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CALCULATION OF COMPOSITION AND PROPERTIES OF DISPERSED MATERIALS BASED ON BASALT COMPOSITION

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Abstract: For the development of the production of fiber concrete and concrete products based on waste, requirements are set for the efficiency and quality of construction work. In order to successfully implement these, it is necessary to achieve a reduction in total energy expenditure in materials and constructions, development of production, reduction of construction cost and labor, weight of buildings and structures, repair and their construction and operation.

Key words: Basalt stone, basalt fiber, basalt reinforcement, fiber concrete, cement, microsilica.

The presence of a large amount of portlandite Ca(ON)2 in concrete during the hardening process can have a negative effect on basalt fibers. Therefore, various active additives can be used to bind it: microsilica, metakaolin (thermally treated kaolin), ash slag. As a result of adding basalt fiber and active additives to concrete, its water absorption is also increased, so it is advisable to use special superplasticizers.

The composition of the concrete mixture based on basalt fiber and microsilica is presented in Table 1.

Table 1. Composition of concrete compositions with basalt fiber and microsilica

Raw material name	Size	Content without additives (T-0)	T-11 (micro)	T-12 (micro)	T-13 (micro)
Cement	kg	0,500	0,470	0,460	0,450
Sand	kg	1,500	1,500	1,500	1,500
Microsilica	kg	-	0,30	0,40	0,50
	%		6	8	10
Superplasticizer	kg	0,0015	0,0015	0,0015	0,0015
	%	0,5	0,5	0,5	0,5

For the preparation of samples, Ohangaron Portland cement was used as a dispersive additive - construction sand with a particle size of no more than 2.5 mm. The composition of 3 types of composites with more than 100% addition of Jizzakh basalt fibers as reinforcing fibers was calculated: 5 mm, 10 mm, and 15 mm basalt fiber samples. Concrete, including an additional component, increases the resistance to shock loads or spreading to the uniform outflow of water.

If the compressive strength of the tiles is 90% on a cold day and 70% on a hot day according to the compressive and bending strength of the concrete class, the product is allowed to be sold. 90% of the strength of this concrete composition is achieved after 10-11 days of hardening, and 70% of the design is achieved after 3-4 days. May vary slightly depending on curing conditions and cement quality.

The main function of basalt fiber is to provide plastic properties and prevent cracking during compression. Basalt concrete is used in various fields of modern construction projects. As a rule, the use of the material is economically effective with a relatively low increase in price when it is necessary to increase a number of properties. If a similar situation occurs, the composition of basalt concrete is very suitable.

