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Study of the Effect of Concrete Strong 17 Superplatificator on Concrete and Cement Properties

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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.

KEY WORDS: superplasticizer, components, Vika, Thickness, Cement, Optional Amount.

I.INTRODUCTION

At present, in order to improve the living standards of the population, new modern affordable housing is being built in our country. The demand for construction materials for large-scale construction is growing. Concrete is one of the most popular materials used 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.

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

The use of additives reduces construction costs, for example, reduces the cost of construction, saves cement consumption and renews the concrete strong, high-quality functional characteristics, preserves its properties in the preparation of concrete mixes: Good efficiency in hardening, placement, compaction of concrete. Increasing the mobility of concrete mixes reduces labor costs, energy savings, and the duration of compaction of the concrete mix while maintaining water demand.

It is important to reduce the proportion of water to cement in concrete mixes, because if more water is added to the concrete than normal, there will be more pores in the structure of the hardened concrete. These pores reduce the strength and frost resistance of concrete. This is because when water enters the pores during the winter and freezes, the water expands by about 9%, causing the structure to collapse.

“Beton strong 17” when a superplasticizer is applied to a concrete mix, it accelerates the hardening of the concrete mix, resists freezing of the concrete in cold conditions, and increases its plasticity.**“Beton strong 17”** is a high-quality superpastifier and has an effective effect in the production of concrete in cold-climatic conditions. **“Beton strong 17”** using a superplasticizer increases the mobility of the concrete mix and reduces porosity in the concrete.
The mechanism of action of accelerating additives is influenced by the hydration and hydrolysis processes of clinker minerals, i.e., accelerates the dissolution of free lime, and accelerates the coagulation process. Approaches cement particles and its hydraulic products. As a result, the retention intensity of cement clinker mixed with water is accelerated. Clinker

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can accelerate the retention of cement paste as a result of the action of additives that do not interfere with the hydrolysis and hydration of minerals, free lime binding.
To date, chemical additives have become one of the mandatory components of concrete mixes, such as binders, fillers, water. Of the many types of chemical additives, plasticizers have a special place, especially the most effective - superplasticizers. In advanced modern practice, it is impossible to imagine the construction of solid cast-in-place concrete buildings without the addition of superplasticizers. In Russia, for example, builders use about 40,000 tons of superplasticizers a year.

Concrete strong 17 superplasticizer can change three properties of concrete. That is, it is designed to increase the strength of concrete, accelerate the setting time and increase its resistance to cold conditions. We conducted several experiments with the addition of concrete strength 17, the first of which was to determine the normal density of cement at 0.5; 1; 1.5; 2%. In all of the experiments, Ahangaron PTs D20 were used.

Determination of normal thickness of cement: In Benda, we took 400 g of cement 26% water and determined the thickness of the cement. The thickness level was 14 mm in 30 seconds using the Vika instrument. In this we got 400 g of cement and 27% water. The result was 7 mm and met the demand. The changes that occur when we add cement density levels are shown in the table below (Table 1.2).

Determination of normal thickness of cement

1-Table

№	Cement(gr)	Water(%)	Optional amount (%)	Thickness darajasi (mm)
1	400	27	0	7
2	400	27	0.5	6.5
3	400	27	1	7.5
4	400	27	1.5	10
5	400	27	2	18

Determination of normal thickness of cement

2-Table

№	Cement (gr)	Water(%)	Optional amount (%)	Thickness degree(mm)
1	400	26	0	14
2	400	26	0.5	7
3	400	24	1	6.5
4	400	23	1.5	2.5
5	400	22	2	2

After determining the thickness of the cement, the curing time was determined by adding it to the cement paste.

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In the laboratory, using standard methods using the superplasticizer "Concrete strong 17" in PTs-400D20 Portland cement, we determined the beginning and end of the setting time of the concrete mix, the results are given in Table 3 below.

3-Table

№	Cement type	Additional name	S / Ts(%)	Extra amount (%)	Start of freezing time (minutes)	Freezing time (end minute)
1.	PTs 400-D20	“Beton strong 17”	0,27	0	93	420
2.				0,5	60	318
3.				1	55	318
4.				1,5	43	300
5.				2	40	275

“Beton strong 17”the addition of superplasticizer PTs-400 D20 in Portland cement at 0.5-1-1.5-2% determined the compressive strength of concrete under normal conditions experimentally. The results are presented in Table 4 below.

