American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 35-38
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ajast

Research Article

ADDITIONAL MEASURES FOR DESIGN AND CONSTRUCTION IN SALINE SOIL CONDITIONS OF UZBEKISTAN

Submission Date: September 10, 2022, Accepted Date: September 20, 2022,
Published Date: September 30, 2022
Crossref doi: https://doi.org/10.37547/ajast/Volume02Issue09-06

Kamildzhan Yuldashev
Lecturer at the Technical Faculty of USU, Urgench, Uzbekistan

ABSTRACT

The article deals with the construction of saline regions of the Republic of Uzbekistan.

KEYWORDS

Salinization, saline soil, characteristic properties of saline soils, melioration, soil deformation, leaching, suffosion sedimentation, stratification, etc.

INTRODUCTION

Saline soil

Soils containing easily soluble mineral salts in the entire composition or in its composition in quantities harmful to plants (more than 0.1 - 0.3%). Salinity under certain conditions can be a variety of different soils. The process of salt accumulation is known as salinization. Salinization can be different, that is, due to natural processes (weathering of minerals, impulverization - the bringing of salts by the wind) and through artificial irrigation processes, drained, etc. According to the degree of salinity, soils are divided into slightly - medium, strongly and very strongly saline.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 35-38
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

Regardless of the chemical composition of the compounds that flood the soil by themselves, salts can be concentrated in a certain soil horizon. According to the depth of the salt horizon, saline (0-30 cm), solonchakous (30-80 cm), deep saline (80-150 cm) and deeply saline (more than 150 cm) soils are distinguished from the day surface. Depending on the composition of salts in the soil, several main types of salinization are distinguished.

a) Chloride salinization of soils is due to the excess content of sodium chloride and magnesium chloride salts (NaCl, MgCl) in the soil.
b) Sulfate salinization is caused by the accumulation of sodium sulfate and magnesium sulfate. (Na_2SO_4, $MgSo_4$, $CaSO_4$)
c) Soda (carbonate) salinization is associated with the presence in the soil of increased amounts of sodium bicarbonate and other sodium salts ($NaHCO_3$, Na_2CO_3).

In the conditions of Central Asia, specifically the Republic of Uzbekistan, the regions of Karakalpak A.R., Khorezm and Bukhara regions are located in very saline soil zones. In thawed soil conditions, the construction of various objects has its own characteristics. At present, in these regions of the republic, soil salinization is especially intensifying, since after the drying of the Aral Sea, soil salinization is enhanced by the influx of various salt formations accumulated on the millionth hectares of the Aral bottom. It is difficult to carry out construction in conditions of saline soils due to the fact that soil deformation manifests itself both during the construction of structures and during operation.

At such moments, having determined the composition of salts in the soil under laboratory conditions, having calculated the amount of suffusion sedimentation of a base composed of soils with easily soluble salts and gypsum sands, performed within the zone of suffosion sedimentation, civil and industrial buildings are erected on these soils, but only after the desalinization of individual layers. In the modern era of scientific and technological progress, the organic world of greasy soils remains a problem for many builders. Construction in conditions of saline soils was well known to many. Since, due to the intensive reclamation of arid regions, large areas of previously low-moisture saline soils turned out to be flooded, which led to their subsidence. As a result, the deformation of buildings, structures arose in the constructed buildings, as well as in the newly erected ones. Significant deformations always force builders to look for optimal solutions in which new horizons would open up for people. Despite the existing experience in construction, there is not enough systematizing, generalizing and even research data in the field of analysis of saline soils. But construction in conditions of saline soils is necessary, this is a requirement of the time. Modern specialists are currently offering solutions to these problems - to reduce construction risks and get rid of unnecessary cataclysms.

