methods

We own to our construction of gypsum mechanic consistency feature increase the goal by doing we put of this for construction gypsum to the composition fibrous and dispersed fillers adding, hydraulic using a press (MI-200 device). to bend and to squeeze relative strength was studied.

### Plaster the normal thickness of the dough determination

Description. Normal thickness diameter of 5 cm, height of 10 cm was, brass cylinder when lifting inside gypsum dough when spread diameter 18 cm the that he showed it is said.

Plaster the normal thickness of the dough 200 g of gypsum in the determination example we got and 100-180 ml of water between water to try we start Then 120 ml of water when we add the necessary result, that is gypsum our dough is 178-186 mm spread Through this water/gypsum the ratio is  $120/200=0.60$  ha equal to the fact that was determined.

### Plaster the dough thickening period determination

Plaster of the dough thickening period in determining to water gypsum put from mixing vika to plaster dough 1 mm sunk into the surface until then was time, gypsum of the dough thickening period is called Plaster of the dough harden term Vika tool using is determined. This is a tool stanina, absorbed metal sterjen, his additional burden is imposed platform, tip cut conical brass folk, from a glass plate organize found [6-14].

Table 1. Hardening to the deadline looking technical requirements

Plaster type	Hardening term index	Hardening duration, min	
		beginning, less it's not	ending, many it's not
Quick hardenable	A	2	15
Average hardenable	B	6	30
Slow down hardenable	V	20	44



### Results and discussion

Composition construction of gypsum samples in preparation fibrous filler as polyester fibres, dispersed filler as while sanding from particles I used it. Samples preparation for 4x4x16 cm sized from the mould used (Fig. 1).



Figure 1. The dimensions are 4x4x16 cm has been mould appearance

a) First, 300 g of alabaster ( $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ ), 220 ml of water and 15 g of polyester fibres 60 seconds during mixed up liquid mass harvest will be done and to the mould one in the plane is put

b) A second example for 240 gr of alabaster ( $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ ) 60 gr of sand (dispersed particles) and 210 ml of water plus 60 seconds during mixed up one different mass harvest will be done. Mould second to the piece one flat by doing is put

c) The third sample to make in the amount of 300 gr alabaster ( $\text{CaSO}_4 \cdot 0.5\text{H}_2\text{O}$ ) and 220 ml of water for 60 seconds during mixed mould the third to the piece one flat by doing is put

Composite samples 24 hours after completely dry from freezing then on the MI 100 device or hydraulic in the compactor to bend has been strength is determined. Sample for special check 2 bottoms of detail support between the distance is 100 mm organize does

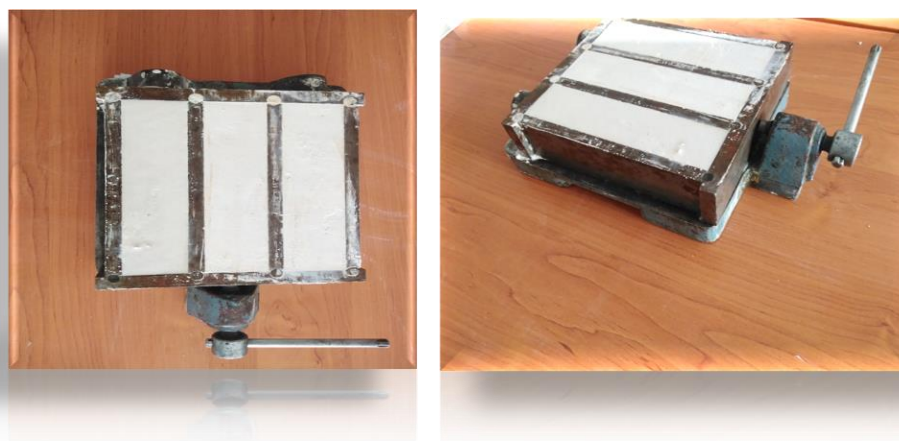


Figure 2. To the moulds placed composite of samples common appearance



To bend strength determination formula:

$$R_{to\ bend} = \frac{3 \cdot P \cdot l}{2 \cdot b \cdot h^2}$$

Table 4. Samples to bend and to squeeze have been strengths determined indicators

Indicators name	Samples			Average value
	a	b	c	
To bend consistency limit kgs/cm <sup>2</sup> · MPa	6.7	5.02	5.69	5.8
Indicators name	Samples			Average value
	a	b	c	
To squeeze consistency limit kgs/cm <sup>2</sup> · MPa	66.92	61.6	63.28	63.9



**Conclusions**

Experiments show that to the composition different fillers added composite alabaster samples to bend and to squeeze has been consistency borders alabaster to the sample relatively increased. Summary in place that's it to say should be construction industry and work in release complex of materials It is also economical to use raw as well material resource savings point of view in terms of useful and today's of the day important is a requirement.

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