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Studying of Deformation Properties of the Additive Bases with the Help by Means of Special Installation

RustamXujakulov, Sergey Zasov

Candidate of Technical Sciences, Karshi Engineering and Economic Institute, Karshi, Uzbekistan
Professor, Russian State Agrarian University, Russia

ABSTRACT. In article discusses the study of the stress-strain state of subsidence bases on models of hydraulic structures of hydraulic structures allow done.
In the process of moistening subsiding soils that serve as the basis of hydraulic structures, they undergo a transformation of the stress state with the appearance of stress concentration zones.
The concentration of stresses on the contact of the Gb flatbed with the base takes place in areas with a large value of the modulus of soil deformation. For a loess drawdown base, these are zones of non-wetted or slightly moist soil. In the depth of the moistened basement array of hydraulic structures, the stress concentration occurs both due to the anisotropy of the strength and deformative properties of loess soils, and due to the influence of a hard, as yet unmoistened layer. The maximum values of normal stresses in the soil layer occur when it reaches the critical humidity ω at the boundary of the soil with the nature of humidity.

KEYWORDS: deformation, process, priming, growth, Circuit, depth, zone, diameter, stamp, pressure, horizontal, flyer, border, humidity.

I. INTRODUCTION

Regularities of process of deformation of the moistened loessial soil of undisturbed structure were studied by us during the work with the device which description is given.

As showed researches, when moistening soil under the loaded stamp development of deformation can be divided into two stages conditionally. On the first deformation increases due to increase in volume of a deformable zone in the course of advance of the front of moistening in massif depth. At the second stage development of a zone of deformation in depth of the massif happens along with further consolidation of the top layers of earth and emergence in them horizontal deformations. It should be noted that side deformations of soil in the bases of stamps were registered only when the humidity of soil reached 25-28%. If the amount of the water pumped in a ditch did not provide such humidity, then side deformations either were absent, or were very insignificant and took place only under edges of stamps.

II. SIGNIFICANCE OF THE SYSTEM

In article discusses the study of the stress-strain state of subsidence bases on models of hydraulic structures of hydraulic structures allow done.The study of literature survey is presented in section III, methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and conclusion

III. LITERATURE SURVEY

The final amount of subsidence of the soil layer at the base of the hydraulic structure can be caused by both the maximum critical moisture content in the soil and the stresses stabilized at a lower level, but at the increased humidity optimal for the subsidence process [1-2].Lateral deformations of subsiding soils in the foundations of structures that transmit pressure to the soil less than 0.05 MPa are insignificant and, as a rule, there is no need to take them into account when calculating the deformations of irrigation facilities [3-4].

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IV. METHODOLOGY

In case of transfer of pressure upon in advance moistened soil the deformation zone almost completely is formed within 1-2 hours. The subsequent growth of deformations is caused, mainly, by further consolidation of all layers involved in deformation.

In fig. 1.contours of the deformed zone in the basis of the semicircular stamp having diameter of d = 35 cm and transferring to soil pressure P = 0.1 MPas are shown. Several hours prior to installation of a stamp the explored massif of soil was humidified with a limited amount of water. Evaporation of moisture from the surface of soil was prevented by means of temporarily laid waterproofing materials. It gave the chance to receive rather evenly humidified soil volume. For obtaining various values of final humidity of soil the volume of the water pumped for moistening and also a period between terms of moistening of soil and installation of a stamp changed. After carrying out experience the humidity of soil was specified by sampling.

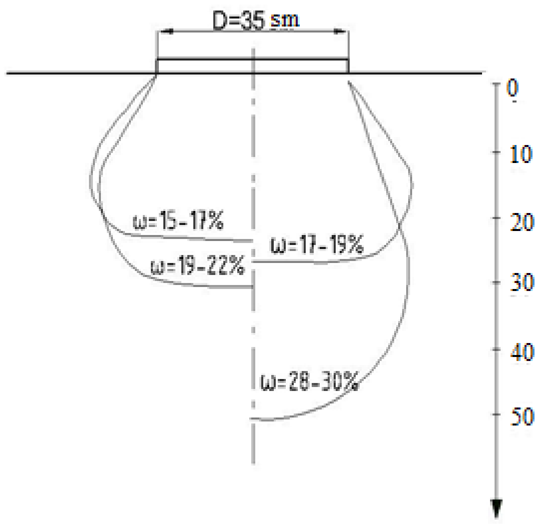

Fig. 1. The contours of the deformed zone about the pit bottom of the stamp with pressure on the contact of the slime and soil P = 0,1 MPa

