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ENERGY-SAVING BUILDING MATERIALS, PRODUCTS AND STRUCTURES

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ANNOTATION

Development of technology for energy-efficient and energy-saving materials that increase the heat protection of buildings, provided for by modern building regulations, is possible in several ways. The main one is the development and development of new materials and products that can provide the required level of thermal protection while maintaining the previous design solutions of buildings, excluding the radical restructuring of the technological equipment of the construction industry.

Keywords: *building materials, products, structures, energy saving, resource saving, durability.*

One of the main goals of the Strategy for the development of the building materials industry for the period until 2020 and further prospects until 2030 is the creation of production of a range of modern high-quality energy-saving and competitive building materials, products and structures, both in the domestic and foreign markets, taking into account the needs and available raw materials. base.

Currently, strict requirements are imposed on modern materials. Materials should be inexpensive, safe, environmentally friendly, have a long service life, fire resistance, ease of installation or installation.

The construction industry is one of the most dynamically developing areas of the industry, consuming a huge amount of resource-intensive materials - metal, cement, aggregates, bricks, concrete, thermal insulation and other materials.

Are there different points of view on the question of what is primary in construction - material or structure? In accordance with our point of view, the material is primary, and the structure is the material that has been given a certain configuration, while the shape, dimensions of the structure, its bearing capacity, reliability and economy are determined by the properties of the material from which it is made. What is the material - such is the construction. In accordance with our point of view, the material is primary, and the

structure is the material that has been given a certain configuration, while the shape, dimensions of the structure, its bearing capacity, reliability and economy are determined by the properties of the material from which it is made. What is the material - such is the construction. First, a material is acquired or created, all its characteristics are established, and then products, structures, buildings and structures corresponding to this building material are construction. Only such an approach will make it possible to build reliable, energy-efficient and cost-effective construction projects. Therefore, one of the main directions for increasing the efficiency of construction is the use of resource-saving materials, products and structures. For the production of building materials, products and structures, various natural raw materials are used, which have a different degree of technological readiness. The energy intensity of all building materials can be reduced by a qualified choice of raw materials. First of all, it is advisable to use such raw materials, which are to a greater extent prepared by nature itself for production and require less energy for its processing, raw materials with defects in the crystal lattices of minerals; the presence of a mineral-forming medium, liquid, gas; with higher reactivity.

The building materials industry is a priority sector that determines the current state of the national economy and the potential for its development, including the renewal of fixed assets, the construction and repair of industrial facilities, transport and engineering infrastructure, the construction of comfortable and high-quality housing in the required volume, employment of the population in medium and small settlements , as well as the amount of government spending associated with the implementation of development programs. The activity of the industry directly depends on the level of investment activity - investment in fixed assets, demand for building materials from industrial consumers and the population. Import supplies of products, weak realization of the export potential of the building materials industry have a significant impact on individual enterprises of the industry. In general, the capacity for the production of building materials is sufficient to meet demand in the forecast period until 2025, and for some items until 2030 (depending on the considered scenarios of socio-economic development).

If we compare the main building materials in terms of energy consumption, then the most energy-intensive building material is steel, for the production of 1 ton of which 32290

MJ of thermal energy is required, and for the production of 1 ton of portlandsement in 8, brick in 12, reinforced concrete in 16, heavy concrete in 23, cellular concrete 25 times less. At the same time, the mass of 1 m^3 of material is also the largest for steel - 7.8 ... 8 tons.The average density of heavy reinforced concrete is 2.4 ... 2.5 t / m^3, light reinforced concrete - 0.7 ... 2 t / m^3, aerated concrete - 0.3 ... 1.2 t / m^3, brick - 1.7 ... 1.8 t / m^3. Based on the foregoing, it can be concluded that cement is the most energy-intensive after metal, and concrete and reinforced concrete are the least energy-intensive and material-intensive. They are also cheaper and more durable than steel. For their production there are raw materials, including waste from various industries, their technology is relatively simple, waste-free, environmentally friendly. A broad regulation of the basic properties of concrete (medium density, strength, durability) is possible. Therefore, these materials were the main building materials in the XX century, they will remain so in the XXI century; there is no alternative to them. Almost all critical load-bearing structures are made of reinforced concrete: long prestressed bridge structures, columns of high-rise buildings, roof beams, crane beams, large-size shells, pipes for various purposes, sleepers, road and airfield coverings, dams, hydroelectric power plants, protective shells of nuclear power plants, treatment facilities and many other.

