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PECULIARITIES OF PHYSICAL AND MECHANICAL PROPERTIES OF UNBOUND SOILS

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Abstract: *Based on the Ackers-White dependencies for determining sediment flow in stationary flows, a method for calculating sediment with an unsteady flow is proposed, taking into account the division of sediment into bottom and suspended, which relates to the calculation of sediment transport itself.*

Key words: *sediment, bottom and suspended sediment, unsteady flow, wave, dimensionless parameters, passing flow.*

The main physico-mechanical properties of unbound soils include the following parameters: size and shape of particles; granulometric composition; specific and volumetric weight; porosity; humidity.

The granulometric composition of the subsoil of the watercourse is determined by the composition of the suspended effluents from the catchment area, the size of the transit effluents and the hydraulic regime of the water flow, which actually determines the size of the transit effluents and separates them from the total composition of the effluents entering the watercourses.[2]

Grunts different in size of fractions consists of Thracian mass according to in the ground percentage quantity of grunt Unbound (granulometric) composition determines[3]

Big piecemeal or sandy of grunts one sexual didn't happen characteristic for one sexual didn't happen coefficient is entered

$$K_{60}/K_{10} = D_{60}/D_{10} \qquad (1)$$

This on the ground D_{60} is known one 60% of particles in soil (by mass). died smaller particles diameter; (sometimes this diameter control doer that called);

D_{10} - 10 % of the particles in the soil smaller particles diameter (effective diameter). (1), how much bigger If so, that ‘s all of different genders There will be different genders level is close to 1 The grunt is perfect will be the same

For sandy and larger unbound soils more accurate classifications are used depending on the granulometric composition.

The type of soil is accepted depending on the degree to which it satisfies the first indicator according to the order of their location.

The shape of soil solid particles also has a significant effect on its properties.

Depending on the genesis of the soil, the shape of sand and larger particles can vary widely, from spherical, very smooth particles to sharp-pointed, angular, and plate-like shapes.

There is no general rule for estimating particle shape. In most cases, the shape of the grains is estimated "by eye" according to the particle configuration tables recommended by various authors.

Ground holes are partially or completely filled with liquid. In construction conditions, such a liquid is mainly water. Water in the ground can be vapor, liquid and solid. Gases with mixture water vapors gaseous of the component one part as will be seen . Hard in case water in the form of ice is also different crystal lattices of minerals to the composition incoming crystallizable water in the form of, that is hard of the phase one part as in grunts located

Physical properties to determine for we three simple indicator we know need: g-natural structural of grunt comparison weight

s-grunt hard of particles comparison weight W-soil moisture. Mineralogical to content depending on, not connected of grunts comparison weight 2,65-2,75 g/cm^3. Most big comparison to weight muddy particles, to a small one while sandy particles have will be Theirs mineralogical to the composition depending on the soil particles comparison weight varies from 2,45 to 2,75 g/cm^3 and sands for average 2.65, g/cm^3 organize does [1]

Many grunts for humidity in the range of 0,01-0,06 changed stands, but the index k’ is 1-2 and from him high to be grunts too there is

Physical properties of soil main from the indicators one porosity being his value varying from 30% to 50% on average stands and mud and lyoce reaching 60% in soils can Sandy of grunts foam of particles dispersion and of grains density level mineralogical to the composition depend[4]

Mechanical properties of soils their composition and to the structure depend Water of his own the bottom organize doer of grunts basic mechanical properties this size, density, shape, hydraulic size and mutually bite

In the rivers water and groundwater at the expense of the most main from problems one to be of the material size and fractional content account get is considered In rivers son alluvium size the river the bottom on the slope, water consumption, depth, flow to the speed and the bottom morphological to the structure looking will change.[5]

Leaks different in size particles mixture being their different genders while granulometric of content curve lines with is characterized. Leaks different sizes and in forms will be Leaks particles geometric properties according to three type divided into: spherical , ellipsoidal and flattened (densified). It's fine of particles shape them how much time movement to do duration depend They are this time inside is absorbed and round to form have gradually volume decreases. River of flow conditions for this process with the following formula defined as:[6]

$$d = d_0 e^{-2x}, \qquad (2)$$

this on the ground d_0- of particles initial size$d$ -flow length across $"x"$ in the distance movement from doing next flow of particles size[7]

Immovable in the water discharge of particles smooth drop off to the speed hydraulic density of fluids that is called V.I. Goncharov three modes of flow through a particle

d<0,15 mm-laminar mode,

d>0,15 mm-turbulent regime,

0,15<d>1,5 mm–transition mode

set up hydraulic density of fluids to determine for the following to connect offer did:

$$U = \frac{1}{\varphi}\sqrt{\frac{2g(\rho_s-\rho)d}{1,75\rho}}, \qquad (3)$$

this on the ground $\frac{1}{\phi}$-of liquids to the size of and water to the temperature depends is a parameter; $\sqrt{\frac{2g(\rho_s-\rho)d}{1.75\rho}}$-grunt and of water density.

of unbound subsoils particles size their diameter with is defined. With that together, of particles shape spherical to form near that is considered Underground grunts complicated granulometric to content have that it was for, method using grunt to fractions separate Har one of the faction grunts to this faction separated sieve of diameters half quantity with determined by the average diameter is expressed. Underground soil fractions according to separate, usually, a fraction composition is of differential or integral type curve line in the form of represents Different genders of grunt average diameter simple averaging method defined as:

$$\phi \quad (4)$$

or

$$d_{cp} = \sum d_i f(d). \quad (5)$$

The differential curve distribution

$$\rho_{s.} \ \rho \quad (6)$$

is changed according to the equation, and an integral curve of the granulometric composition of groundwater is formed.

