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# PERMISSIBLE LOAD ON THE BASE OF GROUND DAMS AT SEISMIC IMPACTS

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**Abstract**

The basis of this report is the issue of assessing the amount of permissible load on the ground of earthen dams in the seismic process. As a result of the research, an expression for determining the maximum load capacity of loose soils was proposed.In the report the question of definition of size of a maximum load on the basis of dams in seismic conditions of their work is considered On the basis of the accepted settlement scheme the formula for maximum load calculation with reference to soil, not possessing forces of connectivity is offered.

**Keywords:** loess soil. water-saturated, seismic subsidence, subsidence, clayey soils, laying depth.

The stability of the foundation of any structure in order to avoid possible severe consequences must be ensured in all cases. But construction practice shows that even the fulfillment of this requirement alone does not always guarantee the strength of structures and normal conditions for their operation.

Especially often, such a situation occurs when there are soils such as moistened loess and loess-like rocks in the thickness of the base of structures.

Seismic subsidence of structures for a number of reasons (heterogeneity of the structure of the base and the properties of the foundations that make it up, the unevenness of the dynamic load and stress distribution in the soil layer, etc.) is always uneven to one degree or another. In many cases, it is measured in tens of centimeters and more than 1.0 meters in the presence of loess deposits with an unstable structure at the base.

Under such conditions, there is a danger of a violation of the strength of the structure with the manifestation of cracks and ruptures in it as a result of overvoltages that have arisen due to their deformation. Consequently,i n most cases, when considering issues of ensuring the stability of foundation soils, one of the most reliable methods is to limit the value of the ultimate load on the foundation of structures.

Let us conditionally assume that the structure was erected on the surface of the soil layer, and we will enter into the calculation the mass of the soil layer with a thickness of . In this case, the design load on the soil at the level of the base of the foundation is determined from the condition:

$p_p=p_0 (1+k_c e^{i\omega t})-\gamma h_3$ (1)

where is the pressure from the weight of the structure;

seismicity coefficient.

Thus, taking into account the deepening of a structure is reduced to considering the following condition:

$P_h=\gamma z=\gamma(z+h_3)$ (2)

where is the depth of the considered horizon below the level of the actual application of the load to the soil, i.e. below the base of the foundation.

Let us assume that at a depth h from the soil surface, the base of the foundation of a structure with an area F that transfers pressure to the soil is laid. It is required to find the foundation depth h, at which the oscillating foundation will not give deformation (seismic subsidence). Let us replace the structure with a column of soil, with height h, having the same base area F and weight. Consequently, the pressure transmitted by the soil column to the base will be the same as that transmitted by this structure. Denoting the soil density as before, we have:

$HF\gamma=p_0$ (3)

or taking into account the forces of inertia:

$HF\gamma=p_0(1+k_c e^{i\omega t})$ (4)

Let us assume that a prism has broken off from a column of soil along the plane AB with a basesoles, and due to the destruction of the soil under its base AF, it tends to settle into the ground.

Destruction of soil stability under the foundation is represented as a certain prism AFC (collapse prism) tending to slide down the AC plane. This shift will be prevented by the FCD prism (resistance prism) and the soil layer GFDE loaded on it, with a height h. Obviously, the collapse prism will press along the plane FC on the resistance prism with some force Q.

Let us assume that the force required to shift the resistance prism and the layer of soil lying on it will be equal to R and the force Q is directed normally to the surface FC. The angle value is determined by the assumption that R will be minimal.

The soil stability condition will therefore be defined as

$R>Q$ (5)

Obviously, the pressure Q will be active and the pressure R passive. The angles of inclination are defined as:

$\alpha=45°-\varphi/2$ (6)

$\beta=45°+\varphi/2$ (7)

The values of Q and R in accordance with the equations of the theory of soil pressure on the retaining wall will be equal to:для активного давления:

$Q=(1/2\ \gamma z^2+\gamma Hz)\ \mathrm{tg}^2 (45°-\varphi/2)$, (8)

for passive:

$R=(1/2\ \gamma z^2+\gamma hz)\mathrm{tg}^2 (45°+\varphi/2)$ (9)

Since, according to the limiting condition of dynamic stability, R=Q, then, substituting their values from expressions (8) and (9), after the appropriate transformation, we obtain:

$p_0 (1+k_c e^{i\omega t}) tg^2 (45°-\varphi/2)=\gamma h\, tg^2 (45°+\varphi/2)$ (10)

or

$\gamma h=p_0 (1+k_c e^{i\omega t}) tg^2 (45°-\varphi/2)/(tg^2 (45°+\varphi/2))$ (11)

In expressions (l0) and (11) means the pressure from the structure, equal to the height of the soil prism h, exerting the same pressure on the base with its weight. However, given that:

$1/(tg^2 (45°+\varphi/2))=1/ctg(45°-\varphi/2) = tg^2 (45°-\varphi/2)$ (12)

expression (11) for the desired load can be represented as follows:

$P_{пр}=(H\gamma(1+k_c e^{i\omega t}))/(tg^4 (45°-\varphi/2))$ (13)

Expression (13) has one very remarkable property. As follows from its consideration, the value is directly proportional to H.

