

USING OF GRADDLE AND MASTIC ASPHALT CONCRETE ON UZBEKISTAN'S AUTOMOTIVE ROADS

T. Dj. AMIROV

(Ph. D. Associate Professor),

D. A. Abdurakhmonova

(Student)MTashkent Institute OF Projection, Building and Maintenance of Automobile
Roads, Tashkent, Uzbekistan

Abstract: The article presents the experience of using crushed stone-mastic asphalt concrete in road surfaces. The features of the structure of alkali metal alloys and the operational properties of road surfaces based on it are considered. We collected data on all stages of the technology of crushed stone-mastic asphalt concrete: requirements for constituent materials, technical requirements and practical recommendations for the design of compositions and preparation of mixtures, especially for laying and compacting them in the coating.

Keywords: crushed stone-mastic asphalt concrete (CSMAC), modified bitumen, stabilizing fiber additives, cellulose additives, polymer bitumen, softening temperature, road surfaces, rutting.

A sharp increase in road traffic, increased loads on the roadway, the use of obsolete technologies, the low quality of road-building materials reduce the performance of road surfaces, contribute to the growth of deformations, cracks, rutting, potholes, etc., which leads to a decrease in overhaul repair terms and durability of asphalt concrete pavings.

A progressive way to improve the quality of road coatings is the introduction of promising new road-building materials with improved physical, mechanical and operational properties. one of such effective materials is crushed stone-mastic asphalt concrete (CSMAC), which has improved physical and mechanical characteristics and durability in comparison with traditional dense fine-grained asphalt concrete.

Today, the main problem in the road industry is its fragility of the road structure and the rapid destruction, as well as not withstanding high temperatures, this is the main problem of the road

sector. To solve this problem, we need to introduce new innovative technologies on the example of our closest neighbors Kazakhstan and Kyrgyzstan. In these countries, a mixture of gravel and mastic asphalt concrete is used in construction. They use this type of mixture with modified bitumen. Modified Bitumen Enhances All Characteristics Compared to Regular Bitumen.

Crushed stone mastic asphalt concrete (CSMAC) or crushed stone mastic asphalt is a type of road surface developed in Germany in the 60s of the 20th century. It is characterized by high strength, suitable for heavily loaded highways [Fig. 1,2] [1].



Fig. 1. CSMAC mixture.

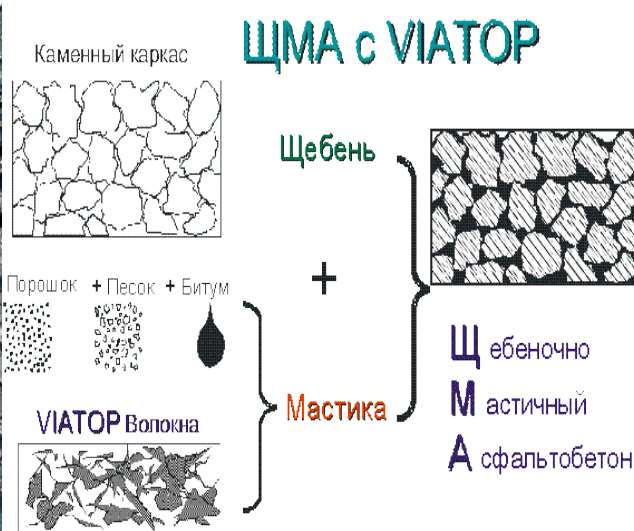


Fig. 2. The composition of the CSMAC.

CSMAC is characterized by a high content of crushed stone of dense rocks, which forms a stone skeleton that successfully resists deformations. Another feature of CSMAC is the presence of stabilizing fiber additives, usually cellulose fibers, which are designed to keep the binder (bitumen) from draining. A typical composition of CSMAC metal grades includes 70-80% gravel, 8-12% filler, 6-7% binder and 0.3-0.5% fiber.

Advantages:

- Resistance to rutting.
- Noise reduction.
- Manufactured and stacked in traditional ways using existing equipment.
- Significantly longer coating life.

Cellulose additives

Stabilizing additives can increase the thickness of the binder films to prevent the bitumen binder from draining at high technological temperatures. To date, the most widely used stabilizing additives based on cellulose, which is a product of various methods of processing plant materials. In this case, cellulose is used in the form of fibrillated (crushed) fiber, or in the form of granules. Short-fiber cellulose fiber should be uniform and contain at least 50% fiber from 0.5 to 1.9 mm long. Granular additives are fibers pressed into granules with or without treatment with modifying compounds [Fig. 3a, b] [2].



Fig. 3. “TOPCEL” Cellulose additives.



Fig. 4 VIATOP

To prepare the mixture of CSMAC organic acids in our territory, we need to purchase these cellulose additives. This is the only component that is not produced in our country. CSMAC mixture is certainly not an ideal mixture and has its drawbacks, well, even with its drawbacks, this mixture is better than ordinary asphalt concrete type, but in all respects. At present, polymer bitumen is used in alkali-alkali metal oxide. In laboratory tests, polymer bitumen performs better than conventional viscous bitumen. Bitumen polymer was not difficult to prepare, only additives were added to bitumen, they used SBS- (styrene-butadiene-styrene) and polymer -20, these polymers showed their good side, Kazakhstan and Kyrgyzstan have been using modified bitumen polymers in their mixtures for several years.

Polymer bitumen

Polymer bitumen is a polymer modified bitumen, the use of polymers increases the durability and reliability of the road surface, and increases the softening temperature up to 100 degrees compared to ordinary bitumen, the degree of which does not exceed 60 degrees (Figure 4 a, b)) [3].



Fig. 4. Polymer additives SBS- (styrene-butadiene-styrene) PR FLEX-20

The usual mixture that we use in the construction of our roads no longer meets modern requirements, the operational condition of the roads does not meet the requirements of users, about 70% of the roads require repairs, the condition of the roads deteriorates year after year, the reason is the traffic load and the influence of high temperatures, the mixture does not withstand such difficulties, and to solve this problem we need new technologies for the use of innovative materials. As an example, I present Crushed stone-mastic-asphalt concrete, this type of mixture is used by many countries, this mixture has proved itself well and has shown its effectiveness. Our closest neighbors have been using this mixture in the construction of their roads for several years and continue to develop. In comparison with the service life of conventional asphalt concrete, which is 8-10 years old, the mixture of CSMAC grades already averages 20 years. From an economic point of view, although we spend a little more on the purchase of various additives, but due to the durability this mixture can be considered much more profitable.

REFERENCES

- 1) Smirnov.E.A. Crushed stone mastic asphalt concrete is an effective material for city highways.
- 2) Kostin.V.I. Crushed-mastic asphalt concrete for road surfaces.
- 3) Stebakov.AP Crushed-mastic asphalt concrete is the future of road surfaces.
- 4) GOST 31015-2002. Mixes are asphalt concrete and asphalt-concrete mastic. Technical conditions. Ed. Officer.; Vved.2003-05-01.-M.: Gosstroy of Russia, State Unitary Enterprise TsPP, 2003.-21.