# QISHLOQ XO‘JALIGI MAHSULOTLARINI ISHLAB CHIQARISH SAMARADORLIGINI OSHIRISHDA INNOVATSION TEXNIKA VA TEXNOLOGIYALARDAN FOYDALANISHNING MUAMMOLARI VA ISTIQBOLLARI




## RESPUBLIKA ILMIY-AMALIY ANJUMANI MAQOLALAR VA TEZISLAR TO‘PLAMI

2024-yil 3-4-may

**O‘ZBEKISTON RESPUBLIKASI**

**OLIY TA’LIM, FAN VA INNOVATSIYALAR VAZIRLIGI**

**QARSHI MUHANDISLIK-IQTISODIYOT INSTITUTI**

# QISHLOQ XO‘JALIGI MAHSULOTLARINI ISHLAB CHIQARISH SAMARADORLIGINI OSHIRISHDA INNOVATSION TEXNIKA VA TEXNOLOGIYALARDAN FOYDALANISHNING MUAMMOLARI VA ISTIQBOLLARI

**RESPUBLIKA MIQYOSIDAGI ILMIY-AMALIY ANJUMANI MAQOLALAR VA TEZISLAR TO‘PLAMI**

**2024 - YIL 3-4 MAY**

**Qarshi -2024**

UDC: 621.65:621.315

# EVALUATING THE INFLUENCE OF IRRIGATED SOIL PHYSICAL PROPERTIES ON ITS SETTLING PROCESS

**F.F. Bobomurodov**- Doctor of Philosophy in Technical Sciences (PhD), **D.D.Dilshodova** - junior teacher, **S.Kh.Kulmatov** - master's student, **I.O.Sattorov** - master's student, **A.R.Khazratov**- master's student.
*Karshi engineering-economics institute*

**Abstract.** On the basis of laboratory studies, the physical properties of the studied soils for erosion were established. The resistance of these soil properties is shown with the eroding ability of the water flow. A relationship has been established between the eroding flow rates and the intensity of erosion of cohesive soils.

**Key words:** soil physical properties, soil erosion, erosion velocity, erosion intensity, clay deposits, cohesive soil, granulometric composition.

It is known to us that soil mechanics and characteristics of cohesion in irrigation canals and drainage channels are unique. Soils are used as construction materials in embankments, structures, and channels. The strength and deformation characteristics of soils used to ensure the durability and safety of irrigation structures, in conjunction with their settlement indicators, are of great importance in evaluating their behavior. Therefore, in order to determine the settlement of soils, it is necessary to conduct laboratory research on the installation of their physical and mechanical indicators, along with studying the kinematic factors of motion.

The research conducted by talented scientists on issues related to the processes of consolidation based on the physical-mechanical properties of bonded soils [1, 2, 3, 5] has been deeply studied by Prof. S.E. Mirshakulov, regarding the influence of the physical-mechanical properties of bonded soils on consolidation.

Aims to install the physical and mechanical characteristics of the soils obtained to determine the compaction speed of the soils in this work and to use them in subsequent places.

In laboratory conditions, iron pipes were used to prepare and classify the clayey soils for evaluating their compaction under the influence of compaction. These prepared clayey soils were categorized in the following order: 1-soft sandy soil; 2-average sandy soil; 3-soft coarse sandy soil; 4-soft sandy soil; 5-soft sandy soil; 6-heavy fine sandy soil. Furthermore, field experiments were conducted, and 6-soft sandy soil was obtained from the "Dustlik" canal in the Kashkadarya region. In subsequent rankings, these soils are briefly referred to as 1-soil, 2-soil, and so on.

Experiments were conducted to gather samples of any soils after testing the speed of erosion of the soil layer and to conduct experiments to determine their physical properties. In order to study the settlement of compressed soils under the influence of the load, experiments were carried out in the laboratory of the "UZGASHKLITI" MCHJ (Construction, Geoinformatics and Real Estate Cadastre State Project Research Institute) to install the physical properties of prepared soil samples. The physical and mechanical characteristics of the compressed soil samples used in the experiments are entered into Table 1.

We analyze the physical properties of the bonded soils that directly affect the canal excavation process in laboratory experiments conducted as part of our work.