Compressive strength of samples

4-Table

Cement type	Additional name	S / Ts	Extra amount, %	Consistency, MPa	
				7 days	28 days
ПЦ 400- Д20	“Beton strong 17”	0,27	0	36	39
			0,5	39	46
			1	42	47.2
			1,5	45	48
			2	51	53

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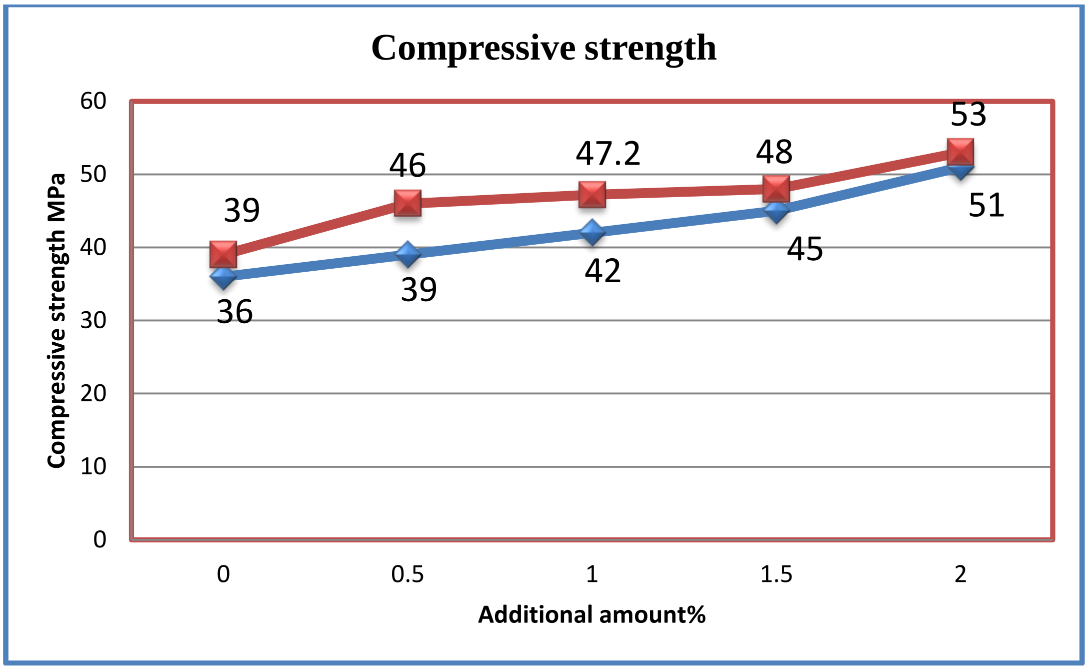

In general"Beton strong 17"We determined the compressive strength of the superplasticizer PTs-400 D20 in Portland cement at 0.5-1-1.5-2%, and the optimal amount reached 51 MPa in 7 days and 53 MPa in 28 days.

"Beton strong 17"by adding the superplasticizer PTs-400 D20 in Portland cement at 0.5-1-1.5-2%, we determined the compressive strength of concrete experimentally at -5 °C. The results are presented in Table 5 below.

5-Table

№	Water-cement ratio %	Superplasticizer amount. "Beton-strong17" %	Strength MRa.	
			7 days	28 days
К	27	0	1.4	2
1	27	0.5	40.5	41
2	27	1	41	42
3	27	1.5	43	44
4	27	2	45	45.4

