

Study of the Influence of Superplasticators on the Properties of Cement

Shakhirov Tuygunjon Turgunovich

Tashkent Institute of Architecture and Civil Engineering Candidate of Historical Sciences, Associate Professor

Usmonova Durdona Asatilloevna

Tashkent Institute of Architecture and Civil Engineering, basic doctoral students

ABSTRACT

In this article at present, in order to improve the living standards of the population in our country, new modern affordable housing is being built. The demand for construction materials for large-scale construction is growing.

Concrete is one of the most widely used materials in construction practice. Various additives are used to improve their properties. Chemical additives have become one of the mandatory components of the concrete mix, such as binders, fillers, water. Of the many types of chemical additives, the most effective is the superplasticizer.

KEYWORDS: *superplasticizer, "Beton strong 17", flexural strength, compressive strength, frost resistance, accelerator, additive, cement.*

In the reports of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev at an expanded meeting of the Cabinet of Ministers of the Republic of Uzbekistan on the socio-economic development of the Republic of Uzbekistan in 2017-2021 based on the resources and capabilities of the Republic of Uzbekistan, output from 33.5% to 40%, the share of agriculture from 6.6% to 8 - 10%, energy consumption is about 2 times; set the goal of doubling the gross domestic product compared to 2016.

In fulfilling this task, an increase in the share of the building materials industry, the creation of important industrial facilities, housing construction, general secondary education, medical and other funds.

Currently, in order to improve the living standards of the population in our country, new modern affordable housing is being built. There is a growing demand for building materials, especially concrete and reinforced concrete structures, for large-scale construction.

Concrete is one of the most popular materials used in construction practice. Various additives are used to improve their properties. Chemical additives such as binder, filler, water have become one of the mandatory components of the concrete mixture. Of the many types of chemical additives, the most effective is a superplasticizer [1].

Controlling the technological parameters of concrete using additives is one of the modern ways to improve the rheological and operational properties.

The use of additives reduces construction costs, for example, reduces construction costs, saves cement consumption and renews concrete, durable, high-quality functional characteristics, retains its properties when preparing concrete: good efficiency in hardening, laying, compacting concrete.,

Reducing labor costs, saving electricity and shorten the time of compaction of the concrete mix.

Reducing the water-to-cement ratio in concrete mixes is important because if more water is added to the concrete than usual, there will be as many pores in the hardened concrete structure. These pores reduce the strength and frost resistance of the concrete. This is because

when water enters the pores in winter and freezes, the water expands by about 9% and leads to structural failure [2].

For the reasons stated above, there are several types of superplasticizers.

Frost-resistant superplasticizers include the following: "Cryoplast P25-1 and 2", "Cryoplast SP15-1", "Cryoplast SP15-2", "Cryoplast SP25-2", "Polyplast-Nord", "Polyplast-PMP", "" Beton strong 17 """. When using these additives in cold climates, it is advisable to apply a temperature based on the application and to determine the water / cement ratio.

Superplasticizers « Cryoplast P25-1 and 2 » are used in the production of heavy structures, lightweight concrete, as well as in the production of building mixtures in the production of foam concrete. The following results can also be achieved by applying this supplement

- Hydration of cement and hardening of concrete are achieved at temperatures below minus 30 ° C.
- Even at temperatures below minus 30 °C, concrete reaches critical strength within 28 days
- As a result of the increased mobility of the concrete mixture during additional application, its strength does not decrease during hardening.

When the superplasticizer "Beton strong 17" is applied to the concrete mixture, it accelerates the hardening of the concrete mixture, resists freezing of concrete in cold conditions and increases its plasticity.

"Beton strong 17" is a high quality superplasticizer, effective in the production of concrete in cold climates. The use of the superplasticizer "Beton strong 17" increases the mobility of the concrete mix and reduces the porosity in the concrete.

The mechanism of action of accelerating additives is influenced by the processes of hydration and hydrolysis of clinker minerals, that is. accelerates the dissolution of free lime and accelerates the coagulation process [3].

Suitable for cement particles and hydraulic products. As a result, the retention rate of the cement clinker mixed with water is increased. It is possible to accelerate the retention of the cement paste due to the action of additives that do not interfere with the hydrolysis and hydration of clinker minerals, free lime binder [4].

