

PREPARATION OF FLOORS IN EARTHQUAKE AREAS AND DESIGN OF LOAD-BEARING STRUCTURES IN EARTHQUAKE-PROBENT AREAS

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Abstract

According to the article, in order to build buildings in earthquake-prone areas, first of all, the composition of the soil should be studied. Earthquakes in rocky areas are poorly known when seismic force is calculated in 8–9-point zones. Seismik is checked with special devices in the study of regions.

Keywords: Ground and foundations, pyramid, Nile River, structures, Great Wall of China, solidity, stability and harmony, foundation of the building.

Introduction

The history of the construction of floors and foundations goes back to ancient times. Several thousand years before our era, in Greece, Arabia, Chin (China), India, Turan (Central Asia) and similar developed countries, large luxurious buildings were built that transferred a lot of load to the ground. As an example, the Cheops (Khufu) pyramid, built 4.5 thousand years ago on the banks of the Nile River, weighs more than 6 million tons and transmits 120 Nsm² pressure to the ground.

About the fact that the engineers of ancient Greece searched for solid rock soil to build unique structures, Vitruvius, a builder, wrote in his treatise "On Architecture" a century before our era. By the time of feudalism, many cities, luxurious palaces and buildings were built. In order to protect them from the enemy, high, thick walls and control towers were built.

In order to protect them from the enemy, high, thick walls and control towers were built. For example, the Great Wall of China, the Kremlin wall in Moscow, etc. The amount of pressure transmitted from them to the ground was tens of kg per 1 cm of surface. That's why Palladio, a great specialist of that time, in his book "Four Works on Architecture" (1570), emphasized to



the builders the need to strengthen the ground and foundations in order to protect the structure from damage.

Establishing a solid and extremely simple ground and creating a structure with a very complex structure on it is especially characteristic of the era of the master Amir Temur (the White Palace, the Bibikhanim madrasa, etc.). The floor of the buildings and structures created in that period is perfect in terms of its durability and resistance to any external influence. Our great-grandfather Abu Raikhan Beruni emphasized in his works that the main attention should be paid to the preparation of the floor. It also details the simple methods of baking empty floors. It is known that Zahiriddin Muhammed Babur (1483-1530) and his descendants built unique structures wherever they ruled. According to historians, many construction works were under the personal control of Boburshokh. It is not without extimol that the innumerable structures built by Babur are distinguished by their strength, stability and harmony, due to the special attention paid to their ground.

At the beginning of the twenties, in order to implement large-scale planned large-scale constructions, extensive research on the ground and foundations was carried out. Their results were summarized and formed as an independent science. The service of engineers-scientists who worked in some branches of this field is great in the implementation of this work. Among them, N.P., who applied the theory of elastic and scattering bodies to the calculation of soils. Puzirevskiy (1932), the author of the theory of water-saturated soils, is credited. N.M. Gersevanov's service deserves special attention. The book "Dinamika gruntovoy masy" (1931-1947) has not lost its value until now.

Research works on soils and soils, especially N.N. Maslov, N.A. Tsitovich, V.A. Florin, V.V. Sokolovsky, M.I. Gorbunov-Pasadov, A. Mustafoev, E.K. Egorov et al. was developed in every way. In the mid-50s, he began to deal with issues of the development of the science of soil and foundations in Uzbekistan. The topic of scientific work is mainly related to ground soils, and began with the study of loess and loess-like rocks.

G.O. the result of scientific observations, which took the main place in the construction of large structures. Mavlonov's treatise "Geneticheskie tipi lessov i lessovidnix porod tsentralnoi i Yuzhnoi chasti Sredney Azii i ix injenerno-geologichieskie svoystva" (1958), K.K. It is explained in detail in Kazoqboev's article "Stroitelstvo irrigatsionnyx soorujeniy v rayonakh novogo osvoeniya" (1981) and in the works of many other Uzbek scientists.

The study of the results of the Tashkent earthquake in 1966 created a new direction in the field of soils and soils - the field of earthquake resistance of loess soils saturated with water. This scientific direction was developed by the author of this book, Rasulov K.Z. a group of scientists led by: Chastoedov Yu.N., Sayfiddinov S., Khakimov G.A. and others are continuing with success

In the following years, the methods of approaching foundation calculations from the point of view of elasticity T. Shirinkulov, S. Makhmudov, study of the properties of loose soil with large particles, Kh. Ibrokhimov;

M. M irzaakhmadiy, E. Kadyrov, Z Yodgorov, K. Polatov, I. Odilov, E. S. Pesikov, A.Z. Khasanov, F.F. Zekhniev, A. Abdurakhmanov; researches on construction of pile foundations



Z.Sirojiddinov, K.M Jumaev; and research works on the strengthening of retaining walls O. It is widely studied by Khalikulov.

The result of ongoing scientific research led to the production of new devices in the field of foundation construction. These include reinforced concrete foundations for wall or column foundations, short pile foundations instead of furrow foundations, or deep-seated foundations such as precast concrete piles. Effective use of them successfully solves the construction of many skyscrapers in our republic, especially in the city of Tashkent.