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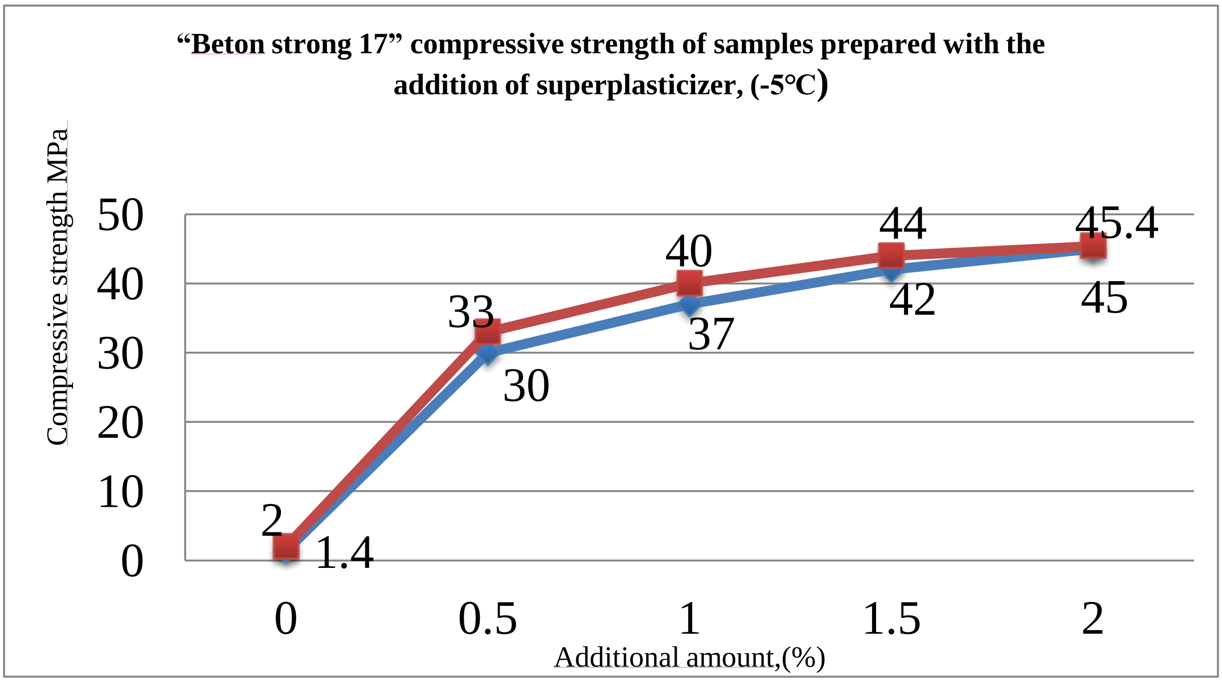

In general "Beton strong 17" We determined the compressive strength of the superplasticizer PTs-400 D20 in Portland cement at 0.5-1-1.5-2%, and the optimal amount of 2% at -5 °C at 45 MPa for 7 days and 28 days. then reached a strength of 45.4 MPa.

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; We tested the bending and compressive strength at normal and -5 °C temperatures by adding 1.5 and 2%, respectively. These figures are given in the following tables.