It can be emphasized from the analysis of the physical characteristics of sediments used in experiments that the physical properties of sediments in the erosion processes occurring in channels

to date are considered as fundamental factors, and general regularities related to their mechanical parameters have not been found. This work accurately corresponds to the scope of experiments conducted to study the erosion process in channels using the properties of sediments installed.

Table 1

**The physical-mechanical indicators of compacted soils.**

| soil | soil 1 | soil 2 | soil 3 | soil 4 | soil 5 | soil 6 |
|---|---|---|---|---|---|---|
| W, 0% | 14,2 | 33,6 | 27,4 | 24,4 | 21,8 | 21,9 |
| $V_{gr}$, g/sm$^3$ | 1,58 | 1,66 | 1,73 | 1,77 | 1,83 | 1,82 |
| $V_{sk}$, g/sm$^3$ | 1,38 | 1,24 | 1,36 | 1,42 | 1,50 | 1,49 |
| ρ , g/sm$^3$ | 2,69 | 2,70 | 2,68 | 2,67 | 2,66 | 2,65 |
| n, % | 48,7 | 54,1 | 49,3 | 46,8 | 43,6 | 43,8 |
| ε | 0,949 | 1,177 | 0,971 | 0,880 | 0,773 | 0,779 |
| $I_w$ | 0,40 | 0,77 | 0,76 | 0,74 | 0,75 | 0,75 |
| $W_{max}$, % | 35,5 | 43,6 | 36,05 | 32,97 | 29.06 | 29.2 |
| $W_T$,% | 32,8 | 28,1 | 22,3 | 19,5 | 16,1 | - |
| $W_P$,% | 24.4 | 20,0 | 16,0 | 13,6 | 13,5 | - |
| $I_P$ | 8.4 | 8,1 | 6,3 | 5,9 | 2,9 | - |
| $I_L$ | | 1,68 | 1,81 | 1,83 | 2,86 | - |
| vp | 1,52 | 1.44 | 1,41 | 1,.28 | 0,9 | 0,7 |

It can be emphasized from the analysis of the physical characteristics of the used soils that, so far, the physical properties of soils in erosion processes occurring in connected channels can be considered as the main factors, and general principles related to their motion parameters have not been identified. This work is in line with the scope of experiments conducted to study the erosion process in the connected channels of the specified soils.

Table 2

**The granulometric composition of compacted soil samples**

| **№** | **Example of soil** | **Particle size distribution analysis,%** | | | | | | | | **Total fractions %** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **>1,0mm** | **1,0-0,5mm** | **0,5-0,25 mm** | **0,25-0,10 mm** | **0,10-0,05 mm** | **0,05-0,01 mm** | **0,01-0,005 mm** | **<0,005 mm** | |
| 1 | soil 1 | 59,54 | 8,43 | 20,37 | 7,38 | 2,78 | 0,94 | 0,33 | 0,22 | 100,0 |
| 2 | soil 2 | 73,12 | 4,58 | 18,15 | 2,79 | 0,87 | 0,31 | 0,13 | 0,05 | 100,0 |
| 3 | soil 3 | 32,17 | 18,22 | 30,78 | 10,29 | 5,14 | 2,03 | 1,03 | 0,33 | 100,0 |
| 4 | soil 4 | 56,48 | 10,46 | 22,32 | 6,53 | 3,18 | 0,76 | 0,21 | 0,05 | 100,0 |
| 5 | soil 5 | 41,90 | 14,42 | 25,69 | 9,51 | 4,37 | 2,41 | 1,26 | 0,44 | 100,0 |

It is known that the granulometric composition of gravel determines its strength indicator. So far, no clear functional connection has been found between the granulometric composition of gravel and the speed at which it is washed away.

The compacted gravel has an average bulk density of 2.65-2.75 g/cm$^3$.

The bulk density of soil is one of the fundamental properties of soil, it changes with the compaction or loosening of the attached particles, but changes relatively little in comparison to the bulk weight (Table 1).

When saturated soil is completely filled with water, the amount of air between soil particles decreases significantly, and its volume increases. As a result, the low permeability of saturated soils causes a decrease in plant growth.

