INCREASING THE RESISTANCE TO CORROSION OF CONCRETE

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Abstract: The article presents the results of studying the erosion resistance of concrete structures used in the construction of buildings and structures.

Key words: concrete, corrosion, road construction, structure, chemical additive.

Until now, the primary and secondary layers protecting concrete against salt corrosion do not show sufficient anti-corrosion efficiency, even if they are used due to their lack of development, the scarcity of materials used for the protective layer, and the high cost. Therefore, the corrosion resistance (stability) of concrete is considered a big problem, especially in the hot and dry climatic conditions of Arololdi regions.

Scientific studies were conducted to determine the optimal composition of GPQ-admixture, and the influence of the amount of admixtures and technological processes of concrete mixture preparation on the physical and mechanical properties of concrete was studied.

Concrete mixtures belonging to classes V 15, V 25, and V 30 were accepted as objects of research. Gravel and sand meeting standard requirements were used as fillers. The components of the additive GPQ, the indicators of the wet-heat treatment regimes of the solidification process were determined by the method of mathematical planning of research.

The GPQ-admixture of concrete is considered one of its main indicators, and the optimization of this indicator consists of the following characteristics: Strength of concrete - (U1), water consumption of concrete mixture -(U2). Taking into account the previous studies, cement consumption was accepted as variable factor - (X1) kg/m2.

These indicators include the molecular filling of large fillers (X2), the amount of fillers (X3) %. Based on the following variation limits in relation to cement mass: 290-430; 0.4- 0.6 and 0.1 – 0.3 (GPQ -2 and GPQ -3 and 0.5- 1% GPQ - 4.

In order to implement the results of active practical research, the data obtained in laboratory conditions were statically processed and a mathematical model was developed for compounds GPQ-2, GPQ-3, GPQ-4. The technological analysis of the mathematical model shows the following. The factors of concrete strength and water consumption of concrete mixture in relation to its quantitative state are in the form of the following decreasing series X1 > X2 >X3. As a result of the differentiation of the received bonds, the optimal amount of compounds was determined in relation to GPQ2 and GPQ-3 (2%)-, in relation to the p/sh amounts for the case corresponding to the following numbers: 0.52; 0.50 and 0.48.

In practice, it is necessary to increase the resistance of various structures to the influence of salt, not only integrated reinforced concrete structures, but also prefabricated reinforced concrete structures (slabs used for roads and airfields, reinforced concrete prefabricated blocks used for different foundations, various irrigation structures, irrigation pipes, etc. [1].

In the production of reinforced concrete, it is necessary to take into account that the GPQ admixture slows down the initial structuring of concrete. For this purpose, optimization of the hot treatment mode during the drying process of concrete with GPQ admixture was also considered.

In the course of laboratory research, the initial mode TVO 2+3+6+2 s, under the influence of temperature 80-850C, the total duration of 13 hours was adopted. Experimental heat treatment of concrete samples was carried out under laboratory conditions in a non-pressure steaming chamber, the heat temperature was automatically controlled with an accuracy of 0.50S. The amount of optimal admixture GPQ to concrete, the optimality of the optimal wet-heat treatment regime was determined by the method of mathematical planning of research.

As a determining factor, the strength of concrete during one day of hot-wet processing of concrete was taken, and (u) as the next variable factors in relation to their variation limit:

X1 is the duration (2-6s) of holding the sample in the initial sample, in hours.

X2- duration of isothermal heating, in hours (4-6s).

X3 – Isothermal heating temperature 0C (65-95).

As a result of statistical processing of active experimental studies and laboratory results, the final strength indicators of concrete after hot-wet treatment were compared to the following parameters created by the mathematical model: for GPQ-2, GPQ-3 and GPQ-4.

We determine the degree of effectiveness of the thermal-wet treatment of concrete on the strength of concrete by the following decreasing series. GPQ-3 > GPQ-2 > GPQ-4. Duration of hot treatment is 14 hours, mode 4+3+5+2 hours, temperature of 800C is the most optimal process. As a result of the plasticizing effect of the GPQ-admixture, it has been determined that the cementing system has a special specific state, which is caused by the nature of the dispersion phase. A significant increase in the efficiency of the GPQ-admixture, along with the plasticizing effect of the components, is explained by the high surface activity on the one hand, and on the other hand, it is determined by the compatibility of ATsF resins.

The second underlying factor is the mechanism of action of high molecular fatty acids formed from water-soluble salts acting on the concrete mixture. In addition, the stress limit of the displacement of the cement system based on the GPQ admixture decreases, and at the same time the sedimentation state of the concrete mixture decreases, which, based on research, has an effect on the water separation, layering and easy laying of the admixture even under the influence of high temperature. appears as a descending line below.