Therefore, in order to prevent earthquakes, engineering geological, hydrogeological, and geodetic exploration of ground soil should be carried out properly and properly. It is necessary to be able to choose earthquake-resistant soils correctly. When constructing multi-story buildings, it is definitely considered seismic strength. It is necessary to know what the result will be, to feel it. It is permissible to quote the following words of our grandfather Rudaki, who said: "The court is the foundation of the building, and the guard of the building is its foundation."

Summary:

It is necessary to choose the construction area, taking into account the responsibility of buildings and structures, seismic district and microdistrict map, hydro-geological conditions. It is known that seismic loads are proportional to masses. Based on this, light materials, concrete with high strength, use of optimal structural schemes and load-bearing elements it is necessary to try to reduce the mass of constructions due to the expansion of the cross-section in height. On seismically unfavorable grounds, the sizes of buildings and structures should be reduced as much as possible, or their vibration complications should be taken into account.

Taking into account that the strength of seismic vibrations decreases as they go underground, it is advisable to place one or more underground floors in buildings and structures as much as possible. , which in turn is important in constructions on sedimentary soils.

It should be kept in mind that the buildings and structures built from precast reinforced concrete are damaged mainly from the place where the structures are connected to each other, and in the buildings built from solid concrete, from the place where the walls located perpendicular to each other are connected. Based on this, it is necessary to follow the principles of integrity and equal strength of the elements of buildings and structures. The places where the composite elements are connected to each other should be in places where there are no maximum stresses that occur during earthquakes, and their quality should not be less than the quality of the elements to be connected to each other.

Laying of anti-seismic belts, vertical stacks (serdechnik) to ensure spatial integrity of buildings built from local and granular materials (stone, brick, large block, straw). It is required to equip the walls with reinforcement, to limit the distances between window spaces and parallel walls. Due to the flexibility of some parts of the constructions, they make it possible to absorb the energy of the seismic effects and their attenuation. For this reason, it is necessary to see proposals that allow the development of plastic deformation in the constructions during the earthquake.



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For example, in thin buildings, the work of the beams in the plastic region should begin before that of the columns. Otherwise, the vertical loads should start before those of the columns. Based on the above, it is required to equip stone structures with a tendency to brittle fracture with reinforcement. Stair nets and curtain walls significantly affect the seismic vibrations of buildings and structures.

Based on this, they should be included in the general structural scheme or separated from the main load-bearing elements using seismic joints. At the same time, they should be securely fixed as shown in the project. The goal is to place the partitions of the separated building parts on the same level in order to prevent them from colliding with each other during the earthquake. according to. All vertical load-bearing elements (columns, diaphragms, single core) should be made continuous throughout the height of the building up to the foundation. It is advisable to take transverse walls and diaphragms along the entire width of the building. The placement of diaphragms around the perimeter of the building improves the torsional performance of the building. If information is provided for the designer, theoretical and experimental studies of earthquake resistance in many cases are intended to be built on the basis of simple systems, materials, and certain technologies of buildings and structures. Because the failure of the concrete core can lead to the destruction of the entire building.

Curtain walls have a sufficient influence on the work of the building under construction. Curtain walls are large in size, but with low strength, they break during earthquakes, change the distribution of stresses between the main load-bearing elements and complicate the vibration of the entire building.

For this reason, it is recommended to include the curtain walls in the general structural scheme or to separate them from the main load-bearing elements with a seam in order to eliminate the load on them. Weak seismic protection of buildings and structures (stone, brick, cobblestone, large block) operating according to the bikr structural scheme one of its important elements is seismic belts. They perform the following tasks: they increase the resistance of walls to damage in corners and joints.

It prevents large parts of the walls from buckling in height, receiving vibrations in the plane normal to the plane of the wall and transmitting them to the load-bearing walls located parallel to the wave vibration.

In 1923, the 3-story Imperial Hotel, built in Tokyo, was put into operation. On September 1, one of the strongest earthquakes occurred there (magnitude 8.2; more than 43,000 people died). but this building remained intact despite its complex shape in plan. Only cracks appeared on



the walls of the corridor, the perimeter of the restaurant was raised slightly, lighting and other non-structural elements failed.

Large comet piles are driven under the building. Many heavy elements have been replaced by light ones. For example, the wall was made of two layers of bricks and the gaps were filled with concrete. As the height increased, the thickness of the wall decreased. The windows on the first floor were smaller than those on the upper floor. The traditional Japanese tile roof was replaced with light copper. Most importantly, the architect F.L. Wright was the first to divide the building into simple blocks with seismic seams, the maximum dimensions of the blocks did not exceed 18.3 meters.

"We solved the threat of earthquakes not at the expense of the integrity of the structures, but rather at the expense of their flexibility and reduction. What do we do to fight earthquakes? It is necessary to look at him kindly, and then to use cunning against him" - F. L. Wright said.

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