

STUDY OF THE PROPERTIES OF FINE-GRAINED CONCRETE MODIFIED BY THE NANODISPERSE SERPENTINITE ADDITIVE

The purpose of the research consists in development of a nano-sized additive containing mineral serpentinite designated for fine-grained concretes. In this article, the results of research into the influence of nanodisperse mineral serpentinite additives on physical-mechanical properties of fine-grained concrete are provided.

Nano-sized particles are obtained by the milling of serpentinite together with C-3 plasticizer, the content of which is equal to 1 % of the mass of serpentinite, and the milling time is 30 min. Milled nano-sized particles are dispersed in the water environment using the ultrasonic technology. The ultrasonic treatment frequency is 35 KHz, and the exposure time varies from 15 to 60 min.

The study of the effect of the nanodisperse additive is performed using samples of fine-grained concretes made of white-color cement and quartz sand and hardened according to the regular procedure.

If the concentration of serpentinite is equal to 0.01 % and the additive is obtained by the 15-minute exposure to ultrasonic dispersion, the 0.15 % content of the nanodisperse additive added to the fine concrete improves the compressive strength 1.5-fold, the bending strength — 1.3-fold, and improves the average density by 8%, while the water absorption rate goes down 1.7-fold. Resulting strength properties comply with the structure of cement identified with the help of an electronic microscope.

Key words: serpentinite, fine-grained concrete, ultrasonic dispersion, nanodisperse additive, plasticizer.

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