STRENGTH OF LAYERED FIBERCONCRETE

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In the work fiberconcrete prisms were created with non-homogeneous layered fibers distribution inside them. Fiberconcrete is important material for load bearing structural elements. Traditionally fibers are homogeneously dispersed in a concrete. At the same time in many situations fiberconcrete with homogeneously dispersed fibers is not optimal (majority of added fibers are not participating in loads bearing process). Is obvious, that is possible to create constructions with non-homogeneous fibers distribution in them, in different ways. (Krasnikovs et al., 2012; Krasnikovs et al., 2008; Li, 2003) Present research is devoted to one of them.

While fiberconcrete strength properties, in most of currently available design recommendations, are observed using inverse approach (approximating the experimentally obtained curve), it should be noted, that the direct modeling approach allows to perform economically optimal design of fiberconcrete structure and to obtain realistic characterization, for the actual fiber type, of fibers distribution and spatial orientations in structural element volume. In the present research three different types of layered prisms with the same fibers amount in them, were experimentally produced (four samples with dimensions 10x10x40cm were fabricated for each type as well as for reference, four prisms with homogeneously dispersed fibers were produced also). Prisms were tested under four point bending conditions till crack (in each prism) opening was reached 8mm. Simultaneously, prism cracking was simulated numerically, using elaborated numerical model for neutral axes location in the prism during crack growth and cracked beam load bearing capacity during crack growth and opening. Numerical modeling results were compared with experimentally obtained. Some conclusions about fracture process features were done.

References

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