ISSN: 3060-4966
JIZPI XABARNOMASI

UDK 691.592

GEOLOGICAL ANALYSIS OF THE CONSTRUCTION OF CEMENT AND ASPHALT CONCRETE PAVEMENTS IN THE FIELD OF ROAD ENGINEERING

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Ushbu maqolada yo‘l va bino inshootlarni loyihalash va qurishda muhandislik-geologik tadqiqotlarga qo'yiladigan talablar, ularning samaradorligini oshirish usullari, me'yoriy hujjatlar talablariga muvofiq namlik darajasi yuqori bo'lgan tuproqlarning fizik-mexanik xususiyatlarini aniqlash, aerofotosuratga oid ma'lumotlar va xulosalar keltirilgan.
Kalit so’zlar: yuqori namlikli tuproqlar, havo kuzatuvi, aerofotosuratlar, binolar va inshootlar, aerokosmik suratlar.
This article describes the requirements for engineering and geological prospecting in the projecting and construction of buildings and structures, methods to increase their efficiency, determination of physical and mechanical properties of soils with high humidity in accordance with the requirements of regulatory documents, opinions about aerial photography which are expressed.
Key words: high-humidity soils, aerial surveillance, aerial photography, buildings and structures, aerospace photography.
В данной статье требования к инженерно-геологическим исследованиям при проектировании и строительстве дорожных и строительных сооружений, методы повышения их эффективности, определение физико-механических свойств грунтов с повышенным уровнем влажности в соответствии с требованиями нормативных документов, представлены данные по аэрофотосъемке и выводы.
Ключивые слова: грунты повышенной влажности, аэрофотосъемка, аэрофотосъемка, здания и сооружения, аэрокосмическая фотосъемка.

Introduction

Nowadays, large-scale construction work is underway in our country. The projecting and construction of buildings and structures in complex climatic conditions require specific researches. Engineering-geological surveys on soil-based sections with high humidity are carried out according to a special program specified in the terms of reference. The software and terms of reference are developed jointly by the project and exploration organizations.

The materials obtained as a result of the search should, in general, allow you to:

1. Quantitative assessment of the stability of the foundation;
2. Predict the value and duration of the subsidence of the base in the consolidation process.

In general, these materials should be evaluated to ensure that the high-moisture layer can be used as the lifting base material.

The program can be edited after receiving the current information by the project organization during the search.

In the projecting and construction of buildings and structures in complex climatic conditions, engineering-geological surveys can include the following types of work:

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1. Collection, analysis and summarization of search and previous years materials;
2. Obtaining and decoding aerospace survey materials;
3. Recognition inspection in conjunction with aerial and route observations;
4. Crossing mountain carvings;
5. Geophysical study of the area;
6. Field inspection of soils;
7. Hydrogeological research;
8. Stationary observations;
9. Study of soil and water in the laboratory;
10. Predicting possible changes in engineering-geological conditions;
11. Processing of materials in the room;
12. Preparation of technical report (conclusions).

When compacting soils to ensure the stability and strength of the foundation of buildings and structures, their moisture is re-strengthened if their humidity is less than the optimal humidity shown in Table 1, if the humidity is less than the allowable, then the soil is additionally moistened.

Table 1

The amount of moisture in the compaction of soils

Ground	The value of moisture content in the required density coefficient		
	1-0,98	**0,95**	**0,90**
Dusty sands, large and light sandy loam	<1,35	1,6	non-standardized values
Light and dusty sandy loam	0,8-1,25	0,75-1,35	0,7-1,6
Heavy dusty sandy loam and light dusty sandy loam	0,85-1,15	0,8-1,2	0,75-1,4
Heavy loam, heavy dusty stems	0,95-1,0	0,9-1,1	0,85-1,2
Less	0,8-1,20	0,7-1,25	0,7-1,40

Soils with more than the allowable level of moisture should be dried: artificially sanded, dry sprinkled soils burnt, adding inactive sediments, laying a water-absorbing or permeable layer. as well as active additives (lime, gypsum, volatile ash, etc.) are used to dry the muddy soils at the base and top of the pavement.

It is necessary to regular monitor the management of water and heat in the area of buildings and structures.

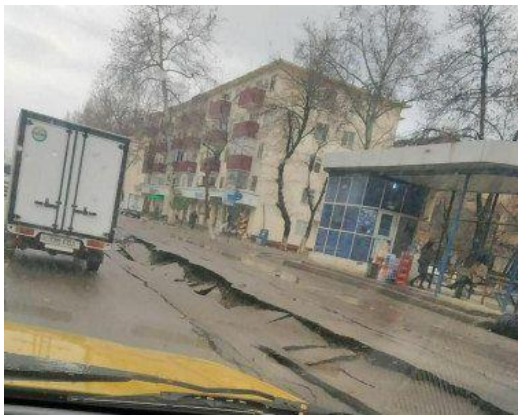

Figure 1. Automobile road collapse, Landslide of soil near the apartment building in Pakhtakor

