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THE EFFECT OF SOLIDING ACCELERATING ADDITIVES ON THE MAIN PROPERTIES OF FOAM CONCRETE

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Annotation: *Foam concrete appeared in the domestic market a long time ago, but even though foam blocks have been used in Europe for more than ten years, many consumers still have questions about the quality of foam, reliability and environmental material. is not aware of what happened, but the whole point is the unconventionality of new materials in domestic consumption. Foam concrete is one of the progressive and promising construction materials that are increasingly used in residential construction around the world. It meets modern requirements for heat protection. The use of foam concrete products can reduce the consumption of materials, labor and construction costs.*

Keywords*: material, construction, portland cement, asylum seekers, Penostrom, Morpen, energy, autoclaved.*

Taking into account the huge energy consumption for heating the buildings, the issue of effective insulation and the use of relatively cheap building materials adhesive structures has become acute. One such material is non-autoclaved foam concrete. Using it as a wall material, it will be possible to provide the necessary heat resistance through heat transfer methods with a small wall thickness.

Non-autoclaved foam concrete is considered as a solution to the residential heating problem of the Republic of Uzbekistan and is a promising heat insulation material for the production of this material. It is characterized by reliability, durability, simplicity of technological solutions, low production costs in production. The use of such materials is available on December 22, 2016 in 2017-2021 and updated model projects in rural areas.

Foam blocks are becoming more and more popular as a reliable material for construction around the world. In particular, they are popular in low-rise construction. Here, heat transfer foam blocks are becoming more and more popular due to the fact that they are easy to install, technological innovation, durability and other factors. Their service life is almost unlimited, and if the construction process is in the right sequence, if it is made of quality concrete construction, it will serve for many years, the building will ultimately be strong and reliable.

Foam concrete appeared in the domestic market a long time ago, but even though foam blocks have been used in Europe for more than ten years, many consumers still have questions about the quality of foam, reliability and environmental material. Is not aware of what happened, but the whole point is the unconventionality of new materials in domestic consumption. Foam blocks in construction successfully replace brick, often surpassing it in

terms of operational and physical properties. It works well as a building material for small-story houses or multi-story houses.

Compatibility. Foam concrete is one of the progressive and promising construction materials that are increasingly used in residential construction around the world. It meets modern requirements for heat protection. The use of foam concrete products can reduce the consumption of materials, labor and construction costs.

The production of small products made of foam concrete does not require large capital investments and can be organized in a short period of time at any enterprise that produces building materials. In this regard, a significant increase has been observed in the last 10 years. In addition to the mass production of foam concrete products, most of the manufactured products are produced in small enterprises, such enterprises should be equipped with the means of technological control of production and dosing of components. It should be noted here that due to the high insensitivity of the vibration characteristics of the precise mixture of products and technological modes, traditional heavy concrete is more complex in the production of foam, technology.

Portland cement of Ohangaroncement OJSC was used as a binder for the production of foam concrete.

The use of Portland cement has the following characteristics:

- commodity-M 400
- Normal density-25%
- special surface area-3150 sm2 / g
- Installation time: start - 130 min, finish - 370 min

Chemical composition of Portland cement,%

Naming	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3	R_2O
Portland cement	21,55	4,96	3,91	64,47	2,76	0,96	1,38

In this article, cement is mandatory according to GOST 10178-85 and Grade 400 Portland cement that meets the requirements of GOST 310.4-81 was used.

Good filler. Quartz sand from the Chinazkoy mine that meets the requirements of GOST 8736-2014 "Sand for construction works" was used as a good aggregate for the production of foam concrete. Technical conditions". The main characteristics of the sand used are listed in the table below (Table 2).

Table 2. Basic physical properties of raw materials

Physical properties	unity	Indicators
Bulk density	kg/m^3	1390
Density	g/sm^3	2,8
Emptiness	%	50,4
Magnitude module	M_k	2,2

Table 3. Granulometric composition of quartz sand of Chinoz mine

Item size, mm	5	2,5	1,25	0,63	0,314	0,14	<0,14
Private balance,%	0	0,30	4,00	0,40	37,00	56,00	2,30
Total balance,%	0	0,30	4,30	4,70	41,70	97,70	100

Since there is water, pipe water was used in the work - it meets the requirements of GOST 2874-82.

