CONDITIONS FOR OBTAINING HYDOPHOBIC CEMENT

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Abstract: The article describes the methods of obtaining hydrophobic cement by means of waterproof additives.

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Hydrophobic cement is obtained by introducing special hydrophobic additives during grinding of cement clinker, and only in this operation does the production of hydrophobic cement differ from the technology of conventional cements. In addition, already prepared cement can be given hydrophobic properties by regrinding it in mills in the presence of water repellents. [1-2]

The production of hydrophobic cement is based on the formation of chemisorption films that appear on cement grains as a result of the interaction of hydrophobic additives with free lime, which is released from cement clinker silicates.

Many centuries before our time, the use of hydrophobic organic substances was practiced to increase the water resistance of air lime. Fats, oils and some other organic compounds with hydrophobic properties are widespread in the animal and plant kingdoms. Everyday encountering such substances in the natural environment, people

have long used them not only for food, but also for various domestic and industrial needs, including in construction equipment. [1-9]

So, for example, in ancient Rome, lard and coagulated animal blood were added to lime, and in ancient Russia - cottage cheese, flax chopped along with flaxseed, a decoction of spruce bark and other substances.

Just as our even more distant ancestors, when producing fire by friction, did not suspect the law of the transformation of one type of energy into another, so the craftsmen and architects of the ancient and Middle Ages used organic surface-active additives, the physicochemical properties of which were discovered only many centuries later.Organic additives to air lime, which in the old days was the main and most important binder, were used until the 18th century. inclusive. Second half of the 18th century and the whole nineteenth century. were an era of rapid development of hydraulic binders. The need for water-repellent and similar additives, as it seemed then, disappeared, and they were forgotten. [1-4]

For example, under various names (ceresite, cerolite, etc.), mixtures of calcium oleate and aluminum oleate with calcium hydroxide were used. (The latter component was usually taken in excess to facilitate uniform distribution of oleates during their introduction into the concrete or mortar mixture). There were also preparations from bitumen, waxes and resins used in the form of emulsions in the manufacture of concretes and mortars. Sometimes the hydrophobization of concrete products was carried out by successive impregnation with solutions of soap and aluminum alum in water, or with a solution of paraffin in dichloroethane or carbon tetrachloride, or other compounds. [5-7]

The development of such methods for the hydrophobization of concrete was mainly of an empirical nature.Some of the original theoretical concepts used by the world concrete science at that time were revised. In the process of research, it turned out. What deserves special attention is not hydrophobic, but hydrophobic additives. The former, for example, paraffin, stearic acid or calcium salts of higher fatty acids, when mixed with cement, do not react with it and remain in it as a mechanical impurity.

The second, for example, water-soluble soaps of fatty, petroleum or resin acids, are not hydrophobic in themselves, but form hydrophobic substances as a result of chemical interaction with cement. [7-9]

Thus, the first fundamental condition for obtaining hydrophobic cement is the use of non-hydrophobic, namely, hydrophobic additives. Additives of this type include substances containing large asymmetrically polar molecules and capable of interacting with calcium or magnesium ions when adsorbed on the initially hydrophilic surface of cement grains. As a result of this interaction, calcium or magnesium hydrophobic salts (soaps) oriented in a strictly defined order are formed.

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