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FIELD TESTS OF SPILLED SOILS

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Abstract
This article provides information on the properties of spilled soils, the amount of subsidence, self-compaction, the fact that the density of dry soil for shallower depths is higher than that of the experiment, the self-compaction characteristics of re-poured gill-like soils, as well as the field tests necessary to study the properties of spilled soils.

Keywords: Specific gravity, spilled soil, self-compaction, amount of subsidence, soil, soil density, compaction of soil, compaction technology, static or dynamic testing of soil, tests with stamps and experimental foundations.

Introduction

Implementation of the targeted programs for the construction of affordable housing, development and modernization of road transport, engineering-communication and social infrastructures and the strategy for the innovative development of the Republic of Uzbekistan in 2022-2026 increase, in the future we will achieve an increase in the well-being of our people, on the basis of the restructuring of production and the acceleration of scientific and technical modernization, we will achieve the goal of effective development of the economy and increase of growth. Based on this, the main part of investments should be directed to the restructuring of production and technical re-equipment.

Reconstruction and modernization are not only focused on industrial facilities, but also on the reconstruction and modernization of old infrastructure buildings along with increasing the construction of new buildings in order to solve the issue of providing separate housing for all families, building infrastructure objects, as determined in the strategy of socio-economic development of our republic. great things are being done. As a result of the reconstruction of residential and infrastructure buildings, mainly located in urban centers, it is possible to increase the standard of living of our people.

One of the main characteristics of spilled soils is the fact that they settle under their own gravity. The subsidence of spilled soil occurs due to the densification of the materials that make it up, mainly due to their specific gravity, external load on them, as well as dynamic load, changes in humidity, and the location of underground water. Field tests during engineering-geological research of spilled soils are carried out to determine their compressibility, density in absolute value and unevenness, as well as their load-bearing capacity.

Methodology

Field tests of spilled soils usually include: static or dynamic sounding, tests with stamps and experimental foundations, determining the load-bearing capacity of piles.

Probing Spilled Soils

Probing of spilled soils allows obtaining sufficiently accurate data necessary to determine separate engineering-geological elements of soil layers, to study their density, compressibility, as well as to determine the resistance of the soil to the probe cone and the friction on the side surface when the probe is immersed. Sometimes it is desirable to use sounding to study the change in the thickness of the poured soil layer, the depth of the subgrade, which can serve as a reliable ground for pile foundations. In addition, probing allows for the determination of solid materials present in spilled soils, and the evaluation of the possibility of cutting with piles that are driven into the spilled soils. Static probing is based on pressing the cone of the probe into the ground with probing rods, and dynamic probing is performed by tapping the cone. Dynamic sensing is the simplest, while static sensing provides the most reliable data.

Sounding is an indirect (cosvennie) method of determining the density, compressibility, load-bearing capacity of piles, but due to the possibility of conducting tests at a large number of repetitions and at great depths (up to 20 ... 30 m), it allows to obtain sufficiently reliable information about the properties of the soil.

Sounding wells, as well as wells and wells, are usually located in the most characteristic places, where it is expected to obtain the minimum and maximum properties of the bottom soils with the main spilled and natural composition under study.

The distances between probed wells, m, are taken as follows: regularly restored spilled soil - 50, soil waste and industrial waste - 20, soil waste and industrial waste - 15.

There should be a minimum of eight monitoring wells per site and at least five monitoring wells per building.

The penetration depth of sounding wells is usually assumed to be equal to the drilling depth. When testing at sites with soil spills associated with spilled soil and industrial waste, it is possible to reduce the penetration depth of the required number of sounding wells by half and obtain a layer 1 m thick from the thickness of the spilled soil. It is allowed to reduce the penetration depth of 2/3 of the sounding wells required in the study of ground waste and industrial waste to the above limits.

The evaluation of the structural density of sand-filled soils, as well as soils of natural composition, is estimated by the conditional dynamic resistance value qS or the resistance of the soil to the body of the probe during static probing qd.

