JHEAA
ISSN : 3032-1123
https://doi.org/10.61796/ejheaa.v1i7.732

STRUCTURE SOLUTIONS FOR THE CONSTRUCTION AND REPAIR OF FOUNDATIONS ON LOESS SOILS IN SEISMIC ZONES

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Received: May 22, 2024; Accepted: Jun 29, 2024; Published: Jul 10, 2024;

Abstract: When repairing slate floors and foundations in earthquake areas, we propose to carry out the expansion of the base surface of the foundation in practice using two methods. In addition there are various methods related to the repair of slate floors and foundations used in construction practice, which can be conditionally divided into three types, depending on the general purpose: reducing the value of the pressure transmitted to the slate floor; strengthening the foundation material; increasing the strength indicators of the slate grout. The Lewis sinks and the strength of the foundation drops sharply. In this case, a loss of stability of the base is observed, which often leads to the complete or partial destruction of buildings and structures. Let's also consider ways to prevent this.

Keywords: Lyoss floor, foundation, grunt mechanics, lyoss grunt, silicate, electrosilicating, heat, thermal method, sandbags, cementing, deformation module, wind hypothesis, exotic dust

Introduction

Based on the decree of the president of the Republic of Uzbekistan No. 144 of May 30, 2022 “on measures to further improve the system of ensuring seismic safety of the Republic of Uzbekistan”, it is envisaged to improve the system of ensuring the seismic safety of the population and the territory until 2025.[17]

Reasons for the repair of slate floors and foundations when the issue of repair of industrial enterprises, public and residential buildings is seen or during the transfer of underground structures from under the buildings in use, when building a new building near them, as well as at the time of unspoiled subsidence on the structure floor, a re-assessment of the strength of the foundation In cases where the result of such an assessment did not meet the established requirements, the issue of repairing the foundation is thrown into the middle.

The methods for repairing floors and foundations used in the construction practice of slate floors and foundations are diverse, which can be conditionally divided into three types, depending on the general purpose:

1. reducing the value of the transmitted pressure to the floor of the bath;
2. strengthening the foundation material;
3. increasing the strength performance of lyossley grunts.

One of the founders of the science of the mechanics of grunts to reduce the pressure transmitted to the floor of lyossley K.Tersagi wrote in his early twenties that "if an opportunity is created, in any grunt setting it is possible to create a solid and stable building, even if it is extremely empty, no matter how high-value load is affected." Two things lie in the content of this statement: the first is to enlarge the dimensions of the base base surface; and the second is to increase the deepening of the foundation and transfer the pressure value to the solid layers located deep. In fact, the value of

the pressure transmitted to the lyossed floor depends mainly on the dimensions of the base floor level, and the pressure value decreases as the surface increases. But there is also a certain limit when enlarging the dimensions of the base floor surface, which is determined by the plan measurements of the building.[1-6].

Results and Discussion

Expanding the base base surface can be done in practice using two methods: (1.1-image)

1. extension of the foundation base surface without additional pressure effect of the lyossi grunt;
2. expanding the base surface under the influence of additional pressure on the lyossi grunt.

1.1-image. Sementing method

In both cases, the total area of its surface increases. Increasing the depth of the foundation of a building in use requires much more complex precautions. The repairable Foundation is fastened using special risers (domkrat), which are drilled from the base in small parts. Concrete is poured into the hollow section, and then transferred to the next section. This work is continued until the base base surface is full. In order to increase the depth of shallow foundations, it is widely used in practice to transfer them to piles. There are also two methods for this:

1. liquid concrete is sent at high pressure using sprayers, screwing the foundation body upright and at an angle (the diameter of the screed is 15-20 cm).
2. fixing the foundation with the help of special risers, prefabricated reinforced concrete piles are inserted under it.

The method of strengthening the lacy grunts is mainly to artificially harden the grunts and increase the load-bearing capacity. In practice, silicate, electrosilicating, heat-induced (thermal method) hardening, application of sandbags and other methods are used. Cementation is used when the strength of the foundation material is insufficient. To do this, holes with a diameter of 25 mm are formed on the body of the foundation, steel pipes are inserted into them, through which a cement mixture of 0.3-0.5 MPa 1:1 content is sent at high pressure. The Loess soils, sand-clay-gravel continental derivatives of the diverse genesis of the group of bonded soils, contain over 50% of

particles measuring 0.05; 0.005 mm; have high porosity, low humidity, and sedimentation when moistened under the influence of their thickness weight or additional loads from engineering structures. Among them, soils in the form of lyoss and lyoss stand out. The LySs, the most typical representatives of this small group of genera, are characterized by very high (usually more than 50%) fine loam (0.1 - 0.05 mm) and large dust (0.01–0.05 mm) particles and a small amount of clay particles. (S. S. Up to 16% according to the Morozov classification), they are in a combined state. Lyose-shaped soils occupy an intermediate position between lyoses and clay soils and are characterized by a predominance of particles measuring 0.01–0.001 mm, which together with clay particles form microagregates.[7-13]

The radius of compaction of the lyossed grunt, the pressure of sending the grout, the consumption of the cement grout and the density of the cemented lyossed grouts are determined in the process of test work. The cementing method is also used to strengthen the construction of foundations. To do this, Spurs are drilled in the body of the foundations, through which a cement mixture is sent under strong pressure to the foundation material or wall.[21].