The flammability of the new fabrics in lovely bonfires will be high (45...90%). The flammability of plastic fabrics varies from 3% to 6%.

The correlation between the cohesion coefficient values obtained for the soil samples connected with the settling velocity of the soil was not clearly observed. However, the increase in settling resistance of the soil connected with the establishment of settling velocity from the conducted experiments was noted. Due to the lack of a clear functional connection between them, this factor was not taken into account in evaluating the settling velocity.

In this way, we observe the resistance of plastic properties of soil samples to erosion. The permeability of plastic between the upper and lower limits is very suitable for freely flowing water. The permeable soils are characterized by a specific thickness of the plastic water barrier.

Most researchers believe that when plasticizers are present in the soil connected to the roots of the majority of plants, water puddles with a certain thickness are formed. This suggests that when water is absorbed by the roots, there is a separation of connections between the roots due to the strong development of diffusion puddles on the surface of the roots, increasing the growth of connected soils and indicating the visible movement of the roots by the dirt. In such conditions, the external influences on the roots are relatively easily facilitated to slip against each other.

The displayed degree of expression of the plasticity property by the cohesive soils and their unique characteristics, i.e. composition (granulometric, mineral, composition of exchangeable bases) and shape, as well as the unique characteristics of the plastic mass affected by them, i.e. chemical composition and concentration, are determined.

One of the indicators of the upper limit of the plasticity of clay is a general idea about the composition of clay particles in clays and their hydrophilic degree forming its minerals.

The quantity and hydrophilicity of clay particles determine the cohesive forces in the soil, and consequently, the rate of erosion.

Experiments failed to establish a functional relationship between the rate of flow erosion and the upper limit of soil plasticity.

According to Table 1, as the plasticity of cohesive soils increases, their resistance to erosion progressively increases.

The level of moisture or the coefficient of saturation, relative humidity – is an important characteristic indicating the relative amount of the gaseous phase in soil pores.

The composition of clay minerals has the most significant impact on the maximum molecular moisture capacity. For montmorillonite clays, it is equal to 50...100%; for hydromica-like, kaolinite, and polymineral clays – it is 12...40%. Organic matter increases the value of the maximum molecular moisture capacity.

Due to the fact that the maximum molecular humidity capacity is dependent on the accumulated surface area (surface) of microstructural elements, it is possible to make an approximate estimation about the microaggregate composition of soils based on its magnitude. The maximum molecular moisture capacity (in %) exceeds 24% for clays; for heavy loamy soils, it ranges from 24 to 16, for medium loamy soils – from 16 to 12, for light loamy soils – from 12 to 8, for heavy sandy loam soils – from 8 to 5, and for light sandy loams and sands – it is less than 5.

Another characteristic of soil is its shrinkage. Shrinkage is the reduction in the volume of soil as it dries out. In the plastic state of cohesive soils, the water-colloidal films become quite strong, and particles can move (migrate) relative to each other more easily. During shrinkage, as the moisture evaporates, the surface tension forces increase, and intermolecular forces become significantly apparent, which results in the particles drawing closer together. Shrinkage continues as the soil transitions from a two-phase system to a three-phase system and persists until the top layer of soil dries out to the state of hygroscopic moisture.

The phenomenon of shrinkage often occurs in conjunction with the formation of cracks (fissures), which reduces the compactness of the soil in the massif. Montmorillonite clays have the maximum shrinkage, while hydromica-like, polymineral, and kaolinite clays shrink considerably less. The lesser the amount of clay-colloidal (glinisto-kolloidniye) particles, the greater the shrinkage will be.

The intensity of erosion was observed to be higher in periodically operating canals compared to continuously operating canals. The primary reason for this is related to the moisture content of cohesive soils. In continuously operating canals, moisture remains high, whereas in periodically operating canals, during inactive periods, moisture is almost absent and cracks appear. When water impacts the soil, the absence of moisture in the cracks means there are no cohesive forces, which leads to soil erosion. This situation was observed in the periodically operating "Dustlik" canal. At the end of the irrigation season, the canal was so eroded that it resulted in a decrease in the ability to supply water to the irrigated areas.

