

STUDY OF THE BEHAVIOR OF POLYMER CONCRETE TO SHOCK LOADING

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Abstract.

The paper presents the results of the study of the basic physical-mechanical properties of polymer concrete produced on the basis of polyester resin. In the material, a mixture of fine- and coarse-grained andesite and teschenite are used as a filler and an aggregate, accordingly. Polymer concrete is reinforced with metal or non-metal fibers. The reinforced polymer concrete is a prospective material for manufacturing of the elements of building structures that are used in difficult conditions, including underground conditions. The reinforced polymer concrete with high mechanical properties may turn out to be effective materials under dynamic loading conditions. The results of testing of reinforced polymer concrete for compression, tension and shock resistance are given. It is revealed that the developed material, as compared with cement concrete, works better for tension and shock. Thus, the tensile strength of polymer concrete is seven-times higher than the tensile strength of ordinary concrete. Reinforcement of polymer concrete with basalt and steel fibers showed a noticeable increase in tensile strength. The advantage of reinforced polymer concrete in comparison with ordinary concrete in terms of shock resistance (10-12 times more) was also revealed. The opinion was expressed that the resistance of a material to dynamic effects is the best assessed not by shock resistance, but by explosion resistance.

KEY WORDS: polyester resin, andesite filler, teschenite aggregate, fibers, reinforced polymer concrete, shock resistance