ADVANTAGES OF GRAVEL AND SAND MIXTURE OVER TRADITIONAL CEMENT CONCRETE ROAD PRODUCTS

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Annotatsion: This article covers issues such as gravel, desert sand, crushed sand, limestone, cement concrete, sieve, temperature, stone, density, cement concrete preparation technology, improvement of cement concrete and its use, as well as advantages and technology of preparation of cement concrete coatings.

Keywords: GOST, liter, cement concrete, coating, sieve, moisture, mass, brand, grade, flint, rock, sand, fraction.

INTRODUCTION. Today, due to the lack of road bitumen in our republic, bitumen is being imported from the neighboring republics of Russia, Kazakhstan, and Turkmenistan, and it is having an impact on the conditions on the roads. Our country is a world leader in the production of construction cement. Taking into account that limestone, sand, and gravel products are local resources in our country, our cement-concrete roads are economical and we use cement developed by ourselves. Also, on October 2, 2019, President Sh.M.Mirziyoyev, at the meeting selector dedicated to the development of the road industry and the wide attraction of investments in this field, said that in the construction of highways, it is necessary to gradually switch to roads with cement concrete coating. , the task of construction, reconstruction and capital repair of highways with the introduction of innovative technologies based on international standards has been set [1.2].

MAIN PART. Gravel and gravel-sand mixture can be used as a large filler for cement concrete mixtures. The strength and durability of cement concrete made on the basis of gravel is comparable to the strength and durability of cement concrete made on the basis of crushed stone. Therefore, gravel is not used in the preparation of cement concrete mixtures. When preparing a cement-concrete mixture, the strength of the concrete will be higher if we mix all the raw materials separately. The elasticity and cracking of the coating decreases [3].

Crushed stone is a material obtained by crushing large pieces of hard rock.

Chaqik stone is passed through special sieves and separated by size. Due to the fact that the pebbles have sharp corners and rough surfaces, they work well with sandy mixtures. A sample is taken for testing in accordance with GOST 8269 by the quartovanie method to the required amount for laboratory examination of crushed stone. For this, according to the requirements of the standard, the limestone sample is cleaned and crushed so that its size does not exceed 5 mm. The mass of the sample is reduced to 150 g, then it is crushed again so that the size of the grains does not exceed 1.25 mm, and the mass is reduced to 30 g. The sample is crushed in a porcelain mortar and dried. 10 g of the dried sample is placed in 2 pycnometers and distilled water is poured over it. The sequence of the test work is the same as the sequence of the process of finding the true density of sand. The average density of limestone grains is determined by hydrostatic measurement. For this, a sample is selected according to the standard requirement, depending on the size of the grains. The sample is dried on a drying rack until its mass is constant, and then sieved. The size of the holes of the sieve must correspond to the size of the smallest grains belonging to the sample of limestone being tested. Then the sample is cooled in water at room temperature for 2 hours. The water level in the container should be 20 mm higher than the surface of the stone. The difference between the mass of the water-saturated sample in the open air and the mass of the water-saturated sample is the volume of the sample.

means Density (m) is found with an accuracy of 0.01 g/cm3 as follows:

$$\rho_m = m\rho_c/(m_1 - m_2) \qquad (1);$$

Bulk density of crushed stone using measuring cylinders. The volume of the cylinder depends on the size of the crushed stone grains, if the size does not exceed 10 mm - 5 liters, if the grains are 20 mm - 10 liters, if the grains are 40 mm - 30 liter, and a 50-liter cylinder is taken for pebbles (gravel) larger than 40 mm.

Sand is composed of scattered small grains of hard minerals, mainly quartz. Most of the composition of the cement concrete mixture is made up of sand, which fills the space between the pebbles or forms the skeleton part of the sand cement concrete. Due to this, during the densification process, an opportunity is created for

the perfect formation of the cement concrete structure, and it is possible to use sands of different groups in accordance with Oz RST 8736. Depending on the conditions under which sands were formed, they are divided into mountain sand, river sand, sea sand, sand from sand dunes (desert sand) and sand made by crushing granite, dense limestone and other rocks.

Crushed sand is sand that is crushed from rock. Its particles are like those of mountain sand, with sharp edges and a rough surface. Because of this, they firmly bite into cement concrete with limestone and serve to increase its strength. Sorted (fractionated) sand is sand divided into two or more fractions using special equipment. Crushed sand is an inorganic dispersive material with a grain size of up to 5 mm, which is obtained from the waste of ferrous and non-ferrous metal ore processing, as well as the waste of minerals mined in other industries.

In order to evaluate the quality of sand intended for construction works, its real density, bulk density, spaces between particles, moisture level of sand, dusty and clay particles, amount of organic compounds and bulk modulus of particles are determined in testing laboratories. Samples were taken from 10-15 places of the sand pile to check the sand in the testing laboratories. The resulting samples were mixed together and diluted as needed in a process called quartovanie. The real density of sand was determined in a pycnometer with a volume of 100 ml. 30-40 g was taken from the sand sample and sifted through a 5 mm sieve. Then it was dried on a drying rack until its mass did not change. From the dried sand, 2 times 10 g were taken and they were placed separately in pycnometers. Each pycnometer of sand was weighed. Then they were filled with distilled water up to 2/3 of their volume, and then the pycnometers were placed obliquely in the sand bath. The water in the pycnometer was boiled to expel air bubbles from the sand particles. After cooling to room temperature, additional distilled water was poured into pycnometers and weighed. Then water and sand were removed from the pycnometer, the pycnometer was thoroughly rinsed and distilled water was poured up to the line on the neck. And weighed again. The actual density of sand was calculated with an accuracy of 0.01 g/cm^3;

$$q=[(m-m_1)c]/(m-m_1+m_2-m_3) \quad (2);$$

Sands are divided into two classes depending on the grain size and the amount of dust in it. Each group of sand is characterized by the size modulus value shown in Table 1.

table 1

the grain composition of sands

The type of sand	Density g/sm^3	Halmic water absorption ‰	Volume addition ‰	Compressive strength, Мпа		Porosity ‰	Porosity after compaction of the mixture, ‰
				R_{50}	R_{20}		
natural	2,16	2,6	0,25	0,19	1,56	27,3	3,6
activated	22,2	2,5	0,06	1,34	3,75	24,0	3,3

Conclusion. Therefore, adding micro-crimson to the cement produced in our country and preparing a high-quality mixture for the highway means reducing the portland cement import. The availability of the main sources of raw materials for the production of this mixture (95%) is limestone, sand, gravel, and limestone in our country, which is a guarantee of economic efficiency. The use of micro-crimson powder not only brings significant benefits to the economy of our country, but also opens up opportunities for export and construction of cement-concrete roads in foreign countries. Including, if we build cement-concrete coatings using micro-crimson, we will achieve the following benefits.

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