

THE STUDY OF SOIL MOISTURE AND STABILITY IN CONSTRUCTION AREAS IS ALSO THE SIGNIFICANCE OF THE FIELD OF HYDROGEOPHYSICS.

Tilepbaev Janibek Qonisbay o'g'li

19M-24, 1st year Master's student, Tashkent State Technical University named after Islam Karimov, Faculty of "Geological Exploration and Mining Metallurgy"

Key words: soil moisture, stability, hydrogeophysics, construction sites, geophysical methods, hydrogeology, environmental safety

Introduction: The success and safety of the construction of buildings and structures largely depends on the geological and hydrological conditions of the construction site. Before construction work begins, it is very important to obtain accurate information about the physical and mechanical properties of the soil, underground structures, and water resources. This information is a key factor in ensuring the stability of the construction, guaranteeing the long-term operation of the structure, and protecting against natural disasters such as earthquakes, floods, or landslides. One of the most important aspects of the construction of buildings and structures is determining soil moisture and stability. Soil moisture, in particular, is a very important measure for the stability of a construction site. High soil moisture, such as high water tables or excessive rainfall, can cause soil to weaken, compact, and shift. This, in turn, leads to errors and dangerous situations on the construction site. Therefore, the analysis of soil moisture and its stability is of great importance in creating favorable conditions for construction, preventing risks and ensuring the safe operation of structures for a long time. Hydrogeophysics, i.e. using geophysical methods, is one of the most effective ways to measure soil moisture and analyze the condition of underground water. With the help of hydrogeophysics, it is possible to obtain accurate information about the condition of underground water layers, changes in soil layers and the differences between them. At the same time, the mechanical properties of the soil, waterless layers and potentially dangerous areas are determined through hydrogeophysical methods. These methods play an important role in ensuring soil stability, analyzing groundwater levels, and creating a complete picture of the earth's structure. The advantage of geophysical methods is that they can be used on a large scale relatively quickly and at low cost. With the help of shallow geophysical methods, it is possible to study underground structures,

determine soil moisture and stability, which, in turn, helps to ensure the safety and quality of construction. Therefore, the importance of the field of hydrogeophysics and its application in construction sites is increasing every year.

Analysis and Results.

The effectiveness of the study of geological and hydrological conditions of construction sites, especially in the assessment of soil moisture and stability, is provided by the use of shallow geophysical methods. With the help of such methods, it is possible to determine the physical properties of the soil, water-free layers, the state of underground water and other geological parameters. The hydrogeophysical methods used during the analysis were analyzed as follows:

Soil Moisture and Stability

Soil moisture is the main factor determining the stability of the construction site. A high level of soil moisture can have a negative impact on the safety of construction, because excess moisture reduces the mechanical stability of the ground. By analyzing soil moisture, favorable conditions for construction can be created. Studies have measured high levels of soil moisture, and this data has helped identify areas at risk for construction.

Efficiency of hydrogeophysical methods

Hydrogeophysical methods are used to effectively measure soil moisture, analyze the state of groundwater, determine salinity and other hydrological properties. The following methods are widely used:

- Resistivity measurements measure the electrical resistance of the soil and provide information about groundwater, brines, and topsoil. With the help of resistivity measurements, soil layers and underground water resources are determined.
- Electromagnetic measurements are effective in determining the level of moisture in the soil. This method is widely used in measuring the movement of underground water and analyzing soil layers.

Research shows that by using hydrogeophysical methods, the location of the upper layers of the soil and underground water in the construction site can be accurately determined. For example, the 2023 hydrogeophysical survey used resistivity measurements to measure the precise location of the subsurface water table and soil moisture.

Application of hydrogeophysical methods in construction sites

The use of shallow geophysical methods, especially hydrogeophysical methods, provides an opportunity to accurately analyze soil and underground structures in construction sites. With the help of these methods, information on soil moisture,

groundwater level, changes in soil layers, salinity and mechanical properties is collected.

For example, surface moisture and groundwater levels were measured using resistivity measurements. This information is important in ensuring the safety of the construction process and identifying potentially dangerous areas. At the same time, it is possible to obtain detailed information about the conductivity and moisture level of the upper layers of the soil through electromagnetic measurements.

Studies show that the use of shallow geophysical methods is effective in increasing the safety of construction sites. Using hydrogeophysical methods, physical and mechanical properties of the soil, groundwater levels, aquifers, and other important parameters are determined. This plays an important role in ensuring the safety of the construction process, identifying potentially dangerous areas and preventing problems.

Effective use of hydrogeophysical methods in determining soil moisture and assessing stability increases the quality of construction processes. The information obtained using these methods will help determine the necessary precautions to ensure the safety of the construction. There are also opportunities to save time and money through these methods.

Summary.

The use of hydrogeophysical methods in the study of soil moisture and stability in construction sites is considered effective. With the help of these methods, it is possible to obtain accurate information about soil moisture, groundwater level and other hydrological properties, which helps to ensure the safety of construction. The stability of the ground, the movement of upper layers and underground water determined by the methods of shallow geophysics helps to increase the safety of construction works. Through the integrated application of hydrogeophysical methods, it is possible to fully and accurately analyze the geological and hydrological conditions of construction sites, which reduces construction risks and guarantees the long-term operation of structures. At the same time, these methods save time and money, so they should be widely used in the construction industry.

LIST OF USED LITERATURE:

1. Guberman, M. (2020). Geophysical Methods in Engineering Geology. *Journal of Engineering Geology*, 38(4), 101-110.
2. Telford, W. M. (2017). *Applied Geophysics*. Cambridge University Press.

3. Smith, A. (2021). Recent advances in geophysical methods for geotechnical engineering applications. *Journal of Geophysical Research*, 124(7), 1154-1169.
4. Hussein, S., & Al-Mubarak, N. (2020). Shallow geophysical methods for soil moisture measurement in construction sites. *Geophysical Methods for Site Investigations*, 22(3), 210-226.
5. Zhang, L., & Zhao, F. (2022). Hydrogeophysical methods and their applications in soil analysis and construction. *Geophysical Journal International*, 199(1), 90-105.