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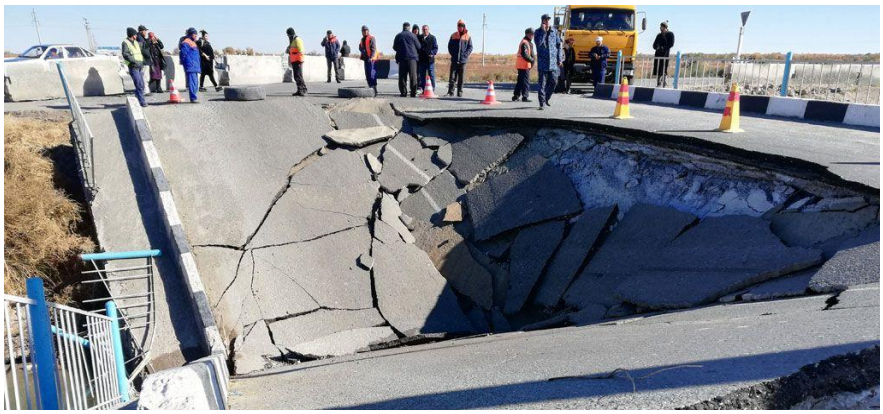

Figure 2. The base of the bridge located on the 16-21 km section of the 3rd category 4R35 “Jizzakh (4R38 automobile road) -Pakhtakor-Dustlik-Gagarin-M39 automobile road (128 km)” automobile road of Pakhtakor district damage to the structure as a result of salinization of soils

Table 2

Solubility of salts at 18^0C

Chemical composition of salts	Water solubility, g/l	Chemical composition of salts	Water solubility, g/l
K_2CO_3	1117	Na_2SO_4	194
$CaCl_2$	745	K_2SO_4	111
$MgCl_2$	545	$MgCO_3$	25,79
$MgSO_4$	354	$CaSO_4$	2
$NaCl$	329	$Ca(OH)_2$	1,48
KCl	330	SiO_2	0,16
Na_2CO_3	193,9	$CaCO_3$	0,0634

The chemical composition of salts in soils depends on the chemical composition of the groundwater and surface water moving in them. Natural waters (groundwater and surface water) form solutions enriched with various chemical elements. Their chemical composition is formed under the influence of atmospheric precipitation and the "alkaline melting" of rocks, evaporation, ion exchange, ion absorption, gases, organic compounds and organisms, and other physicochemical processes. The chemical composition of groundwater is formed mainly due to the slightly soluble salts in the soils dispersed in the aeration zone. The amount and composition of the components in water depends on many factors, mainly the distribution of some elements in the earth's crust, their solubility in water under this temperature and pressure.

To prevent the negative effects of soil salinization, it is necessary to properly ensure the irrigation regime, wash large saline soils in large norms, create an artificial flow of groundwater using drains to radically change the direction of the salinization process.

The main factor in the formation of saline soils is the mineralized groundwater and saline rocks lying close to the surface. Therefore, saline soils are found in impermeable plains, deserts and hilly areas. The description of salinity is directly related to the hydrogeological and geomorphological conditions of the site. The foothills are composed of carbonate rocks, usually unsalted soils. In the soils of the foothills and valleys, water-soluble sulfates and partially chlorides are found.

The strength and compaction of soils should also be taken into account when projectinging and constructing buildings

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and structures in saline areas. Sedimentary rocks are compressed by external forces, resulting in a decrease in their porosity and volume.

Sources of salinization of saline soils are the process of enrichment with salts developed in saline rocks and mineralized waters that rise to the top and evaporate and release a certain amount of salt. Both sources of salinity are found in Uzbekistan. At the same time, salinity of soils from saline rocks without the influence of groundwater is observed, albeit to a lesser extent.

The location of saline soils in the lower part of water basins and their formation in flat relief conditions is the first condition arising from the geographical analysis of saline soils.

The second condition is the generalization of climatic conditions. Almost all areas of Uzbekistan with saline soils are subject to hot climates, where the amount of precipitation does not exceed 200 mm per year and the amount of evaporation is very high. Under these conditions, soils become saline when they are moistened with groundwater through capillaries.

Figure 3. The basis of buildings and structures in saline areas increase durability

The third condition is the known as law of motion of groundwater, which explains the process of salinization of soils. As the relief shifts from the mountains to the plains, the flow velocity of groundwater decreases as the relief flattens and the heavy mineral particles in the soils increase, the transverse surface of the stream and the time of contact of the passing water with the rock or soil increase. As a result, the probability of groundwater consumption and the possibility of salt accumulation and evaporation from the capillaries increases.

Conclusions

Thus, when the amount of calcium carbonate in the soil is less than 5%, it is not decided as necessity, and when it is between 5% and 25%, the soil is called calcified. Typically, large amounts of carbonates occur in dusty soils of various origins.

Ground salts can dissolve under the influence of water and other solutions and spread within the soil. The release of soluble salts from the soil is called quantity or salt leaching or chemical suffocation.

Leakage of soluble salts from the soil can occur with convective displacement buildings and structures and molecular diffusion buildings and structures during filtration. The rate of leaching of salts from the soil with fresh water depends on the property of moisture accumulation, which is controlled by the amount of filtration coefficient: in convective moisture migration (filtration) the leaching rate of salt is maximal. Such situation can be observed when the filtration coefficient is about 10^{-3} m / day, the pressure gradient is around 10^{-6} m/day. At low values of water permeability, most of the leaching of salts occurs with diffuse buildings and structures are slow.

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The leaching of salts in the soil is also controlled by the composition and amount of salts in the water moving through the soil: the salts in the soil do not dissolved when a saturated solution with the same amount of salt as the soil moves through the soil. Therefore, fresh water falling on saline soils over a certain distance becomes saturated with salts and loses its solvent properties. Only when a fresh amount of fresh water enters the soil can it actively dissolve and remove the salts.

When the soil is exposed to certain solutions of salts as well as acids and alkalis, it is possible to completely remove not only weak and moderately soluble, but also difficult-to-dissolve salts from the soil.

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