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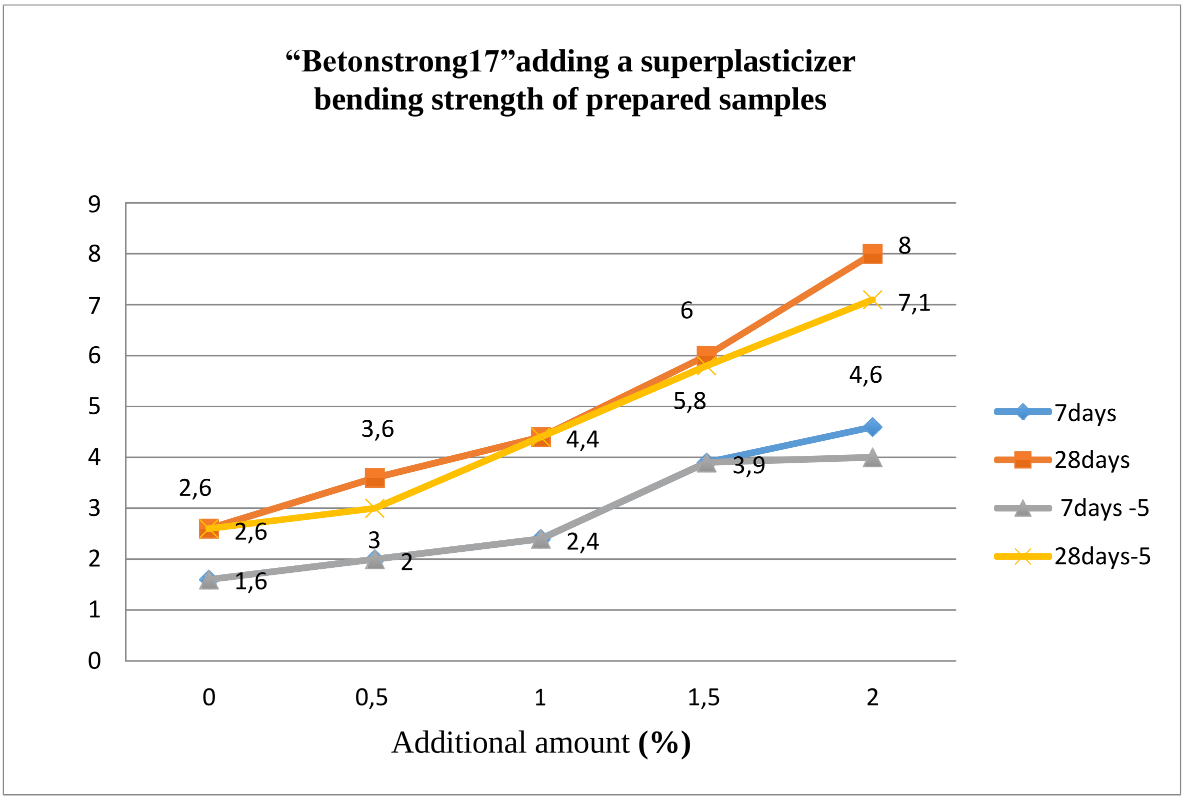
“Beton strong17” bending of prepared samples by adding superplasticizerconsistency

6-Table

№	The amount of cement ,(gr)	“ Betonstrong 17”The amount of superplasticizer ,(%)	The amount of sand ,(gr)	The amount of water ,(ml)	Bending strength, MPa			
					Normal conditions		- 5°Ctemperatur	
					7 days	28 days	7 days	28 days
K	500	0	1500	200	1.6	2.6	1.6	2.6
1	500	0.5	1500	200	2	3.6	2	3
2	500	1	1500	200	2.4	4.4	2.4	4.4
3	500	1.5	1500	200	3.9	6	3.9	5.8
4	500	2	1500	200	4.6	8	4	7.1



“Betonstrong17”adding a superplasticizer bending strength of prepared samples

The following table shows the results of bending strength with reduced water content

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Bending strength of samples

7-Table

№	The amount of cement, (gr)	" Betonstrong 17"The amount of superplasticizer,, (%	Sand amount, (gr)	Amount of water, (ml)	Strength in bending MPa.			
					7 days	28 days	7 days -5 ℃	28 days -5 ℃
К	500	0	1500	155	3.6	4	2	2.6
1	500	0.5	1500	150	4	4.5	4.7	5
2	500	1	1500	145	4.2	5	5	5.7
3	500	1.5	1500	140	5.6	6	6	6.3
4	500	2	1500	138	6	6.4	7	7.7