The mobility of the concrete mixture GPQ-4 > GPQ-3 > GPQ-2 increases, in particular as follows: from OK- 2 cm to 2- 18 cm; 6-12 and 5-7 cm. In this case, GPQ-2 has a good effect on the thickness of the concrete mixture. GPQ-3 and GPQ-4 significantly increase the ability to plasticize, affecting the "lubrication" of particles.

In spite of this, the vibrational forming properties of the concrete mixture are also greatly improved in the high temperature environment. If the mixture taken as a reference loses its mobility in 15 minutes, it is observed that the mixed mixture retains it until 45 minutes.) was observed to be preserved up to 75 minutes [2].

The effectiveness of the plasticizing property of the mixture is determined by the reduction of water consumption, and the ratio to cement consumption is as follows: 7-8, 13-14 and 16-18%. Admixture GPQ- increases the dispersion of newly formed cement stone, increases its bonding with fillers, and reduces the water consumption of the concrete mixture by 1.5-2 times. For example: cube strength of concrete is increased by 9-10% when GPQ-2 admixture is added, by 20-28% in GPQ-3, by 28-36% in GPQ-4.

For each case, an increase of 10-12%, 26-39% and 40-59% were observed, in which the prism strength coefficient was legally increased, and 40-59% was observed, in which the prism strength coefficient was legally observed 0, From 7-0.73 to 0.72-0.75, from 0.7-0.79 to 0.78-0.82. The admixture added to the concrete

mixture at its "early age" (3-7 days) increases its strength very slowly, 24-34% (GPQ-2), 13-20% (GPQ-3) and 20-24% compared to normal conditions. (GPQ-4) during the remaining period (from 28 days to one year) the strength of the concrete with the admixture was observed to increase according to the following parameters:

9-18%, 20-48% and 26-62% are the corresponding amounts for each type of joint, which is explained by the very high structural uniformity of concrete and the lack of defects and the presence of clinker foundation. For example: hydrophobized concrete with GPQ-2 admixture shows an increase in strength even after 15 years of storage.It was found in practical studies that the strength of concrete in the mixture of hydrophobized samples was 3-8, while it was equal to 1.2 MPa in standard samples. When an admixture is added to concrete, its stiffness decreases and its deformation properties improve.

In this case, the modulus of elasticity of concrete decreases to 18-24% when admixtures are added, and Poisson's ratio increases to the following indicators: 0.208-0.232 and 0.212-0.249. serves as an increase. For example: V30 class concrete showed that its coefficient of fatigue strength is higher by 11-24% when GPQ admixtures are added to concrete, compared to the standard sample, GPQ admixture plasticization and particle mutual deformation due to its properties, it reduces the internal stress of concrete under the influence of variable loads.

Due to this, the tolerance to the formation of cracks in indirect samples increases. Even when wetted or dried, heated or cooled tests are performed, it was observed that the capillary volume shrinkage (capillary shrinkage) caused by concrete hardening causes an increase in the fracture resistance coefficient at normal ambient temperature when the joint is added.

The numerical value of this indicator ranges from 0.67-0.7 to 0.79-1.01 under normal temperature conditions, from 0.5 to 0.67-0.9 under dry hot weather conditions, and 0 under the influence of cyclically changing temperatures. From 0.76 to 0.8 to 0.86 to 1.04 was determined as practical results.

The effect of joints on the deformation properties of concrete is observed in the following descending order. The presence of clinker foundation in cement stone GPQ-4 > GPQ-3 > GPQ-2 helps to create "self-healing ability" of defects in the concrete structure when GPQ joints are added, and also increases the cold resistance of concrete during freezing and thawing.

Summary:

According to the results of practical studies, the frost resistance of concrete with the addition of GPQ-2, GPQ-3 and GPQ-4 admixtures was the following indicators

for each case: 250, 300 and 400; which is 1.7-2.7 times greater than the parameters of the standard samples, and the recommended admixtures reduce the water permeability of concrete based on the indicators of improving the porous structure of concrete. At the same time, due to volumetric hydrophobization of cement, it increases its strength indicators, reduces water absorption, and due to this indicator, it is possible to increase the resistance of concrete to the effects of various salts [3]. n this case, the water absorption of concrete increased by 22-25%, the state of water saturation by 1.2-1.7 times, the water impermeability index increased from 4 to 6-12 ATI, i.e. 1.4 times, was confirmed by the results observed as a result of research. - that in order for concrete to have the required design strength indicators, it is necessary to increase the duration of its treatment with a high temperature in the steam chamber. It was confirmed that the best strength indicators were obtained when the thermal treatment time was increased by 2-4 hours compared to standard regimes, in this case, the isothermal treatment time was reduced by 1 hour.

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