TECHNOLOGY OF MODIFIED CONCRETE BASED ON SECONDARY AGGREGATES OBTAINED FROM SCRAP CONCRETE

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Annotation: *The technology of modified concrete consists in the introduction of chemical additives (plasticizers, accelerators / retarders of hardening) and mineral fillers (silica, ash) to improve the properties of the mixture. This increases the strength (up to 80-150 MPa), water resistance, frost resistance and durability of structures, optimizing the structure of cement stone.*

Main components and technologies Modifiers: Chemical additives that change the properties of the concrete mix. They include superplasticizers (to increase workability and reduce water consumption), setting accelerators or retarders, as well as complex additives.

Keywords: *specified parameters, technological techniques, plasticizing effect*

Mineral additives: Silica, electrothermophosphoric slag, fly ash increase the density of the structure, water resistance and frost resistance. Nanomodification: The use of nanosilicon and carbon nanotubes to create high-strength concretes with unique properties, including the ability to self-heal. Methods of administration: The introduction of additives with mixing water or into a dry mixture. Intensive mixing and mechanical activation of components are used for high-strength concretes.

Control mixtures are prepared from the calculated concrete mixtures to determine their mobility (stiffness). If the specified parameters differ from the specified ones, the required mobility (stiffness) of the mixture is achieved by some change in cement consumption. Then, samples are formed from the selected concrete mixtures – 6 from each batch.

Advantages of using High strength: Production of concretes of class B60 and above. Durability: Increased resistance to environmental influences, aggressive environments and sudden temperature changes. Adaptability: The mixtures are easier to stack, which reduces the cost of vibration and compaction. Types of modified concrete High-strength: Used for supporting structures of skyscrapers and bridges. Self-sealing: Does not require vibration, fills complex shapes. Frost- and corrosion-resistant: Used in hydraulic engineering and road construction. The technology allows you to save cement and reduce the total cost of construction by improving the quality of structures.

Various additives are used to regulate the properties of concrete, concrete mix and cement economy. Plasticizing additives are additives that regulate the properties of concrete mixtures. Surfactants increase the mobility of the concrete mixture, its uniformity, non-delamination, fluidity when pumped, and contribute to maintaining the workability of the mixture over time. Plasticizing additives can reduce water consumption by 8-12% or, with constant cement consumption, increase the strength of concrete, its water resistance and frost resistance. All this combined makes it possible to effectively use concretes with low V/C and obtain high strength more simply than using other technological techniques,

to make greater use of laying concrete mixtures with reduced V/C using short-term vibration, to successfully concret complex profile structures, to shorten the molding time of products, to improve the quality of the front surfaces, to reduce consumption of cement. Calculation of the composition of concrete with plasticizing additive When determining the composition of concrete with chemical additives, their effect on the properties of concrete and concrete mixtures with appropriate coefficients is taken into account. Information about the effect of additives is obtained based on the results of preliminary tests or from the relevant instructions. If a plasticizing additive is introduced into the concrete mix , then water consumption is reduced in accordance with its effectiveness. Approximately, it can be assumed that technical lignosulfonates (LST) reduce water consumption by an average of 10%. Otherwise, the order of composition determination does not change. The cement-water ratio does not change, since the effect of the additive on the strength of concrete at the age of 28 days is insignificant. The calculation of the reduction in water consumption, l, by x, % is performed using the following formula:

$$B^1=(1- x)\ 1\ ;$$

B – water consumption per 1 m^3 of concrete mix. The consumption of cement, kg, taking into account the effect of the additive will be.

The essence of determining the mobility of concrete mixtures is to measure the draft of the cone of the concrete mixture using a metal ruler. The mobility of the concrete mix with a maximum grain size of more than 70 mm is determined using a 450 mm high cone device with an inner diameter of 300 mm for the lower base and 150 mm for the upper one. In this case, the draft of the cone of the concrete mixture is reduced to the value of the draft of the standard cone multiplied by a factor of 0.67. The actual technical effect of using plasticizers can be different. To evaluate it, the concept of "effective plasticizing effect" is introduced, which refers to the amount of plasticizing effect that is achieved from the use of plasticizer without reducing the strength of concrete. Table 1 shows the classification of plasticizers according to their effective plasticizing effect.

Category	Name	Effective plasticizing effect (magnification of approx from 2...4 cm), cm	Reduction of the amount of water, %
I	Superplasticizer	To 20 and more	At least 20
II	Plasticizer Up	Up To 14...19	Not less than 10
III	Plasticizer Up	Up To 9...13	Not less than 5
IV	Plasticizer Up	Up to 8	ess than 5

It is recommended to assign the composition of concrete with an additive by adjusting the designed and selected composition of concrete without additives. The composition of concrete without additives can be selected by any proven methods that ensure the

production of concrete with specified properties with minimal cement consumption. When introducing an additive accelerator for concrete hardening in order to reduce cement consumption, it is recommended to adjust the composition of concrete as follows: to establish the optimal amount of a hardening accelerator additive for heavy and light concretes, which is prescribed according to Table 4 with an interval of 0.5%, and the achieved increase in strength at the design age as a result of its introduction;

When using a concrete hardening accelerator additive in order to reduce the heat treatment regime, the adjustment of the concrete composition consists in determining the optimal amount of the additive, which is recommended to be produced in the following order: mixtures are prepared from a concrete mixture selected by any proven method with the addition of an additive, the amount of which is assigned according to Table 4 at intervals 0.5 %; samples are formed from mixtures, which are subjected to heat treatment or kept in natural conditions and tested for compressive strength; according to the results After testing the samples, the optimal amount of the additive is determined; the increase in strength of concrete undergoing heat treatment is then used to reduce the heat treatment regime.

It is recommended to select the concrete composition as follows: select the concrete composition without adding the required grade and mobility using any generally accepted method with minimal cement consumption; in conditions closest to production conditions, prepare mixtures by introducing an antifreeze additive into the selected concrete mixture in the amount specified in Table 5; determine the mobility of the concrete mixture and the time of its loss; if the concrete mixture does not have the initial mobility or retention time If it meets the requirements, then repeated tests are performed with the introduction of retarder additives into the concrete mixture, starting with the minimum dosages.; during plasticization of the mixture, due to the introduction of antifreeze or setting-retarding additives, water consumption decreases until the mixture has a given mobility by the time it is laid.; if it is necessary to introduce microgassing additives into the concrete mix , the mixture is additionally checked for workability.; if it is necessary to introduce air–entrapping additives into the concrete mixture, the specific effect of entrained air on the plastic properties of the concrete mixture should be taken into account - an increase in workability under the influence of vibration with an almost imperceptible effect on its mobility. Therefore, when using air-entrapping additives in combination with antifreeze , the mobility of the mixture should be reduced by reducing water consumption. The decrease in water consumption in this case is compensated by a decrease in strength due to the entrained air, and the mixture in the air-entrapping the additive will be characterized by the same workability as the plastic mixture without it.

Thus, concrete of class B 40 was obtained using traditional components and the simultaneous use of 2 chemical additives. At the same time, the achievement of the design strength of concrete was achieved at the age of 7 days, which certainly indicates the positive effect of chemical additives on the processes of cement hydration, the correct

selection of the component ratio and obtaining a more dense packing of the grains of the solid concrete mixture.

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