EXPERIMENTAL STUDIES OF DEFORMATION AND STRENGTH INDICATORS OF LYOSS SOILS AT DIFFERENT HUMIDITY.

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Annotation : Compression experiments of lyoss soils of different humidity without structural damage, compression experiments with slow increase of moisture content of soil samples during the experiment, shear experiments of displacement of samples of ultra-sedimentary lyoss soils with unstable structure at different humidity.

Keywords : Grunt Lyoss basis foundation construction deformation

Structure intact different compression experiments of lyoss soils in moisture . Soils deformation indicators research meaning hence consists of, then basis and foundations accounts used indicators determined . This indicators are physical constants without , they are the basis of soils performance conditions and applied _ account method depending on determined .

Lyossimon very sinking in soils basis and foundations limited condition on groups (deformation) accounts their deformation indicators used . Most structures basis and foundations accounts basis primers deformation indicators different humidity level , ie natural condition , groundwater shimgan in the state of and groundwater _ shimganidan next in the state of values to know need will be . Usually from lyoss soils consists of which was basis of soils deformation In the calculation , the ground linear vertical deformation module (E_0) is used . This indicator soil compaction laboratory and field conditions from experimental research using determine .

SamDA Q I « Construction technologies and Geotechnics ” department “ Soils mechanics » research in the laboratory lyossli sand primers samples at different humidity cases for physicists and deformation indicators detected .

All experiments following in style take went . Har which from monoliths 3-4 samples compression experiments for disconnect taken . First section experiences natural W = (4-5%) soil samples at humidity with maximum vertical pressure up to 0.3 MPa which was in case was held . The second section experiences while ground samples complete water shimganidan then (29 ÷30%) to 0.3 MPa which was under pressure was held . This experiments all at least repeat three times based on was held . Lyoss primers deformation indicators detection third section experiences while ground samples humidity increased by an average of 4-5% , 9-10%, 13-14%; At 18-19%, 23-24% humidity was held . In this case, the soil samples different in quantities water they are flat when soaked scatter for in the desiccator at least 2 days saved .

Compression experiments on the design of " Hydroproject " compression in the instrument was held . It is known that in the construction of " Hydroproject " compression tool : tool from the table , richagli without adjustment and from odometers formed found _ Richagli of the device function to the ground o 10 times the vertical pressure increase consists of .

On the odometer of tested soil samples heights 25 mm and transverse cut surface is 60 cm2 they did . Soil samples are loaded onto the ground _ _ went .

Experiments compression during vertical pressure on the tool po g'onama -po g'ona 0.05; 0.10; 0.15; 0.20; 0.25; and up to 0.3 MPa delivered , he drowned conditional until stabilized hold stood up .

Har from which pogona pressure then deformations har 30 sec, 1; 3; 5; 30 min; 1 hour and every 3 hours _ _ _ measured deformation conditional until stabilized , ie drowning speed 0.01 mm in the last 3 hours q ilguniga until pressure hold stood up .

Of soils deformability deformation curves line through expression kulayrok . Two curves linear method gruntning at different humidity , ie gruntning humidity natural full of quantity (W) water shimgan condition deformation (Wsat) _ indicators was detected . Installed _ of moisture primary in the range (W = 5 $\div$15%), ground transmitted pressure known values when the modulus of deformation of the soil is significant degree will change and gruntning next density usual to water saturated in soils such as to be continued reaches _

As can be seen from the graphs E = f (W), the $\div$deformation modulus is reduced to 6-7 times from the natural amount (W = 0.04 to 0.05) until the soil reaches the amount corresponding to the full chuvash state (Wsat = 0.28 0.30); when the $\div$moisture range W = 0.14 $\div$0.15 to Wsat = 0.28 $\div$0.30 the modulus of deformation of the soil $\div$decreased by 1.5 2 times. The results of compression experiments also show that lyoss super-sedimentary soils have a very high resistance to compression when the natural moisture does not change. Deformation of these soils in the state of natural moisture is very low.

Compression experiments in which the moisture content of soil samples is slowly increased during the experiment .

Experiments to determine the effect of soil moisture on the deformation of lyoss super-sedimentary soils were carried out using the “single curve” and “double curve” methods. In the first method, the experiment is carried out on a single soil sample and its wetting is carried out at a given given pressure.

Compression experiments in the “two-curve” method are carried out on two compression tools, with two identical soil samples cut from a single monolith. One soil sample is tested while the natural moisture is retained, while the other soil sample is tested with the soil completely soaked.