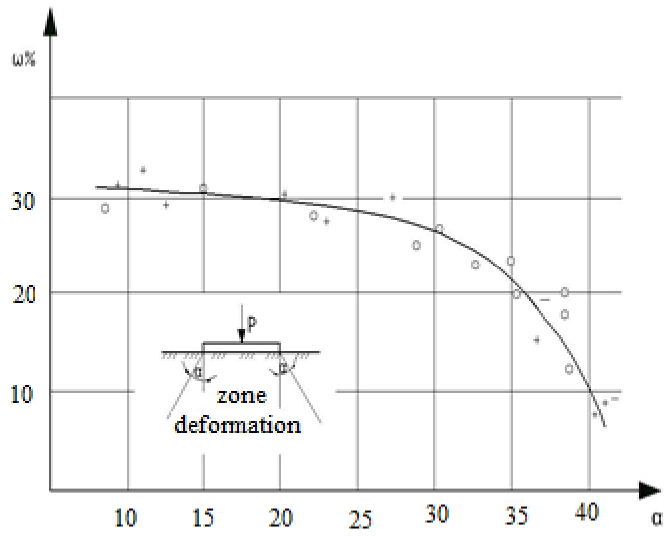

Fig.2. graph of the dependence of α on the soil moisture.
o - on the result of working with the device;
+ - by the result of the stamp tests

Apparently from the drawing, depth of the deformed zone of soil of subjects is more, than more its humidity, and a corner α, limiting this zone, with increase in humidity decreases.

In fig. 2.the schedule of dependence of a corner α, limiting zone of the deformation of soil caused by action of the compressing pressure from weight humidity is provided. The schedule is constructed by results of a research of additive soil of the territory of researches by stamps tests and by means of the device [150] with a pressure upon soil P = 0,05 – 0,2 MPa.

The mean square deviation of experimental sketches from the offered parabolic curve makes ± 3 (%)

In fig. 2.the dependence of depth of a zone of deformations on the area of a stamp and pressure transferred to them to soil is shown. Curves 1 and 2 are constructed by results of the experiments made by means of the above-stated device, and a curve 3 - according to soil tests by stamps with a diameter of 112 cm with the subsequent opening of their basis. The weight humidity of the soil forming the basis of stamps equaled 25-30%.

Apparently from fig. 2.depth of an active zone with increase in diameter of a stamp increases, however, its relative depth of N/D significantly does not change.

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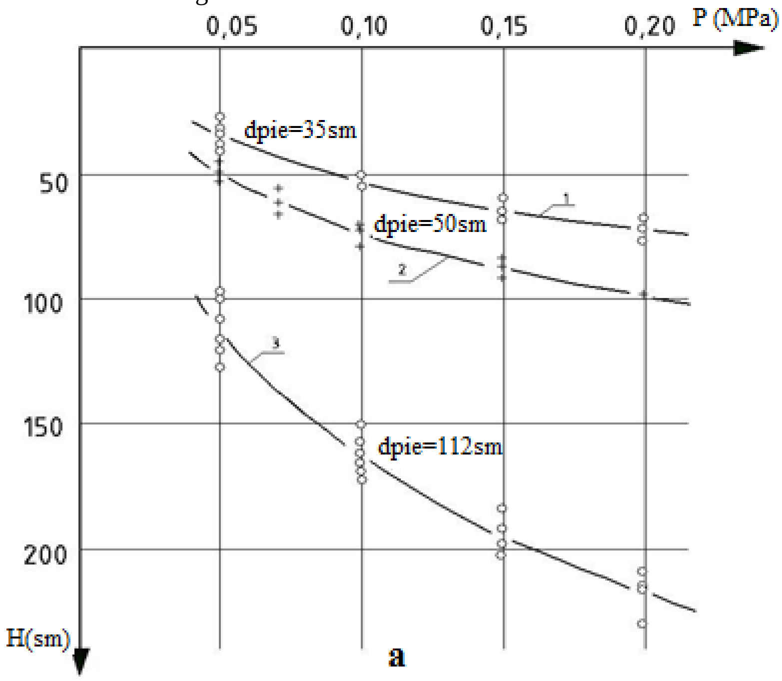
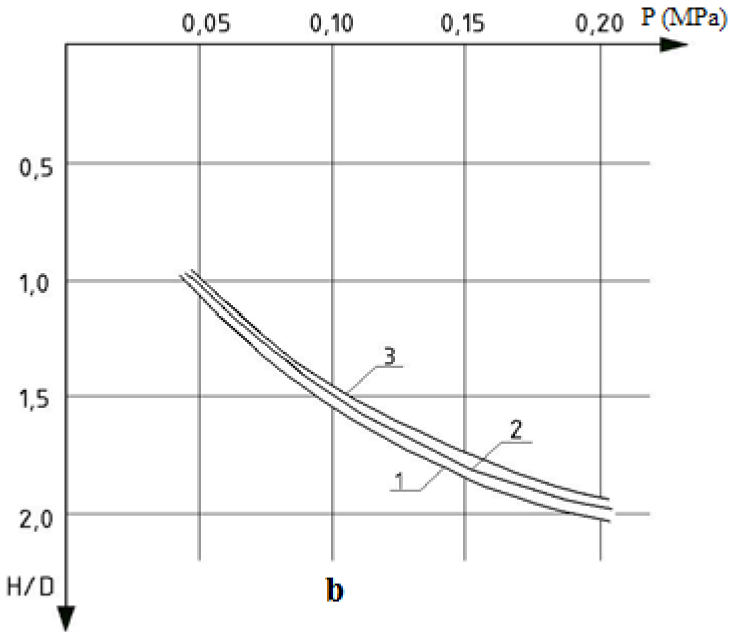
V. EXPERIMENTAL RESULTS

