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Methods of Improving Physical and Mechanical Properties of Light Concrete on the Basis of Chemical Additives

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Annotation: The rapid development of the global construction industry and rising prices for fuel and energy carriers lead to the need to create and implement resource and energy-saving technologies in the production of building materials and products.In this regard, the use of new types of environmentally friendly materials in the field of building materials, the effective use of energy-saving technologies, the improvement of new building materials and their existing technology, thereby improving the physico-mechanical and physicochemical properties of concrete and concrete mix takes over.

Keywords: masonry, material drying, vermiculite concrete, concrete,

Introduction

The rapid development of the global construction industry and rising prices for fuel and energy carriers lead to the need to create and implement resource and energy-saving technologies in the production of building materials and products. In this regard, the use of new types of environmentally friendly materials in the field of building materials, the effective use of energy-saving technologies, the improvement of new building materials and their existing technology, thereby improving the physico-mechanical and physicochemical properties of concrete and concrete mix takes over. In this regard, special attention is paid to the development of chemical additives of concrete and concrete mixes based on local raw materials and energy-saving technologies for their production. It is known that the wall brick industry is one of the most heat-intensive industries. The heat consumed is a large part of the cost. In this case, the heat is mainly used for drying and baking the material. Although vermiculite concrete is used instead of this building brick, it can be used in the construction of houses and buildings, which allows you to save on fuel and heat consumption in the heating of rooms. On the other hand, the importance of improving the physical and mechanical properties of vermiculite concrete products further increases the relevance of the chosen topic. Extraction of vermiculite concrete from the mold in the technological system of autoclave production leads to the maximum achievement of product durability in the short term, which in turn leads to increased production productivity. One way to achieve this is to use chemical additives in production [1,2,3]. Types of attachments.

All additives (natural or artificial chemicals) are divided into 4 classes according to the mechanism of their action:

Appendices 1, which alter the solubility of mineral binders and do not chemically react with them;

2 - additives, reacting with binders and forming difficult-to-dissolve or sparingly soluble complex compounds;

3 - additives, forming the ready center of crystallization;

4- Organic surfactants (SFM) have the ability to adsorb the solid phase on the surface.

Chemical additives for concrete are divided into the following types depending on their use in accordance with GOST24211-2008 (according to the main effect): Various additives are added to binders and concrete mixes to improve their properties. They are divided into six classes that affect chemical, physicochemical processes:

Class 1: regulators of rheological properties of compounds, which are divided into three groups: I - softener - SSB-sulfite - alcohol, SDB - sulfite - yeast liquid, water-soluble polymers. They are added in the amount of 0.15-0.3% by weight of the binder. Class 2: water-retaining additives: active mineral additives (ACM) - trepel, diatomite, opoka, sour ash, as well as airborne substances. They are added in the amount of 0.01-0.05% by weight of the binder. Class 3: diluents (without water separation) - these include micro-foaming

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agents - milonaft, acidol and other water reducers, as well as reducing the consumption of binders and are added in the amount of 0.01-0.2%. Class 2 includes additives that control the retention and solidification of binders, and they are divided into several groups:

1. Retention retardants (gypsum, milonaft, SSB, etc.).
2. Hardening retarders (SSB, SDB).
3. Retention accelerators, (NaF, CaSl2, K2SO4, etc.).
4. Accelerators of solidification (NaSl, SaSl2, FeSl3), calcium, sodium-nitrate and others.
5. Anti-cold additives (NaSl, SaSl2, NaNO2).
6. Activators of solidification of homogeneous clinker-free binders (NaON, Na2SO3, K2SO3, NaNO2, etc.).

Class 3 additives are divided into eight groups, and their common feature is the control and modification of the structure of hardening binders, increasing their density. Class 4 additives include corrosion inhibitors for steel fittings. Class 5 includes aggregates used to reduce the consumption of cement and increase the density of concrete, such as aggregates, lime, gravel, sand, clay, blast furnace and some types of fuel slag, etc. Class 6 includes substances that give concrete and binders special properties, such as anti-radiation. The use of these additives helps to save cement, increase its strength, and their amount is determined experimentally.