Compression experiments of top-impregnated soil samples were carried out in two parts as follows. In the experiments of the first part, the main focus was on the study of the laws of deformation of lyoss soils. From the graphs of the relationship between the applied pressure and the relative deformations, it can be seen that when the soil is wetted from above on the odometer, its structure is disrupted and the relative superconductivity changes significantly. At different levels of humidity during the experiments, i.e. W = 0.05; 0.097; 0.14; 0.19; Different amounts of relative superconductivity were observed ε_{se} at 0.24 constant pressure (= 0.2 MP a) σ = 0.041; 0.027; 0.019; 0.015; 0.013. the moisture dependence graphs of the relative superconductivity obtained from the experiments ε_{se} = f (W) are shown.

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The second vertical deformations of the soil sample in partial compression experiments experience during measured went . Vertical deformations accuracy was 0.01 mm hour type indicators using measured .

Experiments for one big 5-6 identical soil samples from monolith cut off taken . First section experiences gruntning natural humidity saved in the case , the latter is completely primed water shimgan carpet , the rest esa interval in humidity was held . Experiments three times repeated . Of the soil samples being tested humidity immutability with odometer soaked gauze for wrapped stood up .

The second section experiences using gruntning primary very drowning pressure Rse detected . The initial pressure of the additional sediment varied in the range Rse = 0.06 to ÷0.11 MPa.

During the first and second part experiments, the pressure on the soil sample was applied step by step, holding until the deformation was conditionally stabilized.

Thus, the experimental results show that the modulus of deformation of our regional lyoss soils is a variable magnitude, depending on the moisture, density and amount of pressure acting on the soil. This means that when the submerged lyoss soils absorb water at the base of the foundations, its modulus of deformation decreases, resulting in an increase in vertical deformation, resulting in super-subsidence.

Experiments on the displacement of samples of non-stable sedimentary lyoss soils at different humidity. Experiments to determine the strength of unstable regional lyoss soils were also performed on a single-plane sliding device of the "Hydroproject" design.

We know that in the strength of lyoss soils, the viscosity force, which is very sensitive to changes in soil moisture, is of considerable importance.

Graphs of ground viscosity force s = f (w) and internal friction angle and V = f (w) are given from the experimental results. As can be seen from these graphs, the viscosity force (s) and internal friction angle (V) of the lyoss soil ÷are significantly reduced in the range of moisture range W = 0.05 to 0.20. Subsequent increases in soil moisture do not significantly affect the decrease in strength indicators.

natural amount (W = 0.04 ÷to 0.05) to the state of complete water absorption (Wsat = 0.28 ÷0.30), a decrease in viscosity is observed by 3-4 times, a decrease in the internal friction angle ÷is observed by 1.3 to 1.5 times; in the range of humidity W = 0.20 to Wsat = 0.28 ÷to 0.30, the decrease in these values was 1.3 ÷to 1.5 times in viscosity and 1.0 to 1.2 times in the internal friction angle.

The shear strength of soils cannot be considered in isolation from the specific features of their relative deformations. The results of experiments to determine the deformation and strength of soils are given in Table 2.1. The graphs s = f (w), φ = f (w) and E = f (w) are also based on the results of these experiments.

The strength indicators φ and s are variable quantities that depend on the moisture and density of the soil. In general, the shear resistance of soils depends on many factors. The main ones are the granulometric and mineralogical composition of the soil moisture level, the state of stress deformation and the method of experimentation.

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Table 1

Physical and mechanical parameters of the soil obtained from experiments in different moisture conditions

Grunt	Ground moisture W,%		Ground density R , g / cm 3	Dry soil density, R , g / cm 3	The internal friction angle of the soil φ, град	tg φ	Viscosity power, s kPa	Deformation modulus, E_0, MPa
	From experience before	From experience then						
Lyossmon sand grunt	5.0	5.03	1.61	1.48	340	0.68	108.0	17.30
	9.7	9.68	1.65	1.47	290	0.56	67.3	8.70
	14.0	13.95	1.67	1.47	260 301	0.49	61.0	6.20
	19.0	18.96	1.75	1.47	240	0.45	50.7	4.55
	24.0	23.89	1.83	1.47	220	0.418	36.0	3.30
	29.0	27.98	1.90	1.46	20050	0.34	18.0	2.80

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