To study the specific impact of moisture on canal erosion, experiments were conducted under both field and laboratory conditions. For this purpose, research was carried out on the "Dustlik" canal located in the Kashkadarya region. The physical indicators of the soil samples taken from the laboratory and from the canal were entered into Table 1.

For the study of the dependency of canal erosion speed on soil moisture, we utilized the cohesive soil of the canal and the first sample of laboratory soil. Soil brought from the canal was placed in a canal model at moisture levels of 5-10%, 16-20%, 28-35%, and 39-50%, while laboratory soils were placed at moisture levels of 7-10%, 13-22%, 28-35%, and 41-53%. Research was conducted to establish their erosion rates. The data from the experiment were entered into Table 3.

Table 3

**Dependence of soil moisture on the rate of flow washing**

| **Linked grunt** | **Experience №** | **Moisture,** $W$, % | $t$, *мин* | $\upsilon_р$, *м/с* | $\upsilon_н$, *м/с* | $h_р$, *мм* | **Washing intensity, V mm/min -** |
|---|---|---|---|---|---|---|---|
| Suglinok (natural) | 1 | 5-10 | 60 | 0,21 | 0,15 | 8 | 0,13 |
| | 2 | 16-20 | 60 | 0,32 | 0,23 | 6 | 0,10 |
| | 3 | 28-35 | 60 | 0,53 | 0,38 | 5 | 0,08 |
| | 4 | 39-50 | 60 | 0,72 | 0,51 | 2 | 0,03 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Suglinok (laboratory) | 5 | 7-10 | 60 | 0,28 | 0,20 | 7 | 0,12 |
| | 6 | 13-22 | 60 | 0,40 | 0,29 | 5 | 0,08 |
| | 7 | 28-35 | 60 | 0,64 | 0,46 | 4 | 0,07 |
| | 8 | 41-53 | 60 | 0,80 | 0,57 | 2 | 0,03 |

In the experiments, the washing time was determined. Also, the concept of washing intensity was introduced when expressing the character of washing. It shows the ratio of washing intensity to the washing depth for a specified time, that is $V = h_p / t,\ мм / мин$.

Deformation rates were determined for the studied bonded soils with different moisture content. The results of the experiment are included in Table 3, and according to them, the connection graph $\upsilon_p = f\left(\upsilon_H\right)$ was constructed (Fig. 1).

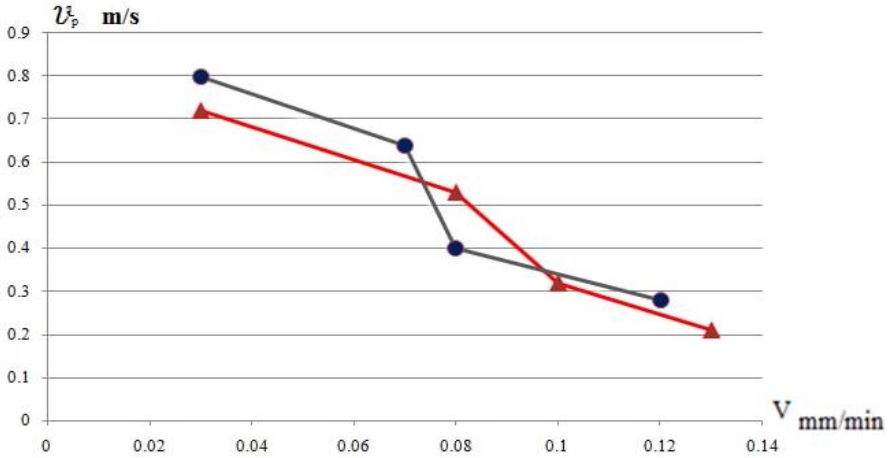



**Fig.1. Graph $\upsilon_p = f\left(V\right)$ of the dependence of the intensity of soil washing on the washing speed**

The average non-washing critical velocity for bonded soil in a channel with dry air (5-10%) is 0.13 m/s, for soil with natural moisture (16-20%) it is 0.23 m/s, equal to 0.38 m/s for soil with natural moisture (28-35%) and 0.51 m/s for soil with moisture (39-50%).