Complex add-ons:

a) complex chemical additives;
b) organomineral supplements.

The correct choice of the type and amount of chemical additives in the technological system, the optimization of the process, in turn, leads to an increase in the efficiency of machinery and equipment.

Demand for energy-efficient and environmentally friendly building materials is growing worldwide.

To meet these requirements, the material should be as light as possible and at the same time strong.

Of course, in today's world of automation can be a daunting task.

Let's compare modern wall thermal insulation, which can be used in Uzbekistan, with energy-saving materials. [4,5].

The heat balance given by 20 cm thick vermiculite concrete
230 cm brick wall
Gives a 50 cm wooden beam.
450 cm simple concrete wall

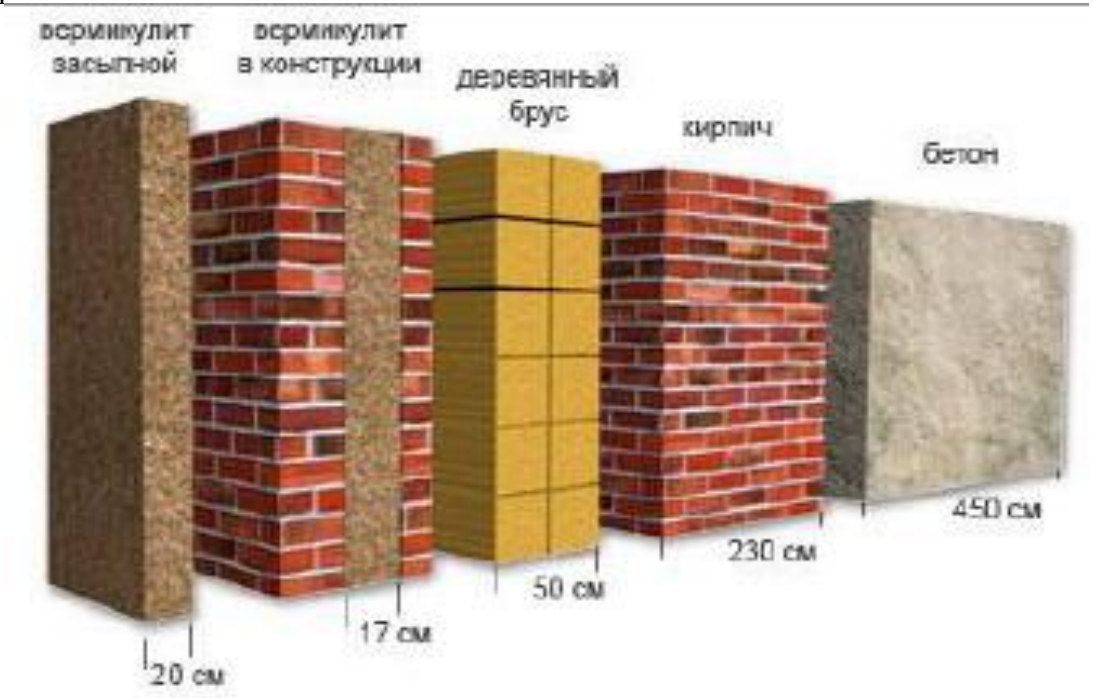

Fig.1. Graph comparing the thermal insulation properties of different wall materials

However, it should be noted that there is a shortage of timber in Uzbekistan. Therefore, there are some restrictions on its use as a building material. Vermiculite concrete, on the other hand, has advantages due to the ease of production technology and the diversity of its production raw materials. In hindsight, we are

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looking for an answer to the question of where the heat in the building comes from. 15% is lost from foundations and floors, 10% from doors and windows, 25% from the top of the building, i.e. the roof, and 35% from the walls. So, one of the main measures to ensure the heat balance of the building is to cover its walls with thermal insulation materials.

Conclusion. Many private vermiculite concrete production shops are being set up in the country. The production of vermiculite concrete is also relevant today to speed up the construction process and prevent construction losses.

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