analysis of the previous method). Furthermore, an additional source of error is the saturation of the sample through an end surface of the sample state and a porosity which is not quite adequate and porosity of the material in the sample. Increased duration of carrying out this method due to the same factors that are listed in the foregoing assay method.

In Polotsk State University the work on the development of a method for determining water resistance of concrete with high marks for waterproof W18 – W20, trademarks frost resistance F200 – F400 is carried out.

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CHOICE OF METHOD OF INCREASING THE WATER RESISTANCE OF CONCRETE

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The article shows various ways to improve the water resistance of concrete. Their main features are described, positive and negative sides are identified. Ways to improve the water resistance of concrete can be divided into two groups. The first includes activities involving the use of different materials for waterproofing. Without changing the degree of water resistance of concrete, it protects against the penetration and impact of groundwater and process water. The second group of special device eliminates the waterproofing layer and provides for increased water resistance of concrete.

The last decades of the twentieth century were marked by significant advances in concrete technology. In those years there were widespread and new modifiers for concrete binders, active mineral additives and fillers, reinforcing fibers, new technological methods and methods for building composites. At the turn of the century greatly enriched understanding of the structure and properties of concrete, the processes of structure formation, the opportunity to predict the properties and characteristics of the active material management, successfully developing computer-aided design of concrete and automated process control.

Today a lot of different types of concrete are used in the construction, and the creation of new concrete intensively continues. Concrete is widely used in residential, industrial, hydraulic, energy and other types of construction.

Concrete, being the most striking representative of a wider class of materials – construction composites hydration hardening projected on the basis of a single material, gives a new impulse to create layered, thin-walled, and other specialized types of building structures of the new generation [1].

Concrete has high mechanical properties: durability, fire resistance, easy adaptability to almost any form. But it also has disadvantages, which primarily relates it watertight. Under the pressure of groundwater there is usually underground part of industrial, civil and public facilities. Seepage of water into structures (hydraulic facilities, tanks, pools, tunnels, basements, dams, etc.) can cause serious consequences. Therefore, improving the water resistance of concrete is an urgent task.

Ways to improve the water resistance of concrete can be divided into two groups. The first includes activities involving the use of different materials for waterproofing. Without changing the degree of water resistance of concrete, it protects against the penetration and impact of groundwater and process water. The second group of special device eliminates the waterproofing layer and provides for increased water resistance of concrete [2].

There are the following main types of waterproofing: the painting (from the roll and film materials), plaster, asphalt and team (made of metal and plastic sheets and profiles). Found application isolation cast (insulating material is poured into the insulated surface and fills the gap), impregnation (saturation of the upper layer materials) Loose-fill (from hydrophobic powders) and injection (injection into the cracks and crevices of waterproofing material) [3].

In the last 5 – 10 years for waterproofing civil and industrial buildings penetrating materials are often used. It has become common practice, both in the construction and the rebuilding of their health. Waterproofing materials are on the market for over 15 years one of the leading groups of companies takes "Kalmatron" producing a whole family of penetrating waterproofing materials and hydrophobisator NGL-11P.

Protective waterproofing penetrating material "Kalmatron" consists of Portland cement, dried, purified and fractionated quartz sand and complex reactive mineral supplements.

For "alerting" material "Kalmatron" requires only mixing the dry mixture with water in a certain ratio.

The principle of operation is based on the interaction of water in the presence of the chemically active part of the cement (as contained in the "Kalmatron", and the concrete structure to be protected), and when formation of this kind of electrolytic solution was saturated, which is due to osmotic choke structure penetrates the available concrete therein capillaries and pores (even towards the water pressure). And already in the concrete of this solution sparingly grow crystals that and compacted concrete structure, but not tightly sealing surface (the film), and sharing existing voids and pores on numerous smaller capillaries.

In any quality concrete have more or fewer non hydrated cement (i.e. not entered into the chemical reactions that result in a crystalline lattice of concrete). And these unreacted cement grains are "weak links" of the lattice, reducing its strength properties. Kalmatron involves them in a stronger reaction to form crystals, thereby increasing the surface layer of concrete.

