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THE DEPT LOCATION THE FOUNDATIONS IN SEISMIC AREAS

Rasulov R.H
Department of Civil Engineering.
Tashkent Architecturally-Building Universitet Uzbekistan

Abstract
In article are stated results of research of authors concerning depth definition location the foundations in seismic areas. The settlement method of depth offered by authors location the foundations is the most simple and effective action for reduction expected procors seismicity construction deformations.

Introduction
By consideration of questions provided for seismic stability of the constructions, one of the most reliable methods is the correct choice of depth location their foundations.
At the same time the given method is the most simple and effective action for reduction expected procors seismicity deformations of constructions in the conditions of oscillatory movement of the basis.
Results of research of the author concerning depth calculation location the foundation of seismosteady constructions are more low stated.
We will accept conditionally, that the construction is erected to surfaces of soil thickness, and we will enter into calculation weight of a layer of soil capacity h_3. In this case settlement loading on soil p_p in level of a sole of the foundation will be defined from a condition:

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

where p_0 - pressure from construction weight;
k_c - seismicity factor.
Thus, the account location constructions is reduced to consideration a following condition:

$$p_h = \gamma z' = \gamma(z + h_3), \quad (2)$$

where z-depth location considered horizon below level of the actual appendix to a soil of loading p_0, i.e. below a foundation sole.
We will admit, that on depth h from a soil surface the sole of the foundation of a construction with area F transferring to a soil pressure p_0 is put in pawn.
It is required to find depth location of foundation h at which the fluctuating foundation will not give deformation (procors seismocity). We will replace a construction with a soil column, with height h, having the same area of foundations F and weight p_0. Hence, the pressure, transferring a soil column on the basis, will be same what transfers the given construction. Having designated still soil density through γ, we have:

$$HF\gamma = p_0, \quad (3)$$

or taking into account forces of inertia:

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

We will admit, that from a soil column the prism on plane AB with the basis of sole F_1 has broken away, and owing to soil destruction under its basis AF she aspires to settle in a soil (fig. 1).

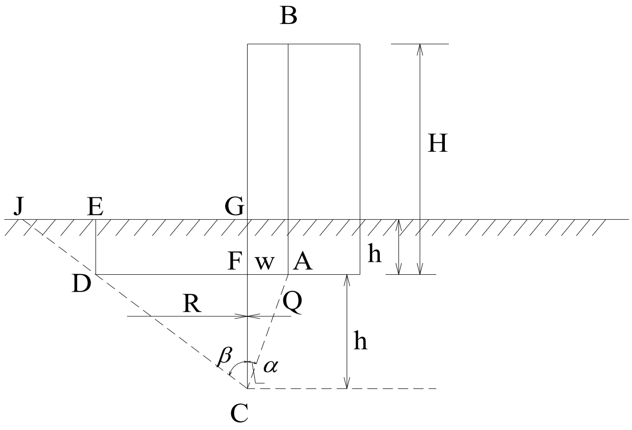

Fig. 1. The settlement scheme

Destruction of stability of a soil under the foundation we will present in the form of some prism AFC (a collapse prism), aspiring to slide off downwards on a plane the expert. Prism FCD (a resistance prism) and layer of earth GFDE loaded on it, with height h will interfere with this shift. Obviously, the collapse prism will press on plane FC on a prism of resistance with some force Q.

Let's put, that the effort necessary for shift of a prism of resistance and a layer of earth laying on it, it will be equal R and force Q is directed normally to surface FC. The quantity of corner β is defined by the assumption, that R will be minimum.

The condition of stability of a soil will be defined, hence, as

$$R > Q \qquad (5)$$

pressure Q active will be obvious, and pressure R passive. Corners of inclination α and β are defined in a kind:

$$\alpha = 45^0 - \frac{\varphi}{2} \qquad (6)$$

$$\beta = 45^0 + \frac{\varphi}{2} \qquad (7)$$

Quantity Q and R according to the theory of pressure of a soil on a retaining wall will be equaled:

for active pressure:

$$Q = (\frac{1}{2}\gamma z^2 + \gamma Hz)tg^2(45^0 - \frac{\varphi}{2}), \qquad (8)$$

for the passive:

$$R = (\frac{1}{2}\gamma z^2 + \gamma hz)tg^2(45^0 + \frac{\varphi}{2}) \quad (9)$$

As according to a limiting condition of dynamic stability $R = Q$, that, having substituted their values from expression (8) and (9), after corresponding transformation we will receive:

$$\gamma h = p_0(1 + k_c e^{i\omega t})\frac{tg^2(45^0 - \frac{\varphi}{2})}{tg^2(45^0 + \frac{\varphi}{2})} \quad (10)$$

In expressions (9) and (10) p_0 means pressure from a construction, equal to height of the soil prism h, putting in the weight the same pressure upon the basis.

However, considering, that:

$$\frac{1}{tg^2(45^0 + \frac{\varphi}{2})} = \frac{1}{ctg(45^0 - \frac{\varphi}{2})} = tg^2(45^0 - \frac{\varphi}{2}) \quad (11)$$

expression (10) for required depth location of foundation H is possible to present in the following kinds:

$$H = \frac{p_0(1 + k_c e^{i\omega t})}{\gamma tg^4(45^0 - \frac{\varphi}{2})} \quad (12)$$

It is necessary to notice, that the formula (12) is deduced without coupling in a basis soil. For the account of this indicator we will use widely used in the soil mechanic reception, i.e. replacement of force of coupling with some fictitious column of a soil with height h_c and density γ (fig. 2):

$$h_c = \frac{c}{\gamma tg\varphi} \quad (13)$$

Taking into account the formula (13) expression (12) will be copied in a kind:

$$H = \frac{p_0(1 + k_c e^{i\omega t})}{\gamma tg^4(45^0 - \frac{\varphi}{2})} + \frac{c}{\gamma tg\varphi} \quad (14)$$

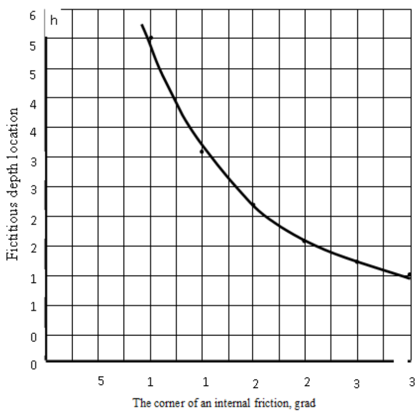

Fig.2 The schedule for an establishment of fictitious depth location the foundation h_c at value of coupling c=0,1·10^5

As follows from this formula, the quantity h is in direct dependence from p_0.

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