

Geopolymeric materials allow normal inject and depth to a depth of 20-30 cm. Technology to use, efficient, economical, they are increasingly spreading.

In the analysis methods of struggle with cement coating defects that arise during the operation revealed that all the existing methods aimed at eliminating of local disturbances strength, appearing in the same plate. It is not taken into account deformations, arising on roadbed construction. All materials currently used for repair of lower strength with strength of cement-concrete, that their use does not increase the strength of the assembly and will not contribute to the improvement of operational characteristics (modulus of elasticity)

For example, a defect in the form of cracks will continue its development if there is no strong basis, which excludes the deformation of the whole plate. A strong foundation is created during construction. Strengthening of the foundations can be performed during repairs, when coverage has been in operation for several years and under the influence of negative factors began to manifest various publishes defects and thus be aware that if the defect resulted from deformation of the base, then the crack, that appeared on the surface, is available in the base.

To eliminate cracks efficient way is to strengthening the foundation with injecting, performed without any destruction of cement-concrete cover and stops the vertical deformation of the coating

Another defect is subsidence of cement slabs that occurs mainly due to technical defects in the dispensation of the base or under the influence of climatic factors. The elimination of this defect costly and usually consists in replacement plates because emptiness , which was formed under the stove almost impossible to fill a non-destructive method due to the lack of strong, waterproof materials with properties significantly increase the volume after usage

The injection of some geopolymeric materials gives an opportunity to strengthen the base and correct operating defects in the cement coverages. It does not lose much money and not using labor-intensive technologies.

When injected into the base of geopolymer materials and sand-gravel mixture under pressure fill the space under the slab. After curing, form a solid array.

The process associated with the introduction of geopolymer materials in the space under the slab refers to the technological. It is a dependence of the rate of losses and the radius of the distribution of material, time of application and airfield construction.

The result of soil treatment is to increase its strength, adhesive and cohesive adhesion of the particles and resistance to frost.

After strengthening the array of soil significantly improves basic operational cement concrete construction. It is the modulus of elasticity.

Today the most common material for injection is a cement-silicate, silicate waste of pulp and paper industry, a rare hot bitumen (hot method bituminization), bitumen emulsion (method bituminization cold), synthetic resins. These materials are suitable for certain soil types. They are shown in Table 1 by filter coefficients which may be used above-considered substance.

Geopolymer resins based on polyurethane are versatile material that can be used for all types of soils - clay soils and clay, sand and gravel.

In addition, the elastic modulus of these materials is in the range of 15 to 85 MPa depending on the density and stored according to the elastic modulus of road -building materials, that is, while injecting when the average hardness of mass that will not change is strengthened. This enables these are the mechanical properties of soil that are needed at a particular site.

So geopolymer materials based on polyurethane when injected into the soil or macadam -sand foundation not only distributed in a short period of time, but also increases in the amount of filling voids in the plates that are strengthened in the direction of least resistance.

When the plate rises, and the void is filled with polyurethane resin the layer base, which is made up of soil from monotonous materials, is strengthening.

Research of determine the physical and mechanical properties of geopolymer materials, based on polyurethane, conducted in the laboratory of reconstruction of airports and roads.

To determine the durability and weather resistance were tested in artificial climate chamber type «Feutron» where samples were within 600 hours (equivalent to 5 years of service in the field operating conditions) under the action of ultraviolet rays, irrigation and so on. Due to the fact that geopolymer materials based on polyurethane have different density. For research were taken 2 materials - density of 150 kg / m³ and 380 kg / m³.

Conclusions

Studies have shown that geopolymeric materials based on polyurethane characterized by high physical and mechanical properties, watertightness and frost. Virtually no frost factor variable even after 20 cycles of supporting over in hostile environments (HCl and H₂SO₄).

Short time of curing of geopolymeric material from 15 to 25 minutes and significant distribution of it in material of basis, that repairs enables usage in operative repair, when work must be finished without of breaks in transport movement.

High temperature resistance (95oC) and low temperature fragility (-55oC) allow for repairs in different temperature conditions and all road and climatic zones of Ukraine.

Using the technological and economic geopolymer materials based on polyurethane will not increase the cost and complexity of the process of repairs, so they can be recommended for implementation for airport industry.

Injected material	Soil permeability Kp, m/day
Silicification method is a single solution, GKJ-10	00,1 - 2,0
Method by two silicification solution	2,0 - 120,0
Synthetic resins	to 0,05
Waste paper and pulp industry (sulfate-alcohol Bard SAB)	0,1 - 0,05
Cement, silicate cement, cement-limestone, clay cement suspension	more 30,0-50,0
Hot bitumen (t – 180-200°C) (hot method bituminization)	more 120,0-150,0
Bitumen emulsion (method bituminization cold)	more 10,0-120,0

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