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RESULTS OF THE RESEARCH OF SALINE SOILS ON THE BASIS OF BUILDINGS AND STRUCTURES

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Ushbu maqolada O‘zbekiston sharoitlari bo‘yicha sho‘rlangan gruntlarda bino va inshootlarni loyihalash va qurishning ilmiy asoslari haqida ma’lumotlar keltirilgan. Mamlakatimizning turli tumanlaridagi murakkab va sho‘rlangan gruntli sharoitlardagi loyihalash va qurish tajribasi, shuningdek, biz tomonimizdan olib borilgan maxsus tadqiqotlarning ko‘rsatishicha, sho‘rlangan gruntlar tarqalgan hududlardagi qurilishlarni loyihalaganda gruntlarning namlanishi va ishqor yuvilishi jarayonida ularning moddalar tarkibi, strukturasi va fizik-mexanik xossalarining o‘zgaruvchanligini e’tiborga olish zarur.

Kalit so‘zlar: gruntlar, sho‘rlangan gruntlar, mustahkamlik, deformatsiya, fizik-mexanik xossalar, filtratsiyalar, tuzilmalar, yer osti suvlari, sho‘rlanish, xlorid-sulfatli sho‘rlanish, sulfatli sho‘rlanish, sodali sho‘rlanish, boshlang‘ich gips miqdori, tuzlarning ishqoriyligi, mustahkamlik ko‘rsatkichlari.

В данной статье представлена информация о научных основах проектирования и строительства зданий и сооружений на засоленных грунтах в условиях Узбекистана. Опыт проектирования и строительства в сложных и засоленных грунтовых условиях в различных районах нашей страны, а также проведенные нами специальные исследования показывают, что при проектировании сооружений в районах распространения засоленных грунтов учитывается их вещественный состав, структура и физико-механические свойства. свойств в процессе намокания и щелочной промывки почвы необходимо учитывать изменчивость ее свойств.

Ключевые слова: грунты, засоленные грунты, прочность, деформация, физико-механические свойства, фильтрация, структуры, грунтовые воды, засоленность, хлоридно-сульфатная засоленность, сульфатная засоленность, содовая засоленность, начальное содержание гипса, щелочность солей, показатели прочности.

This article provides information on the scientific basis of projecting and constructing buildings and structures in saline soils under the conditions of Uzbekistan. In the last few years, a number of saline soils in Uzbekistan have experienced the rise of groundwater and flooding of the territory. As a result, the state of Eurasia is noted in many buildings and structures due to a decrease in the consistency characteristics of foundation lattices. The main reason for the decrease in self-sufficiency characteristics is the result of prolonged leaching of light and hard-to-grind salts under the influence of water. This article presents the results of experiments on the study of legislation on changing their consistency during filtration washing of salt gratings on the basis of buildings and structures.

Key words: soils, saline soils, strength, deformation, physical-mechanical properties, filtration coefficient, structures, underground water, hard-to-dissolve salts, sulfate-chloride

salinity, chloride-sulfate salinity, sulfate salt salting, soda salting, the amount of initial gypsum, salinity, alkalinity of salts, strength indicators.

Introduction

Construction of buildings and structures in our country is often carried out in complex engineering-geological conditions, especially in areas with saline soils. In Uzbekistan, saline soils, which can be used as a basis for the construction of buildings and structures, consist of saline, saline, saline and bald soils, differing in the composition and amount of slightly soluble salts. They are often formed in the depressions of the relief: mountain slopes, lowlands, saline lake shores, cliffs, desert zones formed as a result of suffocation, mineralized waters close to the surface (1 - 3 m).

The main factor in the formation of saline soils is the mineralized groundwater and saline rocks that lie close to the surface. The main condition for salinization is the impossibility of water flow in places and the fact that the amount of evaporation is greater than the amount of precipitation.

Analysis of the existing literature on saline soils and experience in the design and construction of buildings and structures in different regions of the country, as well as special studies on saline soils show that changes in the composition, structure and physical and mechanical properties of substances during wetting and alkaline leaching. and this phenomenon needs to be taken into account in design work.

