ANALYSIS OF STUDY OF PHYSICAL AND MECHANICAL PROPERTIES OF VERMICULITE CONCRETE WITH NEW GENERATION COMPLEX CHEMICAL ADDITION KDj-3

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ANNOTATION

This article presents the results of physical and mechanical properties of vermiculite concrete with the addition of a newly synthesized complex chemical additive KDj-3 on the basis of local raw materials.

Keywords: Portland cement, complex chemical additive KDj-3, vermiculite, vermiculite concrete physical and mechanical properties .

In recent years, the volume of construction of buildings and structures in Uzbekistan is growing due to the needs of the population. This leads to an increase in demand for self-building materials and production. In general, in the construction of residential buildings of thermal insulation materials are widely used energy and resource-saving properties.

Including the addition of a complex additive to the composition of vermiculite concrete mixes significantly changes their properties. Complex admixture increases the mobility of vermiculite concrete mix, improves the properties of convenient placement, reduces water demand, etc.

The addition of complex admixture reduces the ratio of water and cement, the reduction of water consumption leads to increased strength characteristics of vermiculite concrete, all high strength reveals the possibilities of obtaining vermiculite concrete. Such properties have a positive effect on the longevity of vermiculite concrete, ie its longevity. The composition of vermiculite concrete prepared by FarPi in the laboratory "Building Materials" is characterized by a conical subsidence of 4-5 cm.

The results of studies to determine the composition of vermiculite concrete with KDj-3 complex admixtures show that KDj-3 complex admixture has the best operational properties. showed.

In order to approbate the results, to study the effect of the chemical additive KDj-3 on the physical and mechanical properties of vermiculite concrete, experimental studies were conducted on the basis of the laboratory FarPi "Building Materials". All researches Interstate standard GOST 30459-2008 “Additions for concrete and construction solutions. Opredelenie i otsenka effektivnosti ”[1,2].

Based on the results of the analysis of experimental studies on the rheological properties of cement mix and vermiculite concrete mixture, the following was established, 0.4-0.6 relative to the cement mass The best performance of the studied mixtures with the addition of additives in the amount of -1.0% was observed in the mixture with the addition of 0.6%.

Based on experiments to study the physical and mechanical properties of vermiculite concrete, the optimal amount of KDj-3 , Was accepted at 6% [3,4,5].

After preparation, the samples were placed in a normal freezing chamber to solidify. The samples were tested on days 1, 3, 7, 14, 28 of normal hardening.

The second series of vermiculite concrete samples were tested for mass density and water absorption. The results of the tests are shown in Tables 2 and 3 and Figures 1 and 2, respectively.

Tables 2 and 3 show that the addition of KDj-3 complex admixture in an appropriate amount to the composition of vermiculite concrete leads to an increase in the density and strength of vermiculite concrete.

The analysis of the studies showed that the strength of vermiculite concrete increased by 15-20% compared to the control components, and the water absorption decreased by 13-15%. At the same time, it was found that the properties of 0.6% KDj-3 complex additive vermiculite concrete are higher than those of 0.4, 1.0% KDj-3 complex additive vermiculite concrete. Accordingly, the addition of KDj-3 complex increases the strength of vermiculite concrete during the whole hardening period. However, the largest increase in resilience was observed in the first three days. The highest strength is provided by the addition of KDj-3 complex additive in the amount of 0.6%. Compressive strength in 7 days reaches 79% of the design strength of vermiculite concrete.

Compositions of vermiculite concrete mixes.

Table 1.

№	Name of materials	Composition of vermiculite concrete mix, kg		
		1 м^3	Control mixtures corresponding to 7 liters of mixture	Additives KDj-3 corresponding to 7 liters of mixture
1	Cement, kg	400,0	2,800	2,800
2	Vermiculite, kg	1300,0	9,100	9,100
3	Suv, l	425,0	2,975	2,796
4	KDj-3, 0.4% relative to the mass of cement	1,6	-	0,08
5	KDj-3, 0.6% relative to the mass of cement	2,4	-	0,12
6	KDj-3, 1.0% relative to the mass of cement	4,0	-	0,2

* The amount of water may vary depending on the amount of KDj-3 complex additive.

The compressive strength of vermiculite concrete depends on the amount of KDj-3 complex additive

Table 2

№	At KDj-3,% relative to the mass of cement	Compressive strength of (MPa) of vermiculite concrete in days				
		1	3	7	14	28
1	Additional control sample	0,8	1,5	2,0	2,1	2,3
2	0,4	0,9	1,6	2,1	2,3	2,5
3	0,6	1,0	1,7	2,3	2,5	2,9
5	1,0	0,9	1,6	2,2	2,4	2,6