Asylum seekers. As a result of the conducted research, we used "Penostrom" and "Morpen" foaming agents.

- "Penostrom" is a synthetic foaming agent designed for the production of various types of low-stable foam and foam concrete, as well as for the production of light wall and finishing materials.

- "Morpene" is less toxic, less flammable and less environmentally dangerous substance of IV level of harmful substances according to GOST 12.1.007-76. The main technical characteristics of foaming agents according to the passport data of the manufacturer are presented in Table 4.

Table 4. Main technical characteristics of "Penostrom" and "Morpen" foaming agents.

№	Indicator	Trademark	
		"Penostrom"	«Morpen»
1	Density, at 200C, g/cm3	1.02 - 1.09	1,05 – 1,2
2	Hydrogen indicator	7.5 - 10	7 – 10
3	Kinematic viscosity 200S, m2 / s	Not more than 40 10-4	no more 2 10-4
4	A lot of foam	At least 7	Not less than 6.5
5	Foam stability, min	the 8th	12

From the table. 4 information should be obtained, it should be noted that the indicators of all types of foaming agents differ significantly from each other, which can affect their effectiveness in foam concrete products. It depends on various chemical properties of the active substance, as well as methods of evaluating these properties.

Despite the large variety of foam concrete preparation methods and initial data, the laws of its properties change based on its composition have been established. This created the basis for the development of the method of calculating the composition of autoclaved and non-autoclaved foam concretes by calculation-experimental method.

Foam concrete is the best composition for the specified density, it is the composition for obtaining foam concrete with the highest strength among all samples.

The calculation is carried out in the following sequence:

1. One of the approximate indicators of C listed in Table 5 is selected to obtain strong foam concrete.

Table 5. **Initial indicators of C for calculating the composition of foam concrete based on different binders**

Connector type	Mass ratio of siliceous component to binder C	
	autoclaved	without autoclave
Cementitious and lime cementitious	0,75; 1; 1,5; 1,75;2	0,75; 1; 1,25
Limestone	3,5; 4; 4,5; 5;6	-
Lime-slag	-	0,6; 0,8; 1

2. The fluidity of the mixture is determined according to table 2, depending on the average density of foam concrete R_s and the type of binder.

The Suttard viscometer consists of a glass with an inner diameter of 5 cm, a height of 10 cm and a side of 45 cm, a mercury and brass cylinder. Circles are drawn every 0.5-1 cm on the paper to be placed under the glass.

Before the test, the cylinder and bottle are wiped with a soft cloth moistened with clean water. The glass is placed horizontally and a cylinder is placed on it in such a way that the outer contour of the cylinder should correspond to a circle with a diameter of 6 cm.

The test mixture is poured into the upper part of the cylinder and the surface of the mixture is washed with cylindrical edges. Then, with a quick and precise movement, lift the cylinder from the bottom up. Thus, the mixture is determined by the concentration of the mixture, the diameter of which is distributed in the form of a cake.

3. Water ratio (V/T) must ensure the predetermined fluidity of the mortar with the temperature of the mixture at the time of unloading.

V/T can be accepted in the following cases: a) for anti-film technology: 0.5 - cement binder; 0.5 ... 0.55 - in lime; 0.45 ... 0.5 - on the mixture: on sand - 0.5; in ash - 0.6; b) For V/T vibration technology, if sand and coke are used as silica components, it is considered equal to 0.3 and 0.4.

4. V/T is cleared experimentally. For this, take 0.4 kg of powder (initial composition) and 0.16-0.28 liters of water.

V / the weight of the dry mixture as a ratio of the weight of the water mixture to the weight of the mixed solution.