Construction in the conditions of saline soils, in some cases, was carried out without special instructions in the project for the performance of construction work in saline soils. Because of this, in the solid consistency of soils, deformations of the bases were especially pronounced (in the form of a sharp deformation of buildings) when the soils were soaked. This is explained by the fact that when soils are saturated with water and salts are dissolved, the strength and interconnection of individual particles sharply decrease, as a result of which the strength characteristics and the value of the total deformation modulus change.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 35-38
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Crossref doi Google Scholar METADATA INDEXING WorldCat MENDELEY
Publisher: Oscar Publishing Services

The process of dissolution of salts in soils occurs very quickly (especially when easily soluble salts interact with hot water), as does suffusion subsidence, which occurs within a short period of time. When designing, if the designer does not receive information about the specifics of saline soils, for which norms and recommendations for conducting engineering and geological surveys have not yet been developed, at construction sites composed of saline soils, then measures are taken only to protect the foundation from possible corrosion, and the design documentation contains information on the need to protect the surface of the instructions for concrete foundations. That is, construction in conditions of saline soils is carried out according to the same technological schemes as construction on ordinary soils. As a result, during construction work, surface and groundwater often flood the pit and enter the backfill material of foundations and basement structures. Builders can pump out water, but do not eliminate the main cause of soil soaking. Because of this, during the operation of the facility, further deformation of structures and subsidence of buildings occurs.

In order to scientifically and competently carry out construction in saline soil conditions, it is necessary to reduce the compressibility of demineralized soils, and increase the strength of the foundation by several times, as a result, the actual precipitation of objects and structures under construction, which on saline soils, sometimes several times exceed the calculated values, will stop, and possible deformations will be prevented. If the designer is provided with reliable information with the results of engineering surveys and studies of the land plot, they begin to take into account the features and distribution of contact stresses along the sole of rigid foundations laid on unimportant saline soils, and the possibility of changing the contact stress diagram when flooding saline base soils.

The difficulty of studying saline clay soils lies in the fact that salts are present in soils in the form of separate druses, veinlets, concentrated salt solutions and are even contained in atmospheric precipitation (especially in the Aral Sea zones). In order to find a general pattern, a targeted study of saline clay soils will help to carry out safe construction in saline soils, which in different regions will differ significantly in experiments, methods and ways of approaching the solution. To date, the study of the depth of the compressible zone at the base of the foundation on saline soils and the change in its thickness during watering have not been determined, methods for constructing artificial foundations on saline clay soils have not been developed. For this reason, construction in saline soil conditions is carried out using pile foundations that cope with corrosion and other deformation phenomena in such regions. Having calculated the expected deformation of the foundations in saline soils, the suffusion compression is determined and the maximum allowable value of the deformation or insufficient bearing capacity of the structure is calculated.

By taking water protection measures with the possible installation of a cushion of clay soils or from a certain thickness of compacted dune sand, cutting through the thickness of saline soil with pile foundations, fixing or compacting soils, preliminary stratification using compacted dune sand for drainage, it is possible to correctly plan construction in saline soil conditions, while preventing the subsidence of the building under construction and the deformation of its structures.

It means that in the conditions of saline soils on the territory of the Republic of Uzbekistan, especially in the northern regions, underground groundwater has a

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 35-38
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Crossref doi Google Scholar METADATA INDEXING WorldCat MENDELEY
Publisher: Oscar Publishing Services

periodic nature of the speed of movement and direction. Since spring watering for washing land enhances the flow of these waters. These underground saline water currents carry a very large amount of sodium salts. Water currents in some places washes, and in some places it salts the soil. Clayey ground rocks have such a characteristic ability that when wet with saline waters they contain some part of the salts, and are difficult to wash. Therefore, such soils are washed 2-4 times under high pressure of non-saline water in order to dissolve the salts. And barkhan sands, when washed from salinization, do not leave part of the salts in themselves like clay soils. Therefore, in the construction of buildings and structures, it is necessary to foresee and take into account these useful properties of dune sands. Especially the base (horizontal sole part) and the vertical underground structures of the underground parts of the building must be contacted with compacted sand with a thickness of 20 to 40 cm before backfilling. These measures reduce the risk of prolonged contact of underground parts from exposure to salts.

Construction in the conditions of saline soils is a very complex work, requiring the use of specific scientifically sound, economically inexpensive and effective measures. Before builders and designers and scientists working in saline soil conditions, there are big tasks that must be successfully solved.

REFERENCES

1. Guidelines for the management of saline soils. R.Vorgas, E.I. Pankova, S.A. Balyuka, P.V. Krasilnikova.