The additive I use, "Beton strong 17", is a complex additive that can be used to change three properties of concrete. In other words, it is designed to increase the strength of the concrete, speed up the setting time and increase its frost resistance in cold conditions. In all my experiments we used Ahangaron PC 400 D20[5].

To determine the normal thickness of the cement, we took 400 g of cement with a 26% water content and determined the thickness of the cement. The thickness level was 10 sm when I determined it in 30 seconds with the vibration table. We ran another experiment because this figure did not meet the requirements. In this case, we got 400 g of cement with 27% water. The result was 10.7 sm, which was in line with the requirements. The following table shows how the cement thickness changes as we add more.

Table 1. Determination of normal cement thickness

№	Cement (rp)	Water (%)	Additive amount (%)	Thickness power (mm)
1	400	0.26	0	100
2	400	0.26	0.5	102
3	400	0.24	1	102
4	400	0.23	1.5	105
5	400	0.22	2	107

Table 2. Determination of normal cement thickness

№	Cement (rp)	Water (%)	Additive amount (%)	Thickness power (mm)
1	400	0.27	0	107
2	400	0.27	0.5	125
3	400	0.27	1	135
4	400	0.27	1.5	145
5	400	0.27	2	155

In our studies, experimental work on the effect of the superplasticizer "Beton strong 17" on the properties of Portland cement was carried out in a Portland cement dough of normal thickness. Based on the above results, we placed the finished slurry into 4x4x16 cm molds to see how this cement additive would affect its strength. To test the finished cubes after 7 and 28 days,

we placed half in a special tub and half in the refrigerator at -10 °C. At the end of the testing period, we tested its strength in a special press. The content of the tests is presented in the table.

Portland cement (PC) is a cement paste prepared without reducing water.

Table 3. Compressive strength of samples made with superplasticizer "Beton strong 17" (normal conditions)

№	W/C (%)	Amount of superplasticizer "Beton strong 17" (%)	Strength, MPa	
			7 days	28 days
K	0,27	0	36	39
1	0,27	0.5	39	41
2	0,27	1	42	43
3	0,27	1.5	42,4	45
4	0,27	2	43,6	48

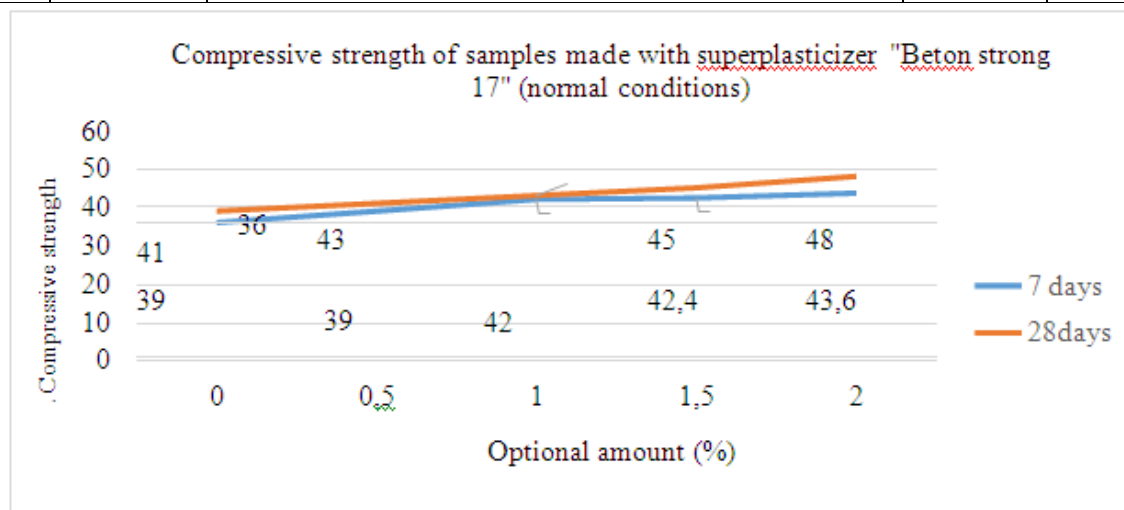
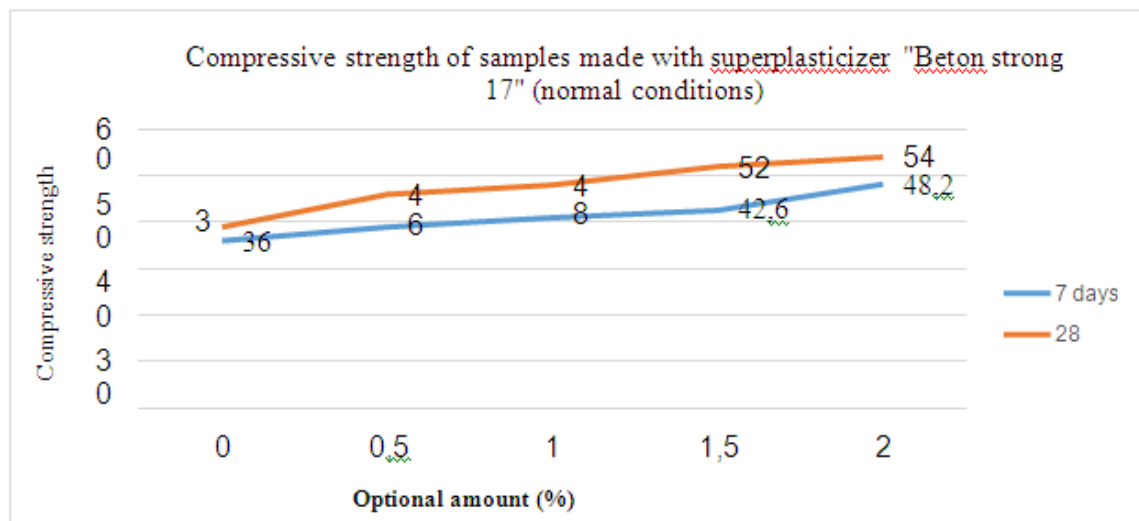


