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THE EFFECT OF FIBROTOLS ON THE PROPERTIES OF FINE-GRAINED CONCRETE

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Abstract
The article presents the level of research, composition and properties of fiber-based concrete. The main direction for improving the properties of concrete is the use of fiber fibers as an additive to concrete.

Keywords: cement, fiberglass, fiber-reinforced concrete, composition, properties, basalt fibers, strength, durability.

Introduction

In our republic, comprehensive measures are carried out to improve and develop the production of building materials, their economic efficiency at the modern stage depends on the comprehensive and rational use of local raw materials, the full use of waste that occurs in various industries [1].

Concrete made from cement or other inorganic binders is widely used in construction. These concretions are mainly mixed with water. The active organizers of concrete are cement and water, the reaction of which results in a monolithic cast cement stone that attaches filler particles. Cement and water are the active constituents of concrete: reactions between them result in a cement stone that binds filler particles to a monolithic monolith.

No chemical interaction occurs between cement, fibratola, and filler (other than silicate concretions obtained by autoclave processing). Therefore, fibratola and fillers are called inert objects. However, they affect the nature and composition of concrete, and this effect is assumed to be taken into account when designing the composition of concrete.

Fibrobeton, which is obtained when reinforcing fiber is added to the concrete structure, has high bending, load-bearing resistance indicators compared to conventional dispersing reinforced concrete. The main direction of strengthening the reinforced concrete structure with fibers is to increase the load-bearing capacity of the product and reduce the consumption of steel fittings. In addition, of all widely used fibers, polypropylene and Basalt fibers do not cause any problems in their use, they can be added at any stage of fiber reinforced concrete preparation.

The properties of the concrete matrix for strengthening fibrobeton depend on the structure of the composition. In this regard, in order to analyze these compositions and predict their behavior at different loads, it is necessary to study the composition of the concrete matrix and consider the main components: the composition of the cement matrix; the shape and location of the fibers; the contact zone "cement stone-fiber". In Fibrotola-reinforced fine-fill concretions, the cement matrix is no different from The Matrix in other fine-fill concretions, and typically consists of: cement, sand, filler, fibratola, and water. Fiber content in fibrobeton varies from 1 to 15% by cement weight. They are used for secondary strengthening to prevent cracking [2].

The presence of a large amount of portlandite Ca(OH)2 in the concrete during the hardening process can negatively affect Basalt Fiber. Therefore, various active additives can be used to bind it: microcremnezem, metacaolin (thermally processed kaolin).

The thoroughly polished material has a high class of frost resistance, inert and viscosity in relation to chemical influences at the level of demand. The structure of the cement with the addition of Basalt Fiber is very similar to the cement reinforced with steel fittings, but its durability characteristics are explained by the high deformation and strength of the reinforcement with the degree of dispersion.

The fiber itself can withstand a load of up to 2500 MPa. This is more than steel. When the Basalt Fiber is stretched, there is no plastic deformation, which allows it to withstand strong elastic deformation. Basalt Fiber has high chemical resistance properties, the diameter of the fibers is about 16-18 micrometers, but this parameter can change depending on what properties all parameters have after mixing.

Basalt concrete is almost insensitive to the appearance of cracks in its structure, but this can only be said if a sufficient amount of fiber is introduced. In addition, the material will have a high resistance to natural and artificial cracks. Thus, basalt concrete can be widely used in cases where reliable production is needed, which can be used for a long time. This is especially true for structures used in open spaces. Here, precipitation, sunlight and other factors have additional negative effects.

The main function of Basalt Fiber is to provide plastic pores and prevent cracking during compression. Basalt concrete can be used in various areas of modern construction projects. The use of the material is considered cost-effective with a relatively low price increase when it is necessary to increase a number of properties. Basalt Fiber concretions have high crack tolerance, flexibility in bending, the ability to resist friction.

Items made from such small granular concrete are not reinforced with nets and carcasses, so the technology of their preparation is much more convenient and relatively little labor is spent [3, 4].

At the end of the hardening period, in our case, 7 and 28 solidified samples were tested in the Press, on GOST 310.4-81, First bent and then half samples were tested for compression. The bending strength is calculated as the average arithmetic value of the four largest test results of the six samples.

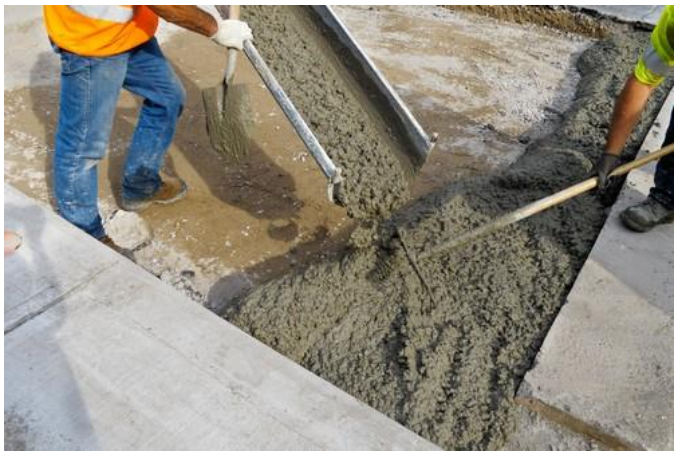

Figure 1. Basalt Fiber fine-grained concrete.

Figure 1 shows the strength of Basalt Fiber fine-grained concrete samples to bending. The results obtained in the testing of fine-grained concrete samples of 7-day basalt fibers are presented in Table 1.

Table 1. 7 strength results of fine-grained concrete with daily Basalt Fiber

Fiber length and type	Fiber content, % volume.	Medium strength, MPa	
		R_{eg}	R_{siq}
-	0,00	**4,7**	**18,3**
Basalt 6 mm	0,05	**5,5**	**19,5**
	0,10	**6,1**	**19,5**
	0,15	**6,4**	**19,4**
	0,20	**6.9**	**19.5**
Basalt 12 mm	0,05	**5,6**	**18,4**
	0,10	**6,3**	**19,5**
	0,15	**6,7**	**19,7**
	0,20	**7,3**	**19,8**

The dependence of 7-day Reg on the dose and length of basalt fiber according to Table 1 was found to be a 17% increase in flexibility with the addition of 0.05% fibers compared to the cement mass compared to the control sample.

Table 2. Strength results of fine-grained concrete with 28-day Basalt Fiber

Fiber length and type	Fiber content, % volume.	Medium strength, MPa	
		R_{eg}	R_{siq}
-	0	6,70	26,5
Basalt 6 mm	0,05	7,10	26,7
	0,10	7,40	26,7
	0,15	8,10	26,5
	0,20	8,30	27,0
Basalt 12 mm	0,05	7,20	26,5
	0,10	7,60	26,7
	0,15	8,10	27,0
	0,20	8,60	26,5

According to Table 2, it was found that the strength for bending increased by 6% with the addition of 0.05% fiber by volume compared to the control sample. With the addition of 0.2% fiber, the strength for bending increased by 24%, which proves that fiber is a strength-enhancing additive under GOST 24211-2008.

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