The shape of subsoil particles in rivers of urbanized areas can be quite different from spherical particles. Particle shape has a significant effect on the interaction with the water mass, including the rate of settling in flowing and quiescent fluids. It is recommended to express the shape of the particles with the shape parameter:

$$d_{cp} = \int df(d)\, d(d), \quad (7)$$

where $d_{cp} = \sum d_i f(d)$-the diameter of the sphere equal to the particle of the fluid on the surface;

$\int f(d)\, d(d) = F(d)$-the diameter of a sphere equal in size to a particle of the fluid.

Representative data on the form of sand and gravel particles of the river alluvium were obtained by V.N. Goncharov. Table 1 presents the data representing the width $d_T$and thickness of the largest dimension of the particle in terms of the equivalent diameter of the sphere. $f = (d_T/d_s)^2$The data in these Tables 1 show that as the size of the particles decreases, their shape becomes increasingly different from the spherical shape.

M.A. As Velikanov noted, the size of the bottom grunts is closely related to their shape. Big discharge flow with most of the time pending transported in condition to smaller ones than shift in time to decay and flow by to lead take will come. With sand (up to 1-0,5 mm). depends has been data (see Table 1) this confirms.

If the weight of the particle-d_s, its speed of movement at the bottom-ℓ, the coefficient of friction-b, the coefficient of friction representing the relative weight loss of the particle when it moves at the bottom-G, the change in the weight of the particle Uover time can be written in the following form:

f_1 (8)

Channel length across of particles movement as x set ,f_2 that we write , then

dt (9)

Table 1

Particle sizes expressed in equivalent diameter

Fractions volume , mm	$f = (d_T/d_s)^2$	d_T	c
75-50	1,44	0,88	0,62
31-22	1,49	1,07	0,75
18-12	1,36	1,02	0,75
12-8	1,39	1,07	0,72
7-5	1,65	1,20	0,70
5-3	1,54	1,23	0,68
3-2	1,47	1,18	0,77
2-1	1,40	1,13	0,87
1-0.5	1,77	1,35	0,88

This integrating the following we find

$$dG = - G\, f_1 f_2 dt \qquad (10)$$

The particle weight of diameter to the cube proportional that account take

$$Udt = d_x \qquad (11)$$

or

$$dG/dx = - f_1 f_2 G \qquad (12)$$

to connect harvest we do

where *x* is the distance from the place of suspended solids falling into the stream bed to the viewing wall; $G = ce^{\frac{f_1 f_2}{u}} x_x$-soil erosion coefficient, which varies from $5 \cdot 10^{-3}$ to 10^{-2}, depending on the type of soil. The last ratio is the Sternberg equation, which assumes that the size reduction of soil particles as they move through the bed is due to their erosion.

In addition to the above, there are also other mathematical models that represent the process of grinding of ground fluids.

D.Simons and K.Miller approximated the experimental results obtained on the basis of research in canals and natural rivers with variable exponential coefficients in the range of 0,04 to 0,09.

REFERENCES:

[1] Латипов.Ш.А. Лабораторные исследования неразмывающих скоростей потока каналов в зернистых грунтах. «Eurasia Science» XXV Международная научно-практическая конференция 15 ноября 2019 Научно-издательский «Актуальность.РФ» Сборник статей часть I Colltcted Papers XXV International Scientific-Practical conference <<**Eurasia Science**>> PART I Research and Publishing Center <<Actualnots.RF>>, Moscow, Russia November, 15, 2019 Moscow 2019 p. 84-85.

[2] Мирцхулава Ц.Е. Надежность гидромелиоративных сооружений. М.: Колос, 1974. 280 с.

[3] Эшев С.С. Расчет деформируемых больших земляных каналов в условиях нестatsiонарности водного потока. Ташкент. ” Voris nashriyot”, 2018. -187с.

[4] Ackers P., Ehite W.R. Sediment transport new approach and analysis. Pros ASCE, Now. 1973, 99 (HY11-), p. 2041-2050.

[5] Engelund R., Hansen E. A. Monograph on sediment transport on Alluvial Streams. Techniques Vorlag Copenhagen, 1967.

[6] Meyer-Peter E. Miller R. Formulas for bed-load trans ort. –Ln. Proc. II Congr. IAHR, Stockhdm, 1948, vol 3, pl 39-64.

[7] Rakhimov, S. Ehsev, S. Latipov, и J. Rakhimov, «Positive and Negative Aspects of Digitalization of Higher Education in Uzbekistan», представлено на AIP Conference Proceedings, 2022. doi: 10.1063/5.0089690.