Our research shows that the structure of concrete, and in particular heavy, is to a greater extent heterogeneous, defective, and this determines its strength and durability, since all these characteristics are interconnected. Durability is a generalized concept that includes weather, frost and corrosion resistance, bio-, radiation resistance and other similar properties. Concrete is considered and is durable if its strength remains stable over time under various operating conditions, because strength is the integral value of the energy of internal bonds in a material with a specific structure, which ensures its integrity, identity to itself and the ability to resist destruction from various factors. In order to significantly increase the value of internal bonds in concrete, and, consequently, its resistance, it is necessary to significantly increase its uniformity and reduce the defectiveness of the structure. The structure of concrete can be considered homogeneous if all its components have the same chemical, mineralogical compositions and geometric parameters, the same structure, physical and mechanical properties, the uniformity of the composition is observed

in each microvolume, etc. Since all natural and artificial inorganic materials are formed from the same chemical elements, but in different combinations, the joint fine grinding of various materials will lead to a mass consisting of the same primary chemical elements. For example, when finely grinding a dry concrete mixture consisting of crushed granite, natural sand and Portland cement, it will eventually consist mainly of the following chemical elements: K, Na, Ca, Ba, Mg, Al, Si, O, Fe and S , since the chemical composition of the initial components is as follows: granite consists mainly of K, Na, Ca, Mg, A1, O, Si; sand - from Si, O, K, Na, Ca, Ba, Al, Fe; portland cement - from Ca, O, Si, Al, Fe, Mg, Na, K, S. In this case, the number of individual chemical elements in the mixture can vary within certain limits. In this case, the chemical, physical-mechanical and geometrical characteristics of the concrete components are aligned, the contact imperfection is reduced, and the surface energy of the solid phase is used to the maximum extent. In the process of grinding the mixture, its uniformity in composition increases, the shape and state of the surface of the particles change, which ultimately increases the integral energy of chemical bonds between elementary particles per unit volume of the material. The destruction of a material during grinding is a process of breaking mainly chemical bonds between the elementary particles of a solid and dividing it into parts. From a theoretical point of view, these bonds can be restored only by bringing elementary particles closer to each other at such a distance when attractive forces arise between them again, which is possible only when very high pressures are applied. From a theoretical point of view, these bonds can be restored only by bringing elementary particles closer to each other at such a distance when attractive forces arise between them again, which is possible only when very high pressures are applied. However, in real conditions, in places where chemical bonds are broken on the surface of the solid phase, a huge number of elementary particles with a large uncompensated charge arise.

Application in construction of high-quality, resource-saving materials, products and structures, such as: nanocement and concretes based on it with an expanded use of mineral and chemical additives in the production of cements and concrete; low-clinker composite binders based on the use of metallurgical slags, ash and slag waste from thermal power plants, as well as cement-free binders and systems with low water consumption; composite materials, including new generation ceramic composite materials based on modified raw

materials; modern polymer materials; concrete with increased strength and high strength for an openwork supporting frame, aerated concrete, gypsum concrete, laminated products in combination with effective thermal insulation materials for enclosing structures; materials with new properties and green building technologies will significantly reduce the material and energy consumption of construction projects and significantly increase the efficiency of the construction industry.

LITERATURE:

1. Пулатова З.У. Применение бетонного лома в качестве сырья в технологии бетона. В сборнике: Проблемы и решения внедрения инновационных технологий в сфере инженерных коммуникаций научно-практическая конференция (часть 1). 2020 год, 21 май С. 20-23.

2. Сулейманова Л.А., Ищенко К.М. Теплоизоляционные материалы. Формованные теплоизоляционные материалы с использованием вспученного перлитового песка и отходов его производства. Германия: LAP Lambert Academic Publishing GmbH & Co. KG., 2012. 148 с.

3. Лесовик Р.В. К выбору техногенных песков для получения композиционных вяжущих и мелкозернистых бетонов // Технологии бетонов. 2015. № 1-2. С. 60–63.

4. Лесовик Р.В. Мелкозернистые бетоны на композиционных вяжущих и техногенных песках: Белгородский государственный технологический университет. Белгород, 2009.

5. Shaydullayevich, I. N. (2021). To Study the Effect of the Amount of Dispersed Fibers on the Cement Stone and Determine the Optimal Composition.

6. Umetovna, P. Z., & Olimovna, A. S. (2021, May). NANOMODIFIED CONCRETE: TECHNOLOGIES OF THE XXI CENTURY. In E-Conference Globe (pp. 68-71).

7. Shaidullaevich, I. N. (2021, July). STUDYING THE EFFECT OF THE AMOUNT OF CHEMICAL ADDITIONS ON LITTLE GRAIN CONCRETE AND DETERMINING THE OPTIMAL COMPOSITION. In Euro-Asia Conferences (pp. 52-56).

8. Saidmuratov, B. I., & Gulomova, H. A. (2021). PESEARCH PROPERTIES OF THE CONTACT AREA BETWEENAND FINE CONCRETE. European Journal of Life Safety and Stability (2660-9630), 5, 36-39.

9. Negmatov, Z. Y., Ochilov, A. E., & Maxammatov, M. S. (2021, May). SPECIAL PROPERTIES OF ALKALI-ACTIVATED BINDERS. In " ONLINE-CONFERENCES" PLATFORM (pp. 56-58).

10. Maxammatov, M. (2021). HIGH-PERFORMANCE CONCRETE BASED MINERAL ADDITIVES. European Journal of Life Safety and Stability (2660-9630), 5, 6-8.

11. Karimov, G. U. (2021, April). ENERGY EFFICIENT BINDER OF LOW WATER DEMAND WITH MODIFIED MINERAL ADDITIVES BASED ON LOCAL AVAILABLE COMPONENTS. In Euro-Asia Conferences (Vol. 4, No. 1, pp. 106-109)