Rustemov Zh. - Master's student of the QarTU (Kazakhstan)

Ryabkova M. P. - Candidate of Technical Sciences, senior lecturer.

A new approach to strengthening the road surface in the construction and repair of highways

In the use of local soils, low-strength stone materials and mineral by-products of production, there is a large reserve for improving road construction. The main direction in solving this problem should be considered the use of reinforced materials, which has shown great technical and economic prospects for road surfaces with structural layers of such materials. Such structures allow you to use the advantages of traditional rigid and non-rigid road surfaces, but they also have significant differences from the latter both in terms of design and construction.

The construction of road surfaces made of reinforced soil is carried out in a complex way, taking into account the category of the road, the type of pavement, the hydrological and climatic conditions of the road. At the same time, the correct location of the reinforced soil layer, depending on its purpose and structural and mechanical properties, is important for the normal and long-lasting operation of the road surface. The article presents studies of the developed design of the road surface using a composition of modern materials and industrial waste.

One of these alternatives was the method of cold recycling or heat-milling restoration of the properties and qualities of asphalt concrete pavement lost during operation. The economic appeal and fruitfulness of this technology was that the material available on the road was reused. Therefore, there was no need to remove the old asphalt from the road and bring new asphalt concrete. However, this hot method did not justify itself due to the rapid aging of the bitumen and the low durability of the restored coatings (destruction began after 2-3 years).

In recent years, with the advent of heavy-duty automobile trains, the wheel load has increased significantly, which causes extreme vertical and horizontal stresses and deformations in the structural layers of the road surface and the upper layers of the roadbed. This makes it necessary to build more and more powerful and expensive structures.

So, on the basis of the studied literature, the design of road pavement for a highway using inorganic binders was developed. As a binder, waste generated by CHPP-3 from the burning of coke coal, as well as Portland cement, were used. The pilot site was laid on the industrial territory of the CHPP-3 in Karaganda.

After filling, the sand-cement mixture was moistened to the optimal humidity, which was determined earlier in the laboratory and amounted to 12.4%. The sand-

cement mixture consisted of a loamy light dusty soil and a composite binder. The binder consisted of 70% PC 500-DO portland cement and 30% fly ash.

The composite binder was applied in an amount of 8% of the mass of the reinforced soil, since strength studies have shown that this amount of binder, for this type of soil, gives the highest compressive strength of water-saturated samples-cylinders. The compressive strength at the age of 28 days was 1.41 MPa, which is more than 34% (1.05 MPa) higher than the control samples of cement ground prepared on Portland cement PC 500-D0.

Next, a load was applied to the experimental section of the road structure, simulating the passage of timber transport. To determine the values of stresses that occur along the depth of the road structure under study during the passage of the experimental stand trolley, tensor-resistor pressure transducers of the PDM type (half - bridge) - messdoses, with a hydraulic multiplier, were used. The principle of operation is based on the dependence of the change in the ohmic resistance of the tensors during their deformation on the pressure applied to the measuring membrane, and the necessary rigidity of the pressure converter is provided by a hydraulic multiplier.

To record the measured parameters recorded by the messdoses, measuring equipment consisting of an eight-channel multifunctional measuring amplifier Spider-8 and a personal computer was used.

References

1. R RK 218-99-2014 " Instructions for the use of cold recycling technology»

2. SNiP 3.06.03-85 " Highways»

3. Linzer A.V. Osnovy industrialnogo primeneniya fortified soils in road construction / / Dis. na sois. step. Doctor of Technical Sciences. Tyumen, 2012.