Formula (13) is the main expression for determining the ultimate load on the foundation of a structure, taking into account the seismic impact.

**Literature**

1. Maslov N.N. Fundamentals of engineering geology and soil mechanics. - M .: "Higher School", 1982. -571 p.
2. Ukhov SB., Semenov V.V. and other Mechanics of soils, bases and foundations.
   Moscow: DIA Publishing House, 1994. -524 p.
3. Rasulov Kh.Z. Seismic resistance of soil foundations. —Tashkent: Publishing house
   “Uzbekistan”, 1984. -192 p.
4. Xushvaqtovich B. S. et al. COMPARISONS OF RESISTANCE TO HEAT TRANSFER OF MODERN ENERGY-SAVING WINDOW STRUCTURES //Web of Scientist: International Scientific Research Journal. – 2022. – T. 3. – №. 12. – C. 396-401.
5. Miralimov, M. M., and Z. S. Tulyaganov. "GLOBAL PROBLEMS OF RESEARCH OF TEMPERATURE AND HUMIDITY PARAMETERS OF ENVELOPED STRUCTURES." INTERNATIONAL CONFERENCES. Vol. 1. No. 1. 2023.
6. Matyakubov A. D. et al. Development of industry and its role in the national economy // Investments, urban planning, real estate as drivers of the socio-economic development of the territory and improving the quality of life of the population. - 2022. - S. 153-159.
7. Qambarov, Maqsudali. "GEOTERMAL ENERGY, USE OF EARTH TEMPERATURE AS AN EFFECTIVE ENERGY RESOURCE." Web of Scientist: International Scientific Research Journal 3.12 (2022): 56-62.
8. Mambetsaliy o’g’li F. J. Development of Production in the Building Materials Industry of Menejment //Eurasian Journal of Engineering and Technology. – 2022. – T. 9. – C. 101-104.
9. Nurimbetov R. I. et al. Trends in the Development of the Building Materials Industry in Uzbekistan During the Years of Independence // Miasto Przyszłości. - 2022. - T. 24. - S. 478-482.
10. Rahimov, Sherzod, Maxsudali Qambarov, and Shuxrat Tirkashev. "CALCULATION OF ENERGY CONSUMPTION FOR HYDROTHERM EXTRACTION WHEN USING THE ILIM HYDROTHERMAL MINE LOCATED IN THE BUKHARA-KHIVA REGION OF THE REPUBLIC OF UZBEKISTAN FOR HEATING BUILDINGS." International Bulletin of Applied Science and Technology 3.3 (2023): 349-353.