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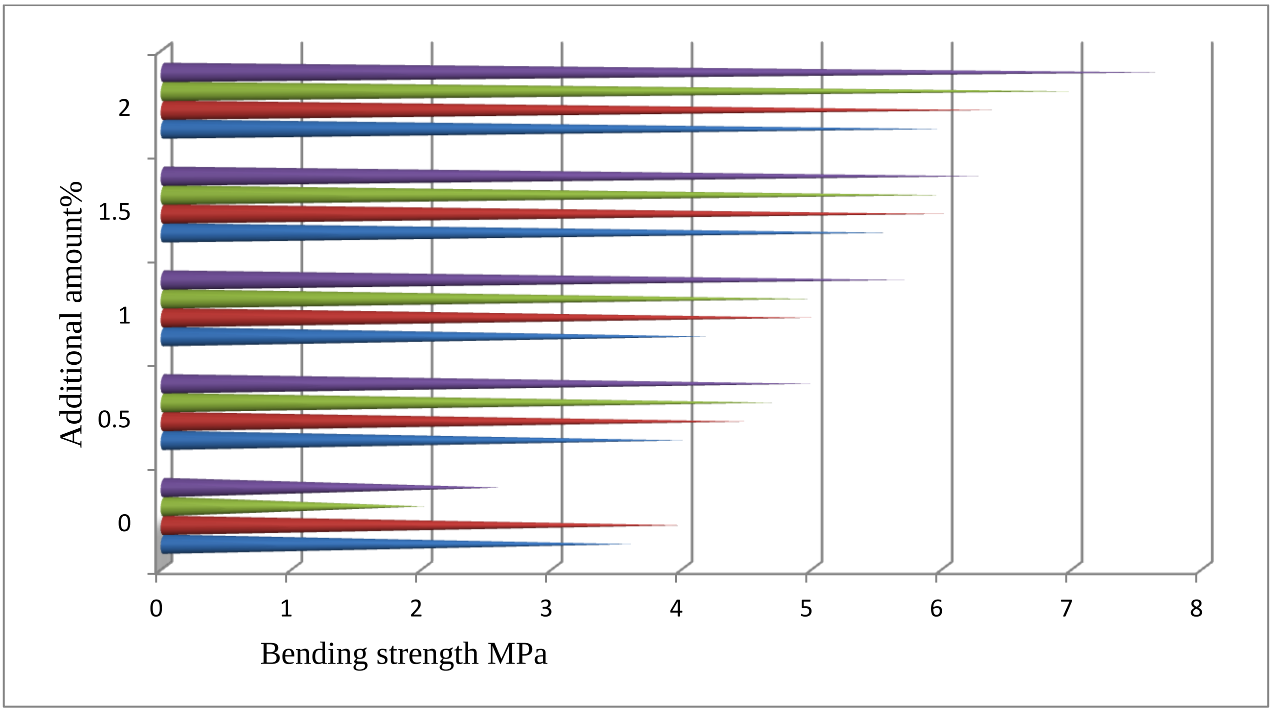
Bending strength of samples



The compressive strength of the above samples was also determined. We conducted our experiment without reducing and reducing the amount of water. The following table shows the compressive strength determined without reducing the amount of water.

"Beton strong17" compressive strength of samples prepared with the addition of superplasticizer

8-Table

№	The amount of cement (gr)	" Betonstrong 17"amount of superplasticizer, (%)	The amount of sand (gr)	The amount of water (ml)	Compressive strength MPa			
					Normal conditi		5°Ctemperatur e	
					7 days	28 day	7 days	28 days
К	500	0	1500	200	29.8	40.5	1.6	2.6
1	500	0.5	1500	200	32	42	30	38
2	500	1	1500	200	33.6	44.3	31	40
3	500	1.5	1500	200	35	46	35	41
4	500	2	1500	200	37	48	35	44

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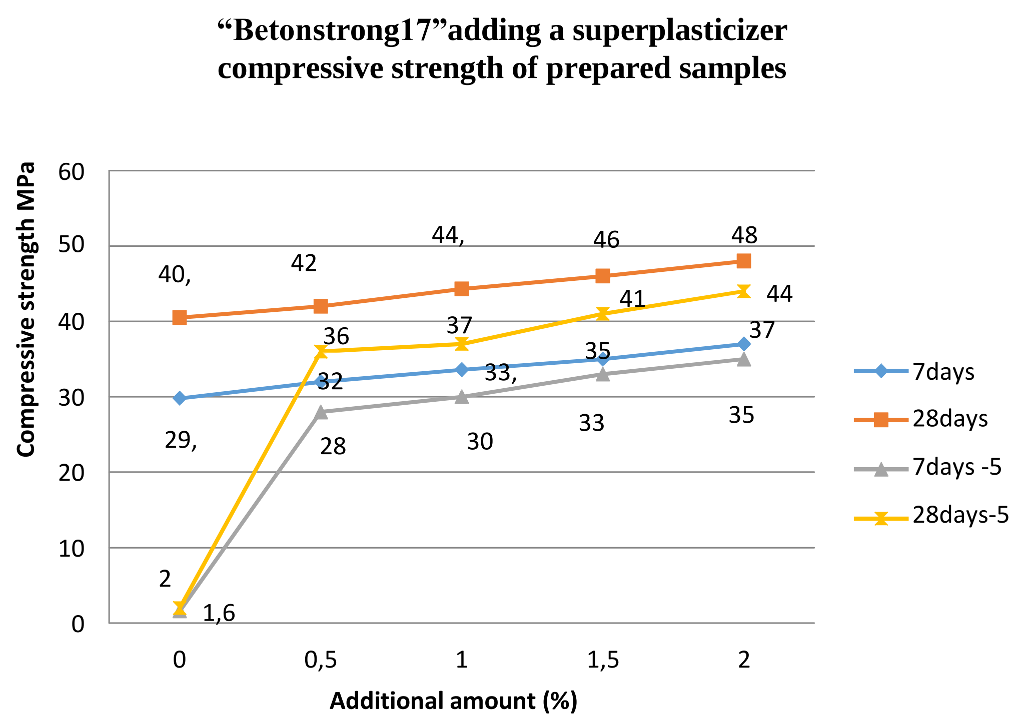

