THE IMPORTANCE OF FILLER IN THE FORMATION OF THE STRUCTURE OF CONCRETE

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Annotation. The physical and mechanical properties of concrete are influenced by the amount and character of the contact zone between the cement stone and the filler. According to the data obtained, the amount of the contact zone may differ significantly depending on the type of filler.

Keywords: concrete, cement, layer, lime, structure, granite, texture, physical and mechanical.

In concrete, fillers occupy up to 80 percent of the entire volume and have a significant impact on its technological and operational properties. Therefore, the quality of fillers is indicated by several requirements that take into account the features of their impact on the properties of concrete screed and concrete.

In concrete strength theory, its absorption is considered closely related to the phenomenon of transverse expansion that occurs in a state of compression. In this case, three marginal cases are distinguished:

1) impregnation occurs as a result of a break in cement stone;

2) the impregnation occurs as a result of a break in the coupling between the cement stone and the filler;

3) absorption is caused by the absorption of the filler itself.

The strength of the concrete will largely depend on the strength of the filler, that is, the mutahkamity of the initial mountain grade. However, the analysis of his literary data shows that the strength of concrete in the conditions of uniformity of mountaineering differs significantly.

Many scientific works are devoted to the issue of the influence of the strength of the combination of cement stone with the filler surface on the strength properties of concrete and the influence of the degree of roughness of the filler surface on the amount of their connection with cement stone. Based on these works, it is possible to distinguish the following varieties by the degree of roughness of the filler surface: rough-here, low-grain-here, smooth, very smooth, polished. The study of such fillers in concrete showed that the strength of the concrete to the junction depends to a lesser extent on the shape and smoothness of the filler. Much more satisfactory results were given the opportunity by the introduction of the concept of a relative surface.

In experimental studies using light and electron microscopy, as well as the microcontroller measurement method, it was found that there would be a very good coupling between the cement stone and the porous filler, while at the same time it turned out that the contact layer significantly differs from the main components in composition and structure.

A number of scientific data are known about the quality of fillers in comparable structural concretions.

Depending on the composition, the following macrostructures of concretions are distinguished: dense, porous filler dense, porous and granular. In different structures, the filler manifests itself in different ways.

The physical and mechanical properties of concrete are influenced by the amount and character of the contact zone between the cement stone and the filler. According to the data obtained, the amount of the contact zone may differ significantly depending on the type of filler. For example, the contact zone of hardened concrete under normal granite Pebble-based conditions is 30-50 μm,

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while in limestone Pebble-based concrete it is 40-160 μm. Heat-moisture treatment leads to an increase in the amount of the contact zone by 2-3 times.

In terms of its composition and structure, the contact zone may differ from the rest of the cement stone. Research of the contact zone using an electron scanning microscope has shown that there are three zones in it. The first zone is the boundary of the "dual – film" filler located on the surface of the filler. It is covered with a layer of Ca(OH)2 1.5 μm thick and new dressing of CSH gel. The second zone is the boundary of the double lime layer with the" double film". This zone is formed after a few days of hydration. The secondary lime layer will consist of much cleaner plates of Ca(OH)2, and it will connect the "double film"with cement stone. The third zone is the boundary between the secondary limestone layer and the cement stone. The secondary lime layer grows from the pores of the cement stone to the side of the "double film".

The composition of the contact zone will depend on the chemical activity of the filler. In this scientific work, chemical reactions on the surface of the following fillers were investigated: sour (granite, granulite, quartz porphyry), intermediate (avgitoporphyr), basic (diabase, basalt).

The authors studied the contact zone and identified these as long as the bond between the linker and filler particles has a microcrystallising description.

The filler has its influence on the processes of structure formation of cement systems: it changes its plastic properties, shortens the cycle of structure formation, that is, it is actively involved in the process of structure formation.

Thus, the filler plays an active role in the formation of a concrete mixture and their structure in concrete.

The importance of filler in the formation of the properties of concrete

The properties of the concrete mixture are characterized by rheological parameters – the marginal tension of the displacement and the plastic viscosity. At the time of vibration, the marginal stress of the shift approaches zero, and the roughness approaches the all-known bounded eroded structural Newtonian roughness.

The technical properties of the concrete screed are: hardness is associated with tightness, while cone sink (KCH) is with marginal stress of displacement.

The determination of the structural viscosity of the concrete mixture is based on the principle that the concrete mixture flows through the calibrated hole during vibration. It provides the opportunity to study the rheological properties of various cement composites: cement paste, construction mixture and concrete mixture on one tool itself .

Berg O.Ya. proposed to evaluate the parametric levels of voltages as descriptions of the microarray formation process. Their identification is made by considering the concrete compression diagram in conjunction with a state diagram, i.e. a diagram in the form of curves of changes in the timing of the passage of ultrasonic vibrations through the sample.

Indicators of deformation of concretions in short-term static Central strain: deformation of the initial elasticity modulus and the material lifting capacity at the moment of loss and the moment of formation of microcracks are noted.

The performance of concrete under the combined action of water and cold is directly related to the type and quality of fillers and the water-cement ratio. As the amount of filler increases to marginal amounts, the resistance of concrete to freezing increases dramatically. This is due to the nature of the absorption of concrete. With an increase in the amount of fillers in cement concrete, the crevice also increases. However, when the amount of filler reaches 0.5-0.6 per unit volume of concrete, the freezing resistance of concrete begins to decrease. This is due to the fact that more and more the quality of the contact zone between the cement stone and the filler begins to take on great importance.

The resistance of concrete to freezing depends on the conditions and acceleration methods of hardening, as well as the type of cement used in its preparation. In order for the concrete to be resistant

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to freezing, it is necessary to select such cements so that the destruction of the cement stone does not occur when using it. For example, such conditions are met by shlacoprotlandtsements with a high (up to 70 percent) content of granulated slag with a base content that seems small. To increase freezing resistance, surfactants (SFMS) are used that reduce the water demand of the concrete mixture and, consequently, reduce the capillary porosity of the concrete.

In the formation of the structure of concrete, a large role is played by the amount of sand in the mixture of fillers, as well as its water demand, since this amount is manifested in an increase in capillary porosity.

The reliability of reinforced concrete structures is largely determined by the crevice of concrete, while it in turn will depend on the presence of micro - and macronuxes in the structure of concrete. The main defect of the concrete structure is the pores in it, which can be seen as inclusions in cement stone. Let these inputs be in the state of the Hox mechanical load, let the Hox be in the state of the environmental impact voltages concentrators are in the position.

Thus, in the filler concrete mixture and concrete, Hox plays an active role, be it in the formation of their structure and properties, and Hox in the process of exploitation. It is possible to say that fillers have a number of specific properties, and these properties should be taken into account when optimizing the composition of concrete mixtures and making a concrete mixture with given technological indicators, as well as using them in reinforced concrete products and structures in various tasks.

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