As a result of flooding and wetting of areas composed of saline soils, a number of major affects can occur in buildings and structures [1,2].

The processes in the mining area largely depend on the amount of precipitation, and due to the arrival of water in the streams in the spring months and as a result of the increase in the amount of atmospheric precipitation, processes such as crushing of rocks and cracking of rocks can be found on the surface of the earth. In the area of the mine, landslides can be found with a surface area of 20 m^2 to 150 m^2, and a thickness of 0,2 m to 1,0 m.

Cracking of rocks in the walls of the mining facility is mainly developed along the angle of 30°-70°. Cracks are mainly formed in the direction of bedding of layers. The width of the cracks is 1-2 mm, the distance between them is 10-20 cm, and the length is from 70 cm to the one where the tectonic cracks cross the tunnel (6-7 m long). As a result of underground water movements in the cracks of some rocks, the cracks are filled with Quaternary deposits.

Rocks around major tectonic faults are fragmented. Fracture surfaces with irregularly densely distributed fractures are clearly distinguished. Man-made cracks are rare in solid rocks. Around large tectonic faults, strongly deformed 0,3-1,0 meter thick crushed rocks are found.

When monolithic samples are taken from the mining facility and studies are carried out, we can observe the changes in the following indicators [2,5].

The physical and mechanical parameters of the samples taken from the mining facility of the North section are as follows: according to the lithological composition, the carbonate rocks are shale, the rhyolite porphyry structure is medium-grained, the color is light dark gray, and everywhere a small amount of iron oxide has been encountered [5]. The texture is rough, these rocks are chloritized and fractured, quartz and sulphide fibers are found between the cracks.

Literature review

During the operation of buildings and structures built on saline soils, man-made level of underground water is formed under the structure due to natural and artificial factors [7,8]. Existing guidelines and normative literature provide recommendations for determining the mechanical properties for saline soils with easy and moderately soluble salts, but the

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amount of difficult-to-dissolve salts is not taken into account. Studies suggest that in order to ensure the safe operation of buildings and structures built on saline soils, it is necessary to study the process of leaching of insoluble salts, especially when the mechanical properties of the soil are exposed to long-standing water. An experimental study of the laws of change of mechanical properties of water from saline soils over a long period of time. This is because the issues of assessing the change in the mechanical properties of saline soils in the long-term exposure to water to insoluble salts have not been fully studied.

Many scientists have worked on engineering-geological research and their use. Including, M.D. Braja, G.P. David, W. Kuhn, B.G. Neal, A.R. Harutyunyan, I.L. Bartholomey, V.M. Bezruk, P.B. Babakhanov, A.A. Glaz, A.I. Grot, R.S.Ziangirov, N.P.Zatenatskaya, M.F.Yerusalimskaya, M.O.Karpushko, A.K.Kiyalbaнev, A.A.Kirillov, N.A.Klapatovskaya, Yu.V.Kuznetsov, A.D. Kayumov, T.Kh. Qalandarov, S.S. Mordovich and many scientists.

Research Methodology

The saline loamy and loamy soils in the territory of Uzbekistan, in particular in Pakhtakor district of Jizzakh region, where capital, industrial and civil construction is currently booming, are taken as the object of research and its mechanical characteristics in the article.

The purpose of this dissertation is to develop a methodology for studying the mechanical properties of saline and sedimentary soils when used with water and solutions and long-term leakage, in order to use the parameters of soils in the calculation of the foundation of structures.

The main feature of saline soils is the change in their mechanical properties during the washing of salts, there are two main types of washing of salts:

- filter washing, in which the washing of the salt in the soil is carried out by the filtration flow of the liquid under the pressure gradient and is of practical importance for soils with high permeability;
- diffusion washing, in which the washing of the salt in the soil occurs as a result of the movement of ions due to the difference in the concentration of salts in solution. This is typical for low absorbent soils.

The laws of changing in salinity level and mechanical characteristics when saline soils are exposed to water for a long time under laboratory conditions were studied and expressions were proposed to predict them [7,8].