The following table shows the compressive strength of concrete prepared by reducing the S / S ratio.

Compressive strength of samples

9-Table

№	The amount of cement (g	" Betonstrong 17"amount of superplasticizer, (%)	The amount of sand (gr)	The amount of water (ml)	Compressive strength MPa			
					7 days	28 days	7 days -5 ℃	28 days -5 ℃
К	500	0	1500	155	30	41	1.6	2
1	500	0.5	1500	150	19	43	25	44
2	500	1	1500	145	22	45	25.8	46.1
3	500	1.5	1500	140	25	48	29.2	50
4	500	2	1500	138	30	51	33	54

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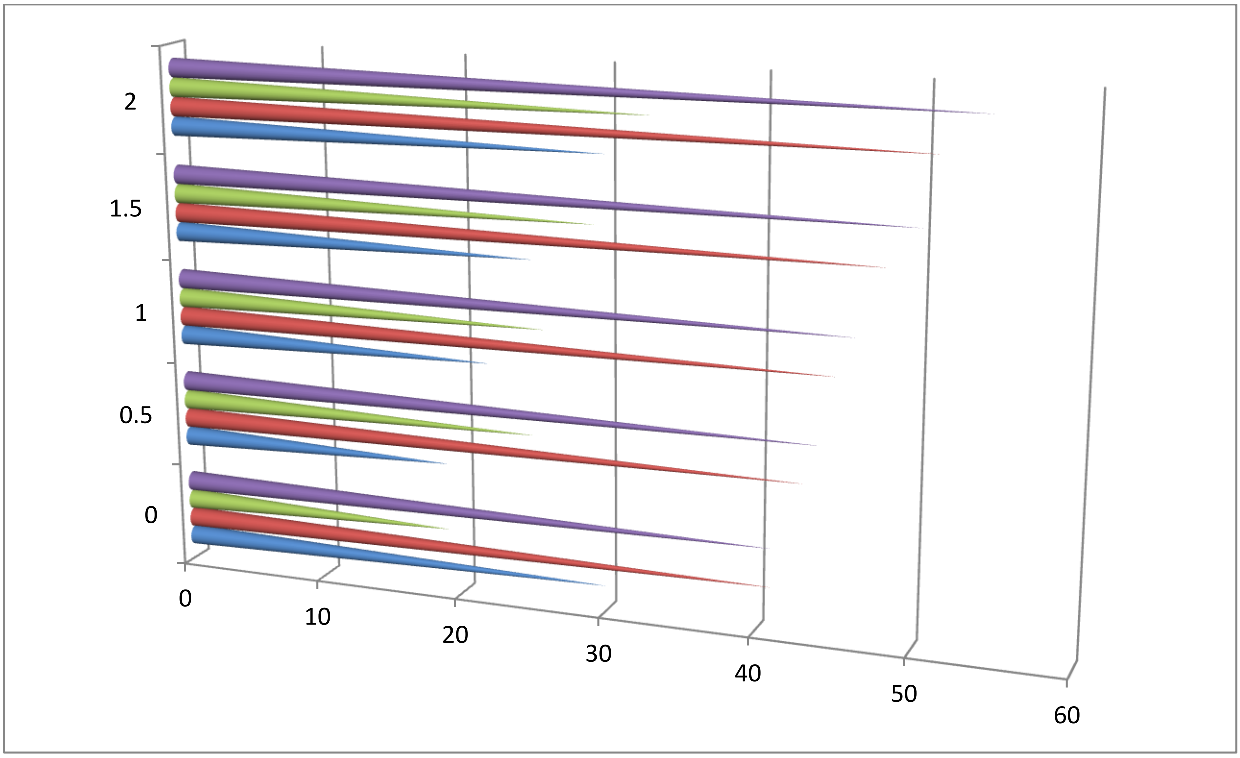
Compressive strength of samples



