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Special Objects from Hydraulik Concrete

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Abstract: In the article, it is planned to build small and medium-sized hydroelectric power stations and irrigation canals in our country. A comprehensive solution to the problems in this field of construction is provided by large-scale industrialization of construction processes.

Keywords: structures, concrete, construction, hydraulic, irrigation, comprehensive, solution, industrialization, processes.

Introduction.

V nashey strane planiruetsya stroitelstvo malykh i srednih hydroelektrostantsii i orositelnykh kanalov. Kompleksnoe reshenie problem v etoy oblasti stroitelstva reshaetsya putem masshtabnoy industrializatsii stroitelnyx protsesov.

By further improving the quality of the main building material of hydraulic structures - concrete and reinforced concrete, it is planned to expand the construction scale of these structures. Special objects are built from hydraulic concrete: dams, water discharge towers, sewage treatment facilities, bridges. We can see 3 types of hydraulic concrete:

- water columns of underwater bridges;
- being in a place where the water level changes from time to time;
- located above the water and is periodically washed away by water.

Another classification divides concrete into non-massive and massive, as well as materials for non-pressure or pressure structures. The construction of these structures can be developed by improving the quality of concrete and reinforced concrete, which are the main materials of hydraulic structures. Concrete produced in hydraulic structures should have the following properties:

Concretes produced in hydraulic structures must have the following properties: high density, frost resistance, sufficient strength, low shrinkage, resistance to mineralized water, and low heat release during solidification By improving the mixability and formability of the concrete mixture, it is possible to prevent watertightness, frost resistance, deterioration from mechanical forces and chemical corrosion of hydraulic concrete.

This is achieved by adding chemical additives and surfactants to the concrete mix. In the construction of hydraulic structures, when pouring concrete mix into large-volume concrete blocks, it is of great importance to achieve slow hardening of the concrete mix and to achieve the properties of not losing water (not dewatering) from the concrete mix itself when placed in the structure. The use of chemical additives in concrete mixtures is the most convenient and

preferred method of controlling concrete technology and its properties. Taking into account the above, it is advisable to add hydrophobic-active chemical additives to hydraulic concrete. They improve the deformation properties of concrete, as a result, the durability of concrete increases.

It is possible to improve the properties of concrete mixtures and concrete used in the construction of hydrotechnical structures by adding various chemical additives to the concrete mixture, primarily products of petrochemical synthesis.

These chemical additives are added during grinding of cement clinker in ball mills. Hydraulic concrete During solidification, limited heat production, limited shrinkage and deformation capacity. It also depends on the class of concrete from water resistance and cold resistance, compressive strength.

Hydrotechnical "hydrophobic" concrete is a type of concrete to which special additives have been added that give the material new properties. Hydrophobic concrete is characterized by high resistance to the negative effects of water. The water-repellent properties of the material allow it to maintain its performance even when in constant contact with water. Concrete for hydraulic structures must provide long-term service in structures that are constantly or periodically washed with water. Therefore, depending on the service conditions, hydraulic concrete also has requirements for water permeability and often frost resistance. The fulfillment of these additional requirements is ensured by correctly determining the exact composition.

Special structures are built from hydraulic concrete: dams, water towers, sewage treatment plants, bridges. Many years of experience in using building materials show that hydraulic concrete structures must be durable, durable, water resistant, and cold resistant. There is a mandatory list of requirements for this construction waterproofing material, firstly, water resistance (tightness) is resistance to the destructive effects of water. Secondly, water permeability. This is the maximum liquid pressure for pouring concrete (from 2 to 8 in the morning). This indicator is also evaluated by the filtration coefficient The test solution can withstand 180 days. Thirdly, frost resistance is an indicator of the number of freeze / thaw cycles. The value of frost resistance is usually from 50 to 300 and more. In this case, the concrete is tested in freezers. In addition, the most important thing is the resistance of concrete to compression strength, resistance to stretching, bending and low heat release during construction are important.

The strength index of hydraulic concrete is determined in the test after 180 days. Concrete of classes B10... B40 is used in construction. According to the water permeability, concrete is divided into four grades in the test after 180 days: B2; B4; B6; B8. During the standard test, the grade of concrete B2 should not allow water to pass through the concrete grade at a pressure of 0.2 MPa, while B4; B6; B8 - at a pressure of 0.4, 0.6 and, respectively, 8 MPa [3].

Hydraulic concrete is divided into five classes according to its frost resistance: B50, B100, B150, B200, B300. In this case, the concrete grade is determined by the number of freezing and thawing cycles (after 28 days), after which the concrete strength decreases by no more than

25%.The requirement of frost resistance is determined only for hydraulic concrete, which is exposed to the influence of water and cold on the structure. The main properties of such concretes are ensured, for example, water permeability:

1) selection of building materials with the required resistance to cold and water;

2) determination of the S/C ratio not only for its strength, but also for its durability;

3) determination of the specific amount of cement to be added to concrete;

4) selection of the shear coefficient α for concrete to be dense and durable;

5) in some cases, the use of small aggregates that reduce heat and deformation in concrete and guarantee the production of dense concrete with low consumption of cement;

6) use of air-permeable additives.

The most important thing is to choose the right W/C ratio, which indirectly ensures the production of concrete of the required density, although the best results are achieved when performing the entire set of measures. [3].

Materials for the preparation of hydraulic concrete must meet the requirements of GOST 26633-2012;

The following types of cement can be used to prepare a concrete mixture:

- portland cement;
- plasticizer (cold-resistant and waterproof concrete with a 10% reduction in cement consumption);
- hydrophobic (property repels water from concrete voids)
- Puttsolan portland cement (mineralized natural water in the densification of concrete and has physical and chemical resistance)
- sulfate resistant (in aggressive waters and difficult conditions).

Special chemical additives increase the water and frost resistance of concrete, for example, superplasticizers such as SDB (Sulfidodrozheaya barda - Sulphide yeast barda) or SNV, or special chemical additives such as organomineral.

Conclusion

Fillers for hydraulic concrete must ensure its water resistance and frost resistance. Quartz sand and crushed stone or gravel of sedimentary rocks, the water and frost resistance of which has been confirmed by experience, are used. Particular attention should be paid to the particle composition of the fillers:

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