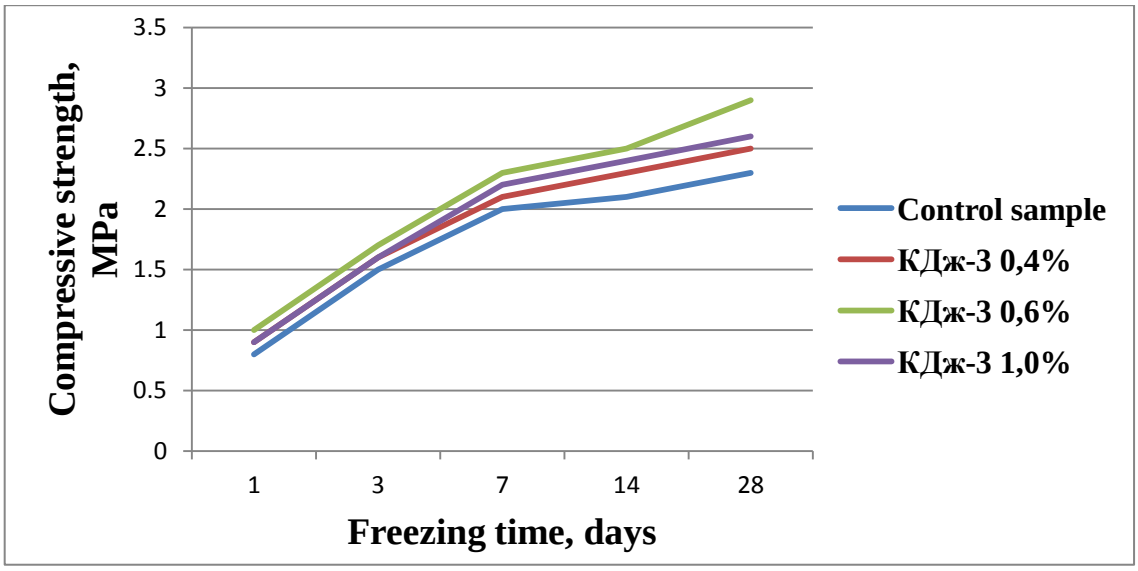

Figure 1. Influence of KDj-3 complex chemical additives on the compressive strength of vermiculite concrete.

Addition of KDj-3 complex additive to the concrete mix allows to reduce its water demand by 13-15% by weight. In this case, the compressive strength of vermiculite concrete increases by 15-20%, and this can be seen in Figure 1-2.

Vermiculite concrete samples were also tested for bending strength. The results of the tests are shown in Table 3 and Figure 2, respectively.

The dependence of the bending strength of vermiculite concrete on the amount of KDj-3 complex additive

Table 3

№	At KDj-3,% relative to the mass of cement	Compressive strength of (MPa) of vermiculite concrete in days				
		1	3	7	14	28
1	Additional control sample	0,7	0,71	0,75	0,8	0,82
2	0,4	0,72	0,75	0,78	0,8	0,82
3	0,6	0,74	0,78	0,8	0,85	0,9
4	1,0	0.71	0.72	0.75	0.8	0.9

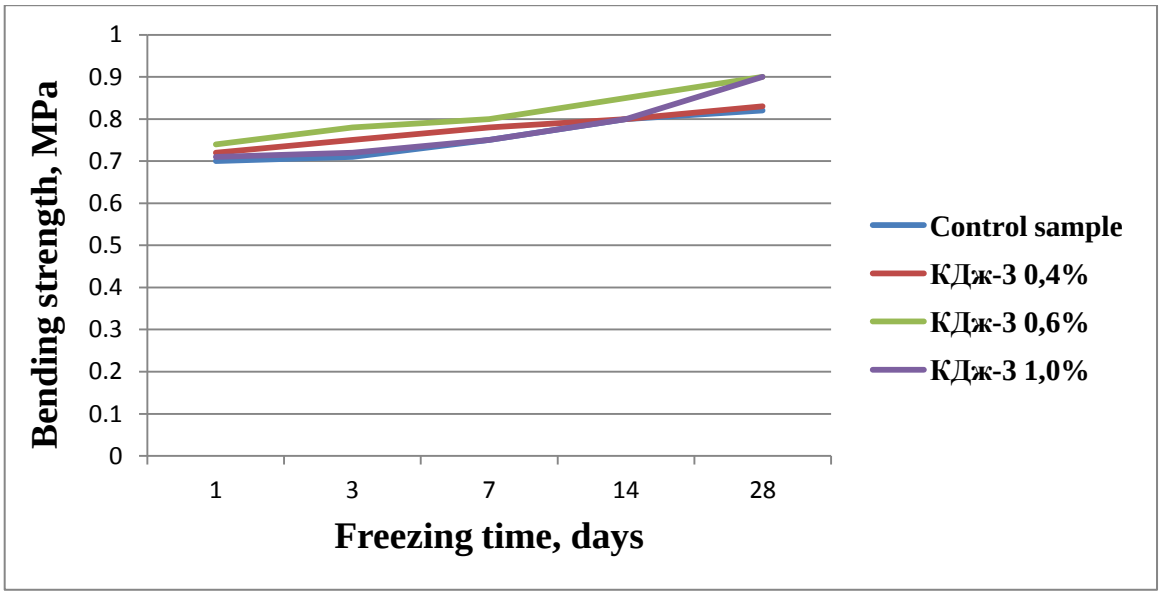

Figure 2. Influence of KDj-3 complex chemical additives on bending strength of vermiculite concrete

CONCLUSION

KDj-3 complex chemical additive containing functional groups in its chemical structure improves the adsorption of its macromolecules on portland cement particles. Vermiculite concretes with the addition of KDj-3 additives were found to have high mobility, density and strength. At the same time, the amount of water is reduced by 13-15%, such a decrease leads to an increase in class strength by 15-20% over a period of 28 days. It should be noted that the inclusion of KDj-3 in the composition leads to an increase in the strength of cementitious compositions in the early stages of solidification. This, in turn, simplifies the technology of preparation of compositions. When KDj-3 is applied at a rate of 0.6%, the excitability of the composites is 12 and 15 cm, respectively, with a cone subsidence of the control content of 5.0 cm.

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