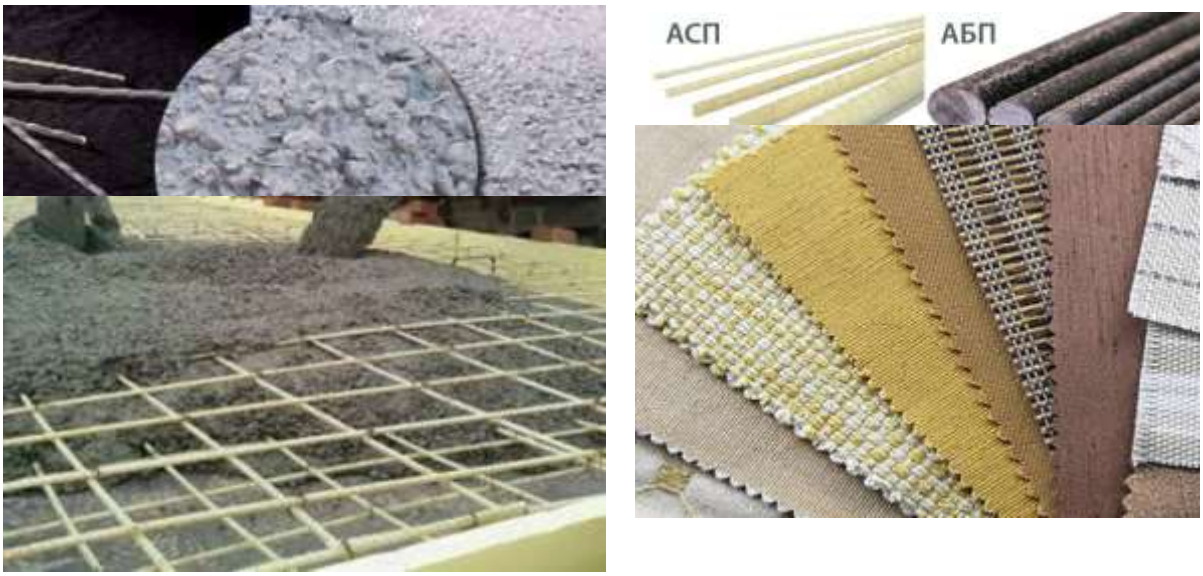

Figure 1. Appearance of samples.

Study of physical and mechanical parameters of concrete samples with basalt fibers 5 mm long.

Table 2 shows the 7-day compressive strength of samples with 5 mm basalt fiber added.

Table 2. 7-day compressive strength of samples with 5 mm added basalt fiber

Mechanical resistance of samples to compression				
Sample	Test 1	Test 2	Test 3	Average indicator
Control sample	185 kg/sm^2	185 kg/sm^2	190 kg/sm^2	186 kg/sm^2
Basalt fiber 1%	195 kg/sm^2	190 kg/sm^2	188 kg/sm^2	191 kg/sm^2

Basalt fiber 2%	200 kg/sm^2	205 kg/sm^2	195 kg/sm^2	200 kg/sm^2
Basalt fiber 3%	195 kg/sm^2	200 kg/sm^2	190 kg/sm^2	195 kg/sm^2

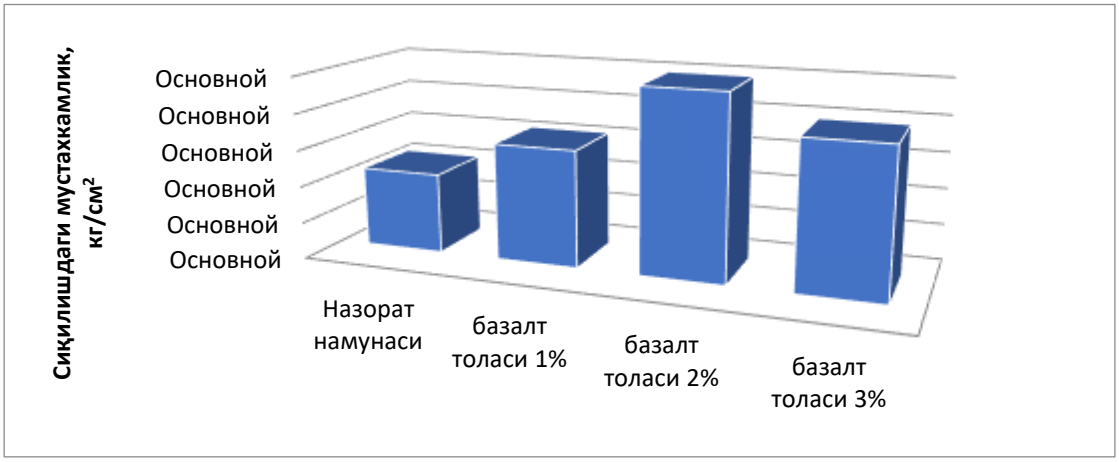

Figure 2. 7-day compressive change diagram of concrete samples with basalt fibers added 5 mm long. As it can be seen from our experiments, 2% and 3% of basalt fibers added to the cement mass of fibroconcrete with 5 mm long basalt fibers gave good results. As the optimal composition of basalt fiber-based fiber concrete, we selected fiber concrete with 2% shrinkage compared to 5 mm long cement mass.

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