Kalmatron may be used not only as a protective coating, but also as an additive in concrete and mortar (cement) mixture to streamline the entire array of concrete structures (due to complete passage of hydration of cement). Kalmatron concrete strength increases up to 20% increases water resistance for 2 – 3 steps and also increases the cold resistance of 50 cycles.

In addition, all materials family Kalmatron do not contain in their composition components harmful to human health, which allows their use in contact with drinking water.

Hydrophobisator NGL-11P (30% solution of sodium methylsiliconate, NGL analog-11H) is designed to protect from moisture absorbent porous building materials and structures. Composition "NGL-11E" gives water repellency treated materials.

Used for:

- processing materials in the masonry (brick silicate, ceramic brick, concrete, natural stone, etc.) to protect against water saturation;
- conservation decorative properties of construction materials for many years color retention and technical characteristics of the material reduces water absorption by 25 times;
- preventing the occurrence of leaks and efflorescence on the surface of ceramic bricks.

The treated surface retains its properties for 15 years.

On a constructive solution waterproofing can be single or multi-reinforced and unreinforced, with a protective layer and without ventilated when space under cover communicates with the outside air.

View received waterproofing depends on the required quality, strength, existing groundwater backwater. Take into account when selecting the required waterproofing indoor dryness, fracture designs. Select those materials that best meet the requirements for waterproofing, by comparing their performance with the operating conditions [3].

Unlike waterproofing associated with high labor and the cost of not providing the required quality and durability of construction, waterproof concrete has serious advantages, causing its wide application in construction.

To improve the water resistance of concrete there are the following groups of additives:

- sealing additives;
- hydrophobizing additives;
- plasticizing agents;
- complex additives.

Packers supplements increase water resistance of concrete through the use of water-soluble inorganic or organic substances. As used mill ground and mineral supplements from fine raw materials granulated blast furnace slag, fly ash and slag FCS. The effect of these additives is mainly to reduce mudding capillaries in concrete, and other leaks section greater than 1 mm, through which the moisture migrates. Such additives when soaking swell and clog the pores of the cement stone. Mineral supplements are considered waste and therefore cost-effective, but they increase the water resistance of concrete is negligible.

Water-soluble additives, concrete sealing materials include the following materials: iron chloride, sodium and potassium silicates, calcium nitrate, sodium aluminate, etc. [5].

Most cheap, simple and effective supplement is calcium nitrate (NC). At a dosage of 0.5 – 1% by weight of cement concrete water provides the best intensifies the strength development and increases the ultimate strength of 20 – 30% [6].

Hydrophobic additives – substances imparting hydrophobic properties of concrete and reduce water absorption of concrete [7].

They are adsorbed onto the cement grains in the form of a thin (monomolecular) layer to form on the surface a water-repellent film. However, they affect the curing process, contributing to the formation of cement with more homogeneous and fine-grained structure.

For water-repellent additives include abietates, sodium oleate, silicone water repellents (NGL), bitumen emulsion, etc.

Complex additives – chemicals that are multi-functional activity and containing in its composition two or more single-component additive [7].

The most used and effective complex supplements include a comprehensive waterproofing additive "Mabel" crystal- additive for water-resistant concrete Betocrete C-17 (C-17 Betokret (BFAU)).

Work on the technology of water-resistant concrete cost is many times cheaper than the device difficult, time consuming and costly waterproofing. This technology greatly affects the quality improvement structures extend their service life, and positively affect other properties of the concrete.

In Polotsk State University carried out the work on a method to improve the water resistance of concrete under the brand waterproof W18 – W20.

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STRENGTH OF MASONRY WITH RETICULAR REINFORCEMENT

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The results of the research of the strength of masonry with transverse reinforcement are given. The coefficient of the effectiveness of reinforcement and the coefficient of the utilization of armature are defined. New dependence by determination of the durability of the squeezed elements is offered.

Masonry is a monolithic anisotropic building material. A difficult tension arises in it under the influence of loading. It is caused by different strength and deformation characteristics of brick and solution. Masonry is widely used in the constructions working for compression. At the same time the increase of durability of separate parts of buildings (columns, walls, etc.) is often required. Mesh reinforcing can be used for it.