UDC 691.327.32

DISPERSED REINFORCEMENT WITH STEEL FIBER OF EXPANDED CLAY AGGREGATE CONCRETE

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Dispersed reinforcement with steel fiber is one of the perspective directions in the modification of expanded clay aggregate concrete. The addition of steel fiber most often could improve the characteristics of normal-weight concrete (for example, the compressive strength). However, the obtained results of the study have concluded other statement for lightweight concrete.

The object of the study is expanded clay aggregate concrete modified with steel fiber.

The subject of the study is the mean value of compressive cube strength of expanded clay aggregate concrete reinforced with steel fiber.

The aim of the study is to determine the influence of the reinforcement percentage of dispersed reinforcement (with steel fiber) on the values of the mean value of compressive cube strength of expanded clay aggregate fiber-reinforced concrete.

The following concrete composition of expanded clay aggregate fiber-reinforced concrete was C : S : G = 1 : 1.84 : 0.79. Water-cement ratio was 0.52. The tests were carried out on concrete specimens in the shape of cubes with an edge size of 100 mm.

The main materials were used for manufacturing concrete specimens: expanded clay gravel (as coarse aggregate), river sand (as fine aggregate), Portland cement (as the binder), and steel fiber (as reinforcement). Milled steel fiber 33 mm long was used as dispersed reinforcement for the study. The reinforcement percentages of steel fiber were used ρ_{sf} = 2 %, 5 %, and 8 % by weight of concrete weight.

According to the results of an empirical study, a decrease of the mean value of compressive cube strength with an increase of the reinforcement percentage was established (by 9 %, 16 %, and 20 % with a steel fiber content of 2 %, 5 %, and 8 %, respectively). The lower values of the compressive cube strength of expanded clay aggregate fiber-reinforced concrete compared to expanded clay aggregate concrete can be associated with non-optimal geometric parameters of dispersed reinforcement (fiber length) and with small sizes of specimens (cubes with an edge size of 100 mm). It is preferable to apply fiber with a length commensurate with the maximum grain size of the coarse aggregate.

The conclusions drawn on the obtained empirical data require additional experimental confirmation. In this regard, it is perspective to conduct further studies.