Table 4. Compressive strength of samples made with superplasticizer "Beton strong 17" (normal conditions)

№	W/C (%)	Amount of superplasticizer "Beton strong 17" (%)	Strength, MPa	
			7 days	28 days
K	0,27	0	36	39
1	0,26	0.5	39	46
2	0,24	1	41	48
3	0,23	1.5	42,6	52
4	0,22	2	48,2	54



The application of additives to the concrete mix reduces construction costs and allows to obtain quality concrete. Increases the mobility of the concrete mix, gives good results in its placement, compaction. "Beton strong 17"

The use of superplasticizer in buildings built in cold climates gives good results. Prevents the concrete mix from freezing and deteriorating in quality.

In the laboratory "Betonstrong17" we added a superplasticizer to the concrete to determine its strength. These samples are 4x4x16 in size and 0.5; 1; 1.5 and 2%, respectively by adding. We tested the bending and compressive strength at normal and -10 °C temperatures. These figures are given in the following tables.

Table 5. Compressive strength of samples made with superplasticizer "Beton strong 17" (-10 °C)

№	W/C (%)	Amount of superplasticizer "Beton strong 17" (%)	Strength, MPa	
			7 days	28 days
K	27	0	1.4	2
1	27	0.5	39,8	42
2	27	1	43,6	43.8
3	27	1.5	44	46.2
4	27	2	46	49,2