Loam and sandy loam samples (Tables 1 and 2) from Pakhtakor district of Jizzakh region were used to study and predict the laws of change in salinity levels and mechanical characteristics of saline soils during prolonged exposure to water.

Table 1

Normative and calculated characteristics of soils.

Names of descriptions	Units of measurement	Normative values		Estimated values, α=	
		Loam	Sandy loam	0,85	0,95
Ground density	t/m^3	1,73	1,76	1,74	1,73
Density of soil in the dry state	t/m^3	1,44	1,43		
Density of soil particle	t/m^3	2,69	2,66		
Porosity	%	46,5	46,3		
Porosity coefficient	dimensionless	0,869	0,863		
Natural humidity	One point	0,175	0,234		
Humidity level	dimensionles	0,54	0,72		

	s				
Humidity at the level of fluidity	One point	0,261	0,261		
Humidity at the germination boundary	One point	0,180	0,212		
Quantity of plasticity	One point	0,081	0,049		
Fluidity indicator	dimensionles s	<0	0,46		
Comparable adhesion strength	kPa	13	9,0	5,0	3,0
Internal thrust angle	degree	26	27	25	24
Deformation modules: in the natural humidity condition	MPa	5,0	5,0		
In wet condition	MPa	4,0	4,0		
Relative deposition: P=0,1 Mpa P=0,2 MPa P=0,3 MPa	dimensionles s	 0,007 0,013 0,017	 0,009 0,015 0,020		
Initial deposition pressure	MPa	0,15	0,12		

Table 2

Chemical analysis of grills using water titers.

Soil name	Dry residue, mg/kg	Ion content mg/kg						pH
		HCO'_3	CI'	SO_4''	Ca··	Mg··	Na·+K·	
Loam	13480	210	640	8800	3250	480	60	7,8
Sandy loam	14380	160	910	9090	3150	390	640	7,8

Based on the task set and the results of previous research, the methodological part of the experiment was based on the following laws:

- In the process of interaction of ground distilled water with water, its structure changes as the amount of soluble salts in the water decreases.
- Changes in soil structure during alkali washing lead to a decrease in strength and an increase in deformation (additional suffocation subsidence).
- Changes in the composition and volume of salts in the soil can affect the water-physical properties of soils, in particular, the composition of the microaggregate, plasticity parameters, viscosity, etc.

Therefore, the experiment is carried out as follows: first, for the first naturally formed primer, the parameters given in Tables 1 and 2 are determined: density (ρ, ρ_d, ρ_c), humidity (w), abrasion and plastic strength (C, φ, ρ_m). The composition was also studied: granulometric, microaggregate, chemical (easily soluble salts, gypsum, calcium content) and mineral composition. In addition, the microstructure of the soils was further investigated.

Analysis and results

Filtration of salts in the soil is carried out according to the lifting current scheme in the FIM device. A pre-tested sample of the natural structure was placed on the device according to the same scheme. B on the side surfaces of the sample for loss of filtration on стенке.P.It it was processed in accordance with the methodology proposed by Petrukhin [1]. The sample was scraped off with a diameter smaller than the ring of the F-IM tool (D=50 cm2), plastic glue on its side

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surfaces is rubbed into the groove, and wax is poured into the gap between the ring and the sample. This treatment allows us to calculate that the liquid moves only through the volume of the soil.

Filtration washing with alkaline was carried out under pressure, often without squeezing the soil, that is, the soil was in conditions of constant volume during the experiment.

Conclusion

From the analysis of deformations in the areas where saline soils are distributed in the territory of Uzbekistan, it is known that the main factor of their occurrence is the change of the physical and mechanical properties of the underlying soils under the influence of water. A study conducted to study their salinity characteristics and the degree of salinity associated with the amount of initial plaster and the degree of salt leaching during prolonged exposure to water based on salt gratings of buildings and structures allows us to draw the following conclusion. Salts of complex soil, in particular, when water enters the mush with which the plaster is salted for a long time, give them a description of the consistency and amount of salt in them, that is, the degree of salinity decreases, which in turn leads to a decrease in the stagnation of the foundation of buildings and structures and additional deposition.

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