The pile foundation is suitable for soils of the lyose type, except for rocky foundations. Its basis is piles, which are placed at a certain depth and are interconnected into a frame with bars. (1.2-image)

1.2-image. Pile foundation installed on loamy soils

Under the terms of occurrence, lyoss soils take the place of cover everywhere. Their strength ranges from a few centimeters to tens and even hundreds of meters wide in Europe, Asia and America. The total area occupied by the lyoss soils in the globe is 13 million km2. The northern limit of their distribution in Europe is up to 62 ° N, in Asia it passes much further north; the southern limit reaches 28° N. lyoss soils are not found in tropical and subtropical regions. The area covered by lyoss soils in the CIS area is about 3.3 million km2. They are widespread in most of Ukraine and the south of the European part of Russia, Central Asia and Western Siberia.

Lyoss soils-polymineral. They are characterized by carbonates (up to 25-35%), water-soluble salts (up to 5%), low natural humidity (usually below 20%), high porosity (up to 55-65%). One of the distinctive features of Lyoss soils is the low strength of water, which is manifested in rapid hydration and significant erosion. It is this feature that contributes to the development of gullies in places where the layers of the lyosse are scattered. The value of the deformation module of Lyoss soils ranges from 2-3 to 50-55 MPa, the highest values of the deformation module are characteristic of soils with

moisture content below 17-18%. In soils in a water–saturated state, the value of the deformation modulus is in most cases less than 4.5-5 MPa.[14-16]

Dipping is a common feature of Lewis soils, manifested in their ability to reduce volume under load during wet weather. As a result of this, a decrease in the surface of the Earth and deformation of engineering structures occurs. The relative sedimentation coefficient includes soils of 0.01 and higher. Its maximum values reach 0.10–0.12, and the thickness of the sediment reaches 55-65 m.

During engineering and geological studies, it is customary to distinguish underground conditions with two types of sediment, depending on the probability of subsidence of clay soils from their own weight:

Type I-deposition is caused by foundation load or other external load in the deformable zone of the foundation, there is practically no drop from the soil's own weight or no more than 5 cm;

Type II – soil subsidence from its own weight can exceed 5 cm and occurs mainly at the bottom of the sedimentary layer, in the presence of external load-in the zone of deformation.

According to experts, up to 45% of the costs of civil and construction work are spent on a number of measures to prevent deformation of structures due to the deposition of foundations of industrial facilities on the lyoss soils. The generalization of this data made it possible to combine all hypotheses into several groups, which explained the emergence of lyosses by wind and water. wind hypothesis. Its founder was F. Richtgoffen (1877). He did not consider the wind to be the only factor in the appearance of lyoss rocks. Then F. Rixtgoffen's detailed study of Chinese lyoss concluded that the lyoss (powdery) material was transported and collected by wind and rainwater at shallow depths and was held there by desert vegetation. The wind hypothesis has found many followers among Russian scientists, and other countries that have developed and replenished its. For Example, V. A. Obruchev (1904) explained the formation of a continuous lyosse coating as follows: high relief elements due to dust, brought from distant places (exotic dust). P. A. In tutkowski's view (1899), winds blew up glacial deposits and drove dust away from the glacier-Pokrov, which he had formed the lyoss. American Scientists F. Leverett (1899), T. Chamberlin (1909) main meaning they ensured the formation of dust layers. River and water-the calculation of Glacial Drift can be attributed to many famous domestic and foreign scientists of the sedimentary rocks of nearby valleys, for example, A. I. Moskvitin, I. I. Trofimov, N. I. Krieger has been ardent proponents of the wind hypothesis to this day. This is because this hypothesis well explains the fact that lyosses are covered in large areas. [18-20]

Conclusion

The Lewis sinks and the strength of the foundation drops sharply. In this case, a loss of stability of the base is observed, which often leads to the complete or partial destruction of buildings and structures. To eliminate the properties of deposition, various methods of lyoss bases are used.

1. The most common method was the method in the first stage of the fight against the decrease in lyoss bases mechanical compression of lyoss soils many times heavy rammers (up to 10 - 16 times) are thrown into a compacted soil area from a height of 4-8 m. Lyoss allows you to compact the thickness of the soil to a depth of 3.5 m. The disadvantage of this method is the effect of the resulting dynamic effects on those nearby.
2. Deep compaction of the soil if it is necessary to eliminate the unloading properties, pressed pegs are used lyoss soils with a depth of more than 10 m, and in this case, dynamic vibrations appear in the foundation soils when piercing wells for installing pegs.
3. Eliminate the features of deposition, perhaps by the method of pre-soaking the lyoss Massif. In this case, soil excitation occurs, after which, it compresses, loses sediment and moves to a stable state. When using this method, the following are necessary: an important

set of activities for this exceptions are wetting the foundations under nearby buildings and structures.

4. Strengthening Lyoss soils, in which hot air was transferred from the ground using special devices or gases at a temperature of 300 - 800 degrees. Under the influence of high temperatures, melting and sintering of minerals occurred contacts and aggregates between individual particles formed strong phase contacts of the crystallization type, resistant to water exposure. The result was a significant increase, the disadvantages of this method were the presence of a significant chemical "contamination" of the established rocks, and therefore it is currently not used.
5. Currently, one of the most effective ways to eliminate sediment is the method of silicatization of loamy soils, and chemical solutions are sent to the ground using injectors. Injectors are dipped with a hammer, making it with strokes slightly larger than the length of the perforated part, usually equal to 0.5-1.5 m.at the depth of each approach, fixators are poured using pumps specially designed for chemical fixation of the soil. The radius of forced propagation is in the range of substances in the soil 0.4-1.0 m, and the depth of immersion of injectors can be 15-20 m or more.

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