According to the results of dynamic testing, if the conditional dynamic resistance value exceeds MPa, the sands are classified as dense: 12.5 - for large and medium-sized sands; 11 – small sands with low moisture; 8.5 - for fine water-saturated and powdery sands with low moisture content. Loose sands include sands with a conditional dynamic resistance value of less than MPa: 3.5 - for large and medium-sized sands; 3 – fine sands with low humidity; 2

- dusty, low humidity and saturated with small amounts of water. At intermediate values of qd, sands are evaluated by their average density.

According to the results of static probing, if the resistance of the soil to the probe cone is more than MPa, the sands are classified as dense: 15 - for large and medium-sized sands; 12 – for fine sand; 10 - for dust with low humidity; 7 - for saturated with dusty water. Loose sands - sands with soil resistance to the probe cone, less than MPa: 5 - for large and medium-sized sands; 4 - fine, 3 and 2 - powdery, for low humidity and saturated with water.

In clay soils with conditional dynamic resistance of 1, 3, 5 and 7 MPa, the normative conditional calculated resistance is 0.1, respectively; 0.25; 0.4; It is assumed equal to 0.55 MPa and 0.12 with soil resistance to the probe cone of 1, 2, 3, 4.5 MPa, respectively; 0.22; 0.3; 0.4; equal to 0.5 MPa.

According to dynamic sounding data, the deformation modulus for loams and clays is assumed to be equal to 6 qS, for sandy soils - depending on their size (2 ... 7) qS. For static testing, it is recommended to take the deformation modulus equal to 3qS for sandy soils and 7qS for clay soils.

According to the results of dynamic and static probing, it can also determine the internal friction angles of spilled sandy soils.

The load-carrying capacity of piles for vertical compression load, according to the results of static probing, the ground resistance of the probe cone qd and qdf along the side surface of the probe is determined by the values of ground resistance according to the recommendations of SNiP 2.02.03-85.

Experiment with stamps and experimental foundations. Tests of poured soils with stamps and experimental foundations are carried out in their natural state or after additional compaction by various methods. Tests are also carried out to determine the deformation modulus of the soil and also the occurrence of subsidence over time.

Static load testing of poured soils without large aggregates is usually done with stamps having an area of 0.5 m2. In studies with a depth of more than 4 m and in the absence of large additions, it is allowed to test certain types of spilled soil at depth in stamp wells with an area of 600 cm2.

If there are large inclusions in the spilled soils (waste, concrete fragments, reinforced concrete elements; remnants of demolished buildings, solid inclusions in slag, etc.), tests with static loads are carried out using experimental foundations with an area of 1 ... 4 m2, the area of which is determined by the size of the joints, so that the width of the foundation exceeds the length of the joints.

In order to study the possibility of subsidence or bulging of spilled soils consisting of clay soils with low moisture content, ash, slag, loose, low moisture content, fine sand, etc., stamp tests are carried out by wetting the soil in accordance with the recommendations for testing sinking soils under static load.

Static load tests are carried out at the boundary of the designed buildings and in the vicinity of wells or wells.

If the thickness of the studied type of spilled soil is less than the calculated compressive thickness of the foundation, and below there are spilled soils of different composition, recharge method and time, then each layer, including the natural soil located inside it, is compressible under the designed building or structure. thickness is tested.

Summary. The thickness of each type of poured soil under the stamp or foundation should not be less than the width of their base. Depending on the uniformity of the structure, composition and laying time of the spilled soil in each section, the number of test points should be at least: for systematically constructed spilled soil - two; wastes of soil and industrial waste - three; ground and production dumps (if they can be used as a foundation) - four.

Stamp test points are determined in places where, according to preliminary data, the soil has minimum and maximum compaction. The soil deformation modulus is calculated according to the following formula based on the results of testing them with stamps and experimental foundations.

$$\varepsilon = (1 - \mu^2)\omega d \frac{\Delta P}{\Delta S}$$

where m is Poisson's ratio, equal to 0.27 for large fractured soils; 0.3 – for sand and supes; 0.35 – for suginok; for clay- 0.42; ω is the accepted dimensionless coefficient equal to 0.79 for circular stamps; square - 0.88; for rectangles with an aspect ratio from 1.5 to 3 - 1.08 ... 1.44; d - diameter (width) of the stamp; ΔR - pressure in the stamp; ΔS – stamp subsidence.

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