11. Dilshod B. Seismic Stability of Sands Sultonsayjor in the Example of a Dam //Web of Synergy: International Interdisciplinary Research Journal. – 2023. – T. 2. – №. 4. – C. 703-706.
12. Allambergenov, A. J., Samiyeva Sh Kh, and M. Asemetov. "FORMATION OF THE MICROCLIMATE OF BUILDINGS IN THE CLIMATIC CONDITIONS OF THE REPUBLIC OF UZBEKISTAN." European Journal of Interdisciplinary Research and Development 11 (2023): 28-35.
13. Mambetsaliy o'g'li F. J. INNOVATIVE GROWTH OF THE REGION'S BUILDING MATERIALS INDUSTRY USING THE CLUSTER APPROACH //Conferencea. – 2022. – C. 239-245.
14. Allambergenov, A. J., Samiyeva Sh Kh, and T. Genjebaev. "ANALYSIS OF SPACE-PLANNING SOLUTIONS, THERMAL PROTECTION OF THE BUILDING FOR ENERGY CONSUMPTION AND COMFORT FOR ACCOMMODATION." Web of Scientist: International Scientific Research Journal 4.1 (2023): 111-117.
15. Faizullaev J. MANAGEMENT METHODS OF MANUFACTURING ENTERPRISES //Innovative research in the modern world: Theory and practice. - 2022. - T. 1. – no. 21. - S. 43-49.
16. Nurimbetov R. I., Matyakubov A. D. The effectiveness of the use of investments and the economic development of regions in the lower reaches of the Amu Darya // Veles. – 2017. – no. 4-2. - S. 32-38.
17. Djabbarova, Shahnoza, Turovoy Muslimov, and Shahriddin Boymatov. "Influence of speed of filling and draw-off to the filtration regime of Earth-fill dam." E3S Web of Conferences. Vol. 264. EDP Sciences, 2021.
18. Jonibek F. INDUSTRIAL DEVELOPMENT AND ROLE IN THE NATIONAL ECONOMY // Bulletin of science and practice. - 2022. - T. 8. - No. 4. - S. 445-449
19. Jonibek F. The Role and Importance of the Production of Building Materials in the Development of the Economy of Uzbekistan // Bulletin of Science and Practice. - 2020. - T. 6. - No. 12. - S. 292-296.
20. Fayzullaev J. THE TUBE TURN OF THE BUILDING MATERIALS INDUSTRY IN UZBEKISTAN //Theoretical aspects in the formation of pedagogical sciences. - 2022. - T. 1. – no. 6. - S. 152-163.
21. Matyakubov A. D., Matrizaeva D. Yu. Economic analysis of the effectiveness of investment management in industry // Bulletin of science and practice. - 2020. - T. 6. - No. 7. - S. 251-256.
22. Khadzhaev R. M. Essence and economic aspects of renovation in the formation of modern residential development // Bulletin of science and practice. - 2021. - Vol. 7. - No. 1. - S. 330-334.
23. Nurimbetov R. I., Matyakubov A. D., Matrizaeva D. Yu. Analysis of the effectiveness of investment management in the building materials industry. – 2020.
24. Ernazarova G. P. ANALYSIS OF THE STATE OF PEDESTRIAN TRAFFIC AND TRENDS IN THEIR DEVELOPMENT //Scientific progress. – 2021. – T. 2. – №. 2. – C. 990-994.
25. Mambetsaliy o'g'li F. J. INNOVATIVE GROWTH OF THE REGION'S BUILDING MATERIALS INDUSTRY USING THE CLUSTER APPROACH //Conferencea. – 2022. – C. 239-245.

26. Khadzhaev R. M. Modern socio-economic aspects of the formation of residential development // Bulletin of science and practice. - 2020. - T. 6. - No. 8. - S. 179-183.
27. Матризаева Д. Ю., Мирджалилова Д. Ш. ОПЫТ РАЗВИТЫХ СТРАН ПО ПРИМЕНЕНИЮСЕРВЕЙИНГА ВСФЕРЕ УПРАВЛЕНИЯ НЕДВИЖИМОСТЬЮ //Gospodarka i Innowacje. – 2022. – Т. 22. – С. 371-376.
28. Kutbitdinova M. I., Matrizaeva D. Yu. NEW UZBEKISTAN: STRATEGY OF SOCIO-ECONOMIC DEVELOPMENT OF THE REGIONS //Central Asian Academic Journal of Scientific Research. - 2022. - T. 2. – no. 5. - S. 506-515.
29. Matyakubov A. D. et al. Main Directions for Attracting Investments to Industrial Enterprises // Central Asian Journal of Theoretical and Applied Science. - 2022. - Vol. 3. - No. 10. - S. 158-167.
30. Khadzhaev R. M. Recommendations for Improving the Management of the Development of the Housing Stock of a Large City in the Conditions of Digitalization // Central Asian Journal of Innovations on Tourism Management and Finance. - 2023. - Vol. 4. - No. 1. - S. 128-132.
31. Matyakubov A., Matrizayeva D. SUSTAINABLE ECONOMIC GROWTH WITH INNOVATIVE MANAGEMENT IN UZBEKISTAN //Theoretical & Applied Science. – 2019. – №. 8. – С. 250-257.
32. Matyakubov A. D. Management of the resource base and investments in the production of building materials // Social and economic development of cities and regions: urban planning, business development, life support of the city. - 2018. - S. 214-220.
33. Kutbitdinova M. I., Matrizaeva D. Y. EXPANDING MODERN METHODS OF CORPORATE MANAGEMENT IN THE COMPLIANCE CONTROL SYSTEM // Educational devotees. - 2022. - T. 6. – no. 1. – S. 163-169.
34. Matyakubov A. D., Boltaev U. T. The trend of economic development of building materials production in the Republic of Uzbekistan // Bulletin of science and practice. - 2021. - Vol. 7. - No. 3. - S. 243-249.