As a result of observations of deformations of soil in the bases of stamps it was established that horizontal deformations arise only when pressure upon soil reaches a certain size which depends on properties of the studied soil and on the stamp size. With pressure smaller, than this critical size, despite existence of vertical deformations, horizontal movements in soil were not registered.



Dependence of the power of the deformed zone of pressure on the ground:
a). depth in centimeters;



Dependence of the power of the deformed zone of pressure on the ground:
b). Depth in fractions of punch diameter.

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The greatest lateral deformations were observed under the edges of the punch at a depth depending on the size of the punch and the pressure transferred to it on the ground. In our experiments, this depth varied from 0,7 to 1,0 of the stamp radius.

The coefficient of lateral expansion of the soil was determined by the well-known formula.

$$\mu = 0,5 - \frac{V_0 - V}{2V_0} * \frac{h_{cд}}{S} \quad (1)$$

where V_0 - the volume of the soil under the stamp to the experience,
h - the height of the soil column under the stamp within the zone of shear,
V - volume of the same soil after the experiment,
S - vertical draft of the stamp.

In this case, in the absence of lateral deformations in the soil

$(\frac{\Delta V}{V} = \delta_1 > 0$, a $\delta_2 = \delta_3 = 0$), $\mu = 0$. In the case of deformation only due to the flow of the form of the material under study at a constant volume($\Delta V/V = 0$), $\mu = 0,5$.

The validity of these limiting values of μ was proved in the work of Trinity MN (MSU) for the expression easily derived from formula (1).

$$\Delta \frac{\Delta V}{V} = \delta_1 (1-2\mu) \quad (2)$$

The lateral expansion coefficient was calculated from the results of experiments on a device for studying the physicomechanical properties of the soil . In the experiments, semicircular dies with an area of 480; 980 and 1920 sm². At the same time, it was believed that the processes occurring on the ground contact with the screen are similar to those occurring under the diameters of round dies with an area of 960,1960 and 3840 sm², i.e. The axisymmetric problem was experimentally solved.

In fig. 2.shows the graphs of the dependence of the lateral expansion coefficient μ on the pressure transmitted by the stamp to the base.

It should be noted that when transferred to the ground by a pressure stamp, there is enough lateral expansion for lateral deformations, in all cases satisfying the requirement 0.5> μ> 0

At relatively low pressures transmitted by the stamp to the ground, the dependence μ = f (P) is straightforward. With increasing pressure, as can be seen from the graphs in fig. 2.21 μ strives to its limit, which depends on the size of the stamp, is less than 0,5. In this case, the larger the area of the stamp that transfers the load to the soil, the smaller the value of this limit.

From fig. 2.it can be seen that lateral deformations of the soil in the foundations of structures, which significantly affect the amount of subsidence, occur at pressures exceeding 0,05 MPa. The coefficient μ characterizing these deformations at a given pressure is the greater, the smaller the area of the structure flut-beta.

VI. CONCLUSION AND FUTURE WORK

Thus, taking into account lateral deformations when calculating the second group of limiting states of irrigation facilities transmitting pressure less than 0.05 MPa to loess soil is apparently not necessary.

REFERENCES

[1]. AbelevYu.M. Investigation of the influence of the shape and size of foundations in terms of the drawdown value. In the book: Construction on the filler and swelling soils. 1961, issue 46, pp. 28-34.
[2]. AbelevYu.M., AbelevM.Yu. Fundamentals of design and construction on subsidence macroporous soils. 1968. pp 431.
[3]. Ariel R.S., Berzner A.S. Experience pre-soaking loess soils. Hydrotechnical, 1965, № 4, pp 39-45.
[4]. AskarovKh.A. On the methods of locking subsided loess soils for hydraulic structures. - Hydrotechnics and Land Reclamation, 1955, № 1, pp. 28-34.
[5]. Bakiyev M.R. Evaluation of the reliability and safety of reservoir hydroelectric. Materials of the Republican scientific-practical conference "Problems of reliability and safety of hydraulic structures", dedicated to the 60th anniversary of the faculty "Construction and operation of irrigation hydraulic structures. T., 2006, pp 21-24.