In general“Betonstrong17”we determined the compressive strength when we added the superplasticizer PTs-400 D20 in Portland cement at 0.5-1-1.5-2%, and when we added the optimal amount of 2% to 37 MPa under normal conditions for 7 days, and after 28 days At 48 MPa, -5 °C, it reached 35 MPa in 7 days and 44 MPa in 28 days.

The application of additives to the concrete mix reduces construction costs and allows to obtain quality concrete. It increases the mobility of the concrete mix and has a good effect on its placement and compaction.“Betonstrong17”The use of superplasticizer in buildings built in cold climates gives good results. Prevents the concrete mix from freezing and deteriorating in quality.

Determining cost-effectiveness: To date, concrete is one of the most widely used materials in modern construction practice. According to experts, the annual production of concrete in the world is more than 2 billion m3.

In order to prepare a concrete mix that meets the requirements of UzRST with low cement consumption, it is necessary to calculate its composition correctly. To do this, it is necessary to select and determine the amount of concrete, depending on the quality of the materials that make it up.

The use of additives reduces construction costs, for example, reduces the cost of construction, saves cement consumption, preserves the properties of concrete in the preparation of its quality and functional characteristics.
This is as important in construction as it is in any other field, where economic efficiency is paramount.

That is, along with the cost of raw materials used, the quality is also important. In particular, the cost, quality and use of the admixture in the concrete will be studied. We also studied our superplasticizer in detail and determined its effect on the properties of concrete. As a result of our experiment, we determined the optimal variant of the superplasticizer and calculated the economic efficiency. We calculated the consumption of cement (S), water (S), sand (Q), gravel (SH) and superplasticizer per 1 m3 based on market prices (Table 10.11).

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1 m^3cost of concrete

10-Table

№	Of raw materials to be called	Quantity 1m^3	Price (sum)	Expenditure (sum)
1	Cement	350 kg	640(sum/kg)	224000
2	Sand	0.45 m^3	75000(sum/m^3)	33750
3	Gravel	0.9m^3	45000(sum/m^3)	40500
4	Water	158l	252(sum/m^3)	39.850
5	Chemical supplement (superplasticizer “Beton strong 17”)	0	8100(sum/l)	-
Total:				**298300 sum**

“Beton strong 17”adding a superplasticizer 1m^3cost-effective from concrete

11-Table

№	Of raw materials to be called	Quantity 1m^3	Price (sum)	Expenditure (sum)
1	Cement	245 kg	640(sum /kg)	156800
2	Sand	0.45 m^3	75000(sum /m^3)	33750
3	Gravel	0.93 m^3	45000(sum /m^3)	42750
4	Water	158 l	252(sum /m^3)	39.850
5	Chemical supplement (superplasticizer “Beton strong 17”)	4кг	8100 (sum /l)	32400
Total:				**265800 sum**

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1.Cement - 245 * 640 = 67200sum
2. Sand - 0.45 * 75000 = 33750
3. Gravel - 0.93 * 45000 = 42750
4. Suv -158 * 252 = 39.850
5. Chemical additive = 4 * 8100 = 32400
We subtract the cost of additional concrete mix from the cost of ordinary concrete mix

298300-265800=32500 sum

Let's look at this savings in the example of the annual production of 30,000 m^3 of concrete.

30000*32500=975.000.000 saves UZS.

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