

## Relevance of use of composite materials on the basis of basalt in the production technology of the high-loaded concrete cross ties

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### Abstract

The analysis of scopes of composite materials on the basis of basalt is made and its benefits in comparison with the metal and polymeric reinforcing fillers are revealed that will give the chance to create material with not electroconductive armature, to raise durability on a bend, crack and crash-worthiness, freeze- and chemical firmness of concrete with its use to reduce water penetration. The use of a basalt fiber and grids from basalt for various scopes is considered. So introduction in a cement matrix of basalt fibers allows to increase: durability of samples on compression for 30-40%, on axial stretching in three – four times; impact strength of a composite by 3-4 times. The use of a basalt grid for reinforcing of road surfaces allows: to considerably increase time between repair work (by 2-3 times) at the expense of more uniform load distribution by a roadbed, and also due to reduction of formation of cracks because of temperature cycles; to reduce thickness of an asphalt covering to 20%; to carry out styling in all weather conditions, even at low temperatures; improve the comfort of road users; ensure easy operation, easy cutting and grinding using standard equipment during repair of the roadway in an ecologically safe manner. In different types (fabrics, fibers, a roving, a fiber, films, finished products) strength indicators of a surface and in amount allow to increase use of a plasma processing of numerous types of substrata, such as different types of metals, inorganic materials, natural, artificial and synthetic polymeric materials, to influence a lyophilic property of a surface including imparting necessary chemical groups, increasing adhesion to the processed materials. Therefore for the purpose of reduction in cost of lifecycle of concrete cross ties with simultaneous increase in a resource, the question of production of a concrete cross tie with dispersible the reinforced basalt fiber or a woven three-dimensional design from basalt fiber modified by low-temperature plasma for further application in the high-loaded and high-speed railroads is discussed.

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