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Adding Additional Substances to the Composition of Serobitum

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Abstract

Analysis of methods of production of serobitum. Adding the necessary components to the composition of serobitum and obtaining serobitum with a high degree of strength on their basis. They improve the physico-chemical properties of serobitum.

Keywords: serobitum, bitumen, sulfur, urea.

The patterns of changes in the group chemical composition and structural features of modified bitumen using an adhesive additive have been established. The values of the effective particle diameter were identified at an optimal additive content of 0.8 wt.%, at which the bitumen system reaches the most active state. It has been shown that a decrease in the contact angle of wetting, surface tension of bitumen, and, as a consequence, an increase in the work of adhesion is extremely dependent on the content of the adhesive additive in the bitumen [1].

Contains an analytical review of domestic and foreign literature on sulfur-containing binders for building materials. In particular, the issues of structure formation of sulfur bitumen compositions for road use are covered. The influence of recipe and technological factors on changes in their physical and mechanical properties is considered. It has been shown that experimental data obtained in a number of works characterizing the properties of sulfur-containing road building materials are often contradictory in nature, due to differences in the group compositions of road bitumen, the elemental composition of technical sulfur containing various impurities, as well as differences in technological parameters for the preparation of compositions. It has been established that the use of sulfur bitumen binders in hot asphalt concrete technology is hampered due to the release of toxic hydrogen sulfide during the production of sulfur bitumen compositions and when laying the sulfur asphalt concrete mixture into the pavement. The possibility of increasing the practical value of the production of sulfur-containing road binders by ensuring the sanitary and toxicological safety of their production, as well as by increasing the technological and operational properties of asphalt concrete when using bitumen-polysulfide compositions as binders is substantiated [2].

For the first time, a system-technical analysis of the specific features of technological stages in the production of sulfur-asphalt concrete mixtures was carried out in order to determine the principles of structural synthesis and functional content of the automated technology for their production. Scientific and methodological foundations for synthesis and practical methods for constructing automated systems for the production of sulfur asphalt concrete mixtures have been created in the direction of integrating technological processes for selecting a mixture recipe, heat treatment and classification of aggregates, coherent multicomponent dosing and mixing, technical means for their implementation, methods and controls. A concept has been developed for constructing local process control systems with structure, functional connections and control criteria that reflect the specific

nature of the transformation of primary information, the degree of generalization and the features of its use in control processes. Principles for the formation of structures of matrix-type composite materials based on the probabilistic-geometric concept are proposed, requirements for the features of computer modeling of such structures are formulated, and a mathematical model for the formation of the structure of sulfur asphalt concrete is developed. Based on the developed model for the formation of the structure of sulfur asphalt concrete, a modeling algorithm and program have been synthesized that allows for the optimal selection of the mineral part of the sulfur asphalt concrete mixture. Using the concept of constructing complex systems, classification schemes of functionally isolated units in the form of some ordered sequence of qualitatively improving structures have been developed using the basic evaluation functions. Classifications are predictive in nature, allowing one to determine the place of existing systems among functionally similar ones, assess potential capabilities and strategy for improving their quality characteristics, allowing to justify structures with new properties [3].

A change in the properties of bitumen has been established when CNM is introduced into its composition using different methods of production and quantity. It was revealed that the introduction of CNM expands the temperature range of operation of bitumen, increases the dynamic viscosity and adhesion of the binder with the filler, which leads to an improvement in the physical, mechanical, deformable properties and durability of asphalt concrete. The mechanism of action of CNMs of various compositions and methods of production on changes in the group composition and structure of bitumen has been revealed. The introduction of CNM into the composition of bitumen leads to the creation of additional elements of the dispersed phase of bitumen, which leads to an increase in the resistance to compression, shear and tension of asphalt concrete. The patterns of influence of the composition and amount of CNM on the physical, mechanical and operational properties of asphalt concrete based on modified binders have been revealed. It has been established that the optimal amount of CNM from various production methods is 0.1% by weight of bitumen [3].

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