5. Based on the strength characteristics of foam concrete cube samples with the variable mixture shown in the table, determine the optimal level of the connecting part C word. 7 and can be steamed, steamed or allowed to naturally cure for 28 days in an autoclave.

6. Determine the viscosity of the mixture that must be created by the swelling agent for the production of foam concrete with the specified values \u200b\u200bof PC and V/T:

$$П_р = 1 - \frac{\rho_c}{K_c \cdot 1000} \cdot (V_{уд} + \frac{B}{T})$$

Rs - forecast of the average density of foam concrete in the dried state, kg / m3; Kc is the coefficient of mass increase due to hardening due to chemically bound water (Kc = 1.1); Wood is the specific volume of a dry mixture, determined experimentally or by formula

$$V_{\text{уд}} = \frac{1+\frac{B}{T}}{\frac{\rho_{\text{ф.р}}}{1000}} - \frac{B}{T},$$

where $P_{f.r}$ is the actual value of the average density of the silica-binding solution (1400 kg / m^3)

7. Determining the cost of materials per batch

$$P_{\text{п}} = \frac{П_{\text{р}}}{(\alpha \cdot K)} \cdot V,$$

where α is the coefficient of the use of the ventilator intelligence service (0.85);

V - products poured at the same time (volume of the pool), l;

K is the hole yield coefficient. Amount of powder K = ratio of Pr/Pn to the mass of foaming agent, foaming agent for calculations - 20 l / kg

$$P_{\text{сух}} = \frac{\rho_c}{K_c} \cdot V,$$

including: forced consumption

$$P_{\text{вяж}} = \frac{P_{сух}}{1+C},$$

consumption of cement

$$P_{\text{ц}} = P_{вяж} n,$$

n is the volume ratio of complex binder cement.

Lime consumption

$$P_{\text{и}} = P_{\text{вяж}}(1\text{-}n),\ P_{\text{и.ф}} = P_{\text{вяж}} = (P_{\text{и}}/A_{\text{ф}})100,$$

where Pu is the mass of lime with 100% active CaO; Re.f - actual consumption for lime, l / kg; Af is the actual activity (70, 80, 90% for types 3, 2 and 1 of lime, respectively).

Consuming a component of silica

$$P_к = P_{сух} - P_{вяж},$$

9. Water consumption

$$P_{\text{в}} = P_{\text{сух}} \frac{B}{T},$$

binder 5% - mass flow stabilizer, the structural strength of gypsum or waterglass is estimated to be equal to 3.

When other stabilizers are used, their consumption is determined based on literature or operative data.

10. Estimated consumption of foaming intelligence is determined according to specifications or literature data and depends on its type; components of the mixture, as well as raw materials, mineralogical and granulometric properties.

M3 foam concentrate with an average density of 400 ... 800 kg is usually 1.2 ... 1 kg for the production of 1 m3 of non-autoclave foam.

with the temperature of the mixture V is determined by the initial water-to-solid ratio, for the foam or cement-mix must / T should be 25 ° C

quality foam must meet the following conductive requirements: The resulting pore K - is not a factor, foam is characterized by the use of less than 15 l / kg, resistance - at least 0.8.

To obtain the conditions for the production of foam of the necessary quality, the optimal ratio of the empiric foaming agent and water is clarified.

Initial water ratio (percentage by weight) for different foam materials: for PO-6-12; smolosaponinovogo - 8; kleikanifolnogo - 5.

For the first two blowing agents, Frothers water change ratio was found to be ± 2 ± 1 and within the final range.

11. Mass mass

$$M_з = V \cdot K_з \cdot \rho_р,$$

where V is the volume of foam concrete mixer, m3; Kz - the filling factor of the foam concrete mixer is equal to 0.6 ... 0.8; R is the average density of the silica-binding solution, for calculation it is equal to 1400 kg / m3.

The calculation results showed that 525.8 kg and 163.5 liters of dry matter are required for 1 m3 of foam with a density of 400 kg/m3. The value of dry components is several tens of times higher than liquid. In the total volume of raw materials, 1 m3 of foam concrete is 198,506.5 soums.

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