SSNN P3 **HOMOGENIZATION OF THE NANOMODIFIED CONCRETE MIXTURE IN THE MAGNETO FLUIDIZED LAYER**

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There are presented the experimental results on the hardening of the concrete by the activation of its components in the magneto fluidized layer and the use of nanomaterial in the form of graphene.

Recently, nanotechnologies are beginning to be widely used in construction, which are aimed primarily at improving the quality of mineral binders and, above all, Portland cement. Two directions are observed: the first involves grinding the cement particles before using it, and the second consists in adding nanodispersed materials to the cement as modifiers.

When manufacturing concrete from ordinary Portland cement, the specific surface of which is about 3000 cm^2/g , only a third of the volume of its particles, mainly from the surface, enters the hydration reaction, the rest of the cement remains as a simple inert aggregate. Additional grinding of cement allows to increase the specific surface area of the particles, which leads to an increase in its quantity that reacts with water. Consequently, to obtain concrete with given characteristics, less cement is required. The second direction, namely, the addition of nanomodifiers in portland cement, allows to increase the strength of concrete products or to reduce the quantity of cement while keeping the same mechanical strength of the concrete.

The surface energy of the nanoparticles is very high, so they form conglomerates. When solidifying the nanomodified concrete mixture, they adversely affect the formation of the cement matrix and the increase in the strength characteristics of the concrete. So, at nanomodification of building materials, the problem arises of uniform distribution of nanoparticles in the volume of a dispersed mixture.

The tasks of fine grinding portland cement and homogenizing the nanomodified concrete mixture can be solved by means of a magneto fluidized layer. The magneto fluidized layer is a suspension of needle-shaped ferromagnetic elements in a rotating electromagnetic field. Ferromagnetic elements in the magneto fluidized layer perform intensive rotational and translational movements, colliding with each other and with the walls of the apparatus. They simultaneously bring in motion the components of the concrete mixture and nanomaterials, which are placed in a magneto fluidized layer. As a result of intensive movement and impact between ferromagnetic elements Portland cement particles are crushed, and nanomaterial particles are evenly distributed in the volume of the entire concrete mixture.

In the experiments we used Portland cement PC 400-D20 produced by Lafarge Cement Moldova S.A. and sand from local quarries, which underwent mechanical activation in the magneto fluidized layer. As a nanomaterial, graphene was used.

It is shown that the addition of graphene even in small amounts (~ 0.01% of the volume of the mixture) makes it possible to increase the strength of concrete for compression $f_{ck.cube}$ by 23 ÷ 28% and on stretching at flexure $f_{ctk.}$ - by 10 ÷ 20% compared to the concrete mixture activated in the magneto fluidized layer.