

## **RESEARCH OF PHYSICAL AND MECHANICAL PROPERTIES OF MULTILAYER CERAMIC TILES**

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Nowadays, in the field of building materials production, the modern direction of development is the use of resource-saving technologies. Constantly increasing requirements for the quality of construction products and growing competition among manufacturers force the development of materials with increased strength, resistance to aggressive environments, adjustable hardening speed, as well as concretes for various purposes: radio-absorbing, cementing, structural and thermal insulation, hydraulic, energy-efficient, luminescent, etc. The most important characteristics are decorativeness, strength and durability, and related to them are porosity, water absorption and frost resistance of the material. The development of such materials is a priority area for modern materials science.

In this work, granite crushed stone, granite screenings, washed river sand, and Portland cement were used as raw materials. The experimental tile samples were obtained using classical technology, but they had two layers (layer I (base) – a mixture with an additive for hard concrete mixtures to store the optimal amount of water while simultaneously preserving the geometric parameters of the products, layer II (textured) – a mixture with the addition of a hydrophobic sealant that disperses fine fractions in the concrete mixture).

To form a multilayer structure, the first layer was poured into the matrix and a vibrating table was used to compact the mixture for 30 seconds, then the second layer was poured and vibro-pressing was carried out with a pressure of 15...20 MPa. The molded tiles were kept in a humid environment for the next 12 hours before being moved to storage warehouses.

The physical and mechanical properties of the test specimens were determined according to current standards. The experimental values of the indicators were found as the arithmetic mean of 5 conducted studies. Analysis of the obtained results showed that 14 days after vibroforming, the test specimens of the tiles acquire 70...80% of the total strength and have the following properties: water absorption – 3.5%, apparent density – 2.2 g/cm<sup>3</sup>, compressive strength – 38...45 MPa, which corresponds to the concrete class B 30 - B35 and the concrete grade M 400 - M 450.

Thus, according to the results of the experimental studies, a multilayer paving slab was obtained, which is characterized by a complex of high physical and mechanical indicators, due to the use of the optimal amount of additives for hard concrete mixtures for the main matrix and a hydrophobic sealer for the textured layer.

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