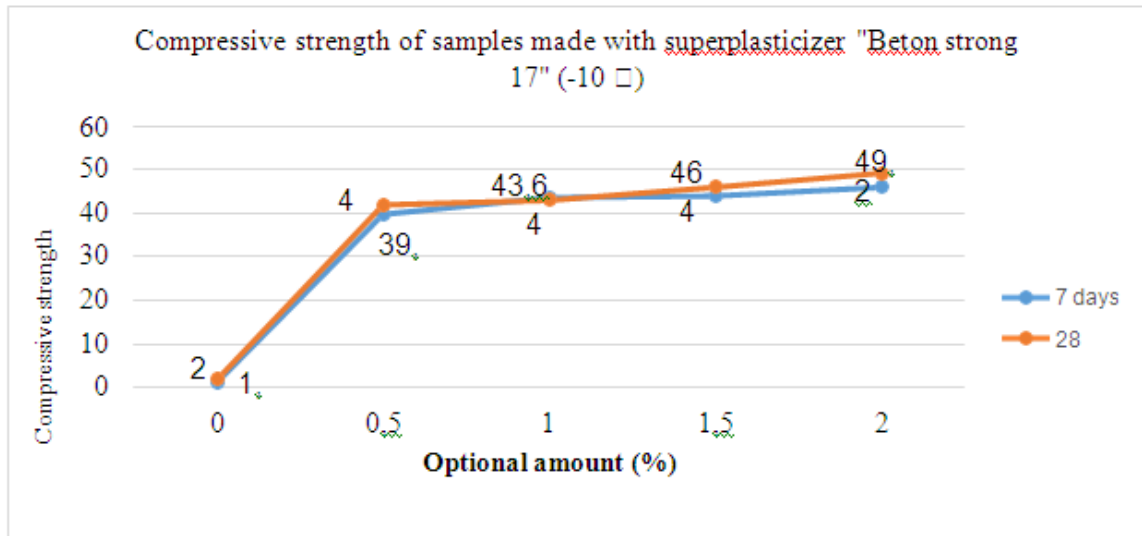
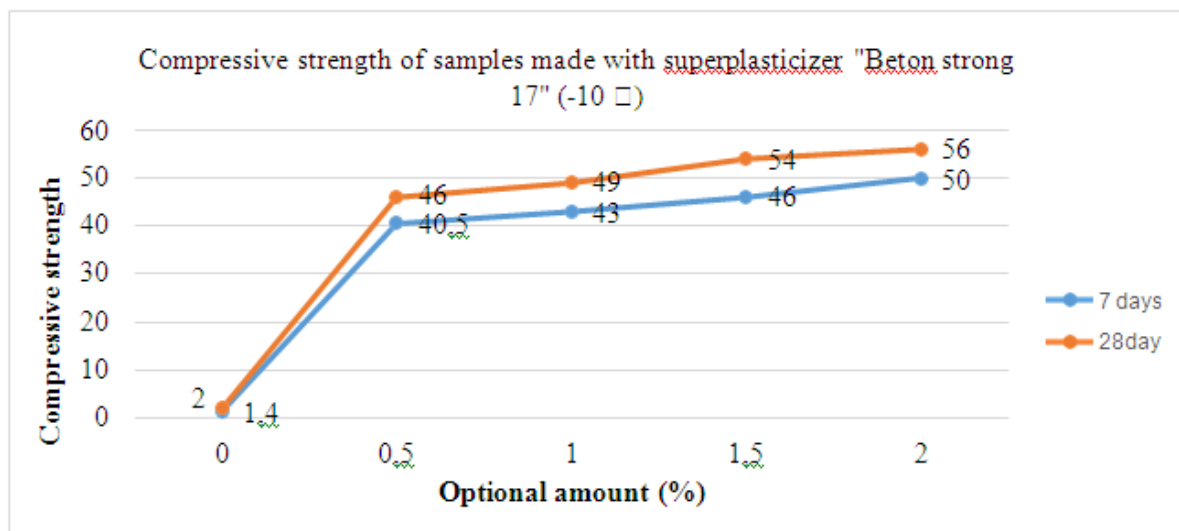


Table 6. Compressive strength of samples made with superplasticizer "Beton strong 17" (-10 °C)

№	W/C (%)	Amount of superplasticizer "Beton strong 17" (%)	Strength, MPa	
			7 days	28 days
K	27	0	1.4	2
1	26	0.5	40.5	46
2	24	1	43.6	49
3	23	1.5	46	54
4	22	2	50	56



Conclusions: When using all types of superplasticizers, special attention should be paid to the water-cement ratio, as well as the type and quality of cement, because the above qualities are taken into account when determining in the laboratory.

It should be noted that the types of cements are different, but their composition is different. Incorrectly selected cement or superplasticizer will negatively affect the strength of the concrete.

The influence of the superplasticizer "Beton strong 17" on the properties of Portland cement has been studied.

List of used literature:

1. U.A. Gaziev, D.Sh. Kadyrova "Additives for concrete and mixtures" Tashkent-2015
2. GOST 10180-90 "Concrete. Methods for Determining Strength Using Control Samples "
3. Izotov V.S. Chemical additives for modifying concrete: monograph / V.S. Izotov, Yu.A. Sokolov- M .: Kazan State University of Architecture and Civil Engineering: Publishing House "Paleotype", 2006
4. Ferronskaya A.V., Korovyakov V.F., Melnichenko S.V., Chumakov L.D. Waterproof gypsum binders of low water demand for winter concreted // Building materials, 1992.
5. GOST 30744 "Cements Methods of testing with using polyfraction standard sand"