From the comparison of these obtained results, it can be seen that soils with greater values of natural moisture can withstand the washing rate of the stream compared to soils in dry air conditions (Figure 2).

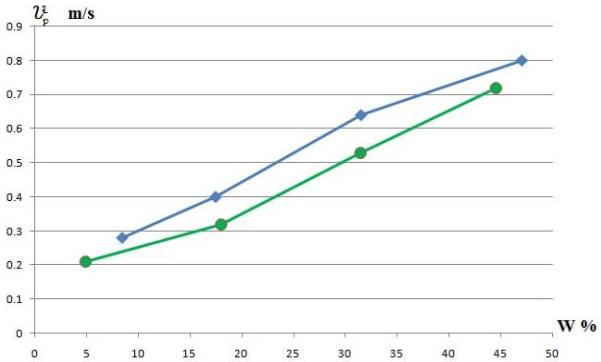



**Fig.2. Dependence of flow rate on ground moisture $\upsilon_p = f\left(W\right)$**

As a result of the impact of the flow on soils with a dry air condition, the pore medium quickly

occupies the layer and weakens the internal connection between the particles. In addition, compressed air bubbles weaken the interrelationship of particles by causing a process of mechanical breakdown. When wet soils with maximum molecular moisture capacity are exposed to water, absorption occurs very slowly, thus the soil is protected from various forms of deterioration. It can be explained differently.

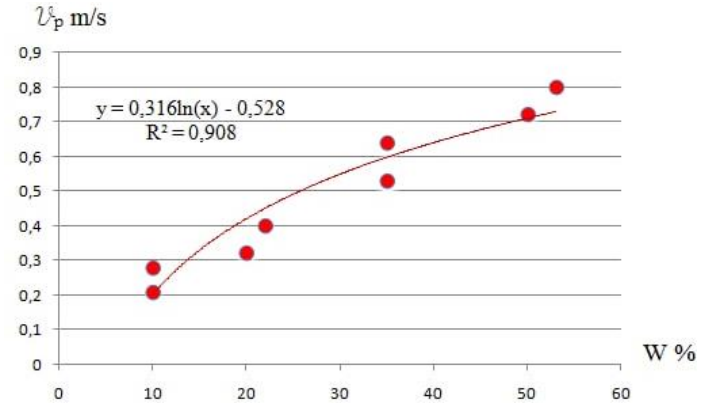



**Fig.3. Diagram showing relationships** $\upsilon_p = f(W)$

If the bound soil moisture is greater than the maximum molecular moisture capacity, then depending on the moisture content, a certain number of capillaries (pores) will be filled with water, and water will only enter the unfilled capillary and, as a result, the possibility of its failure decreases.

Therefore, the high humidity in the soil significantly increases the rate of non-washing by the flow.

Thus, the study of physical and mechanical properties of the above-mentioned bound soils showed that they have the ability to resist the washing speed of the stream. We come to the conclusion that it is appropriate to take into account the above-mentioned factors in the studies conducted with the determination of flow rates of connected soil channels.

## References

1. Гончаров В.Н. Динамика русловых потоков. – Л.: Гидрометеоиздат, 1962. – 373 с.

2. Мирцхулава Ц.Е. Размыв русел и методика оценка их устойчивости.М.: Колос, 1967. - 179 с.

3. Осипов В.И. Природа прочностных и деформационных свойств глинистых пород. - Изд. Московского университета. 1989, - 235 с.

4. Цытович Н.А. Механика грунтов. – М.: Высшая школа, 1983, -288 с.

5.Sobir, E., Furkat, B., Alisher, I., & Nurbek, M. (2022). Evaluation of the influence of the physical properties of bound soils on the washing process. Universum: технические науки, (9-5 (102)), 18-22.

6.Эшев, С. С., Авлакулов, М., & Бобомуродов, Ф. Ф. (2022). Боғланган грунтларнинг физик хусусиятларини ўзан ювилиш жараёнига таъсирини баҳолаш. Инновацион технологиялар, 3(3 (47)), 48-54.

7.Хазратов, А. Н., Раҳимов, А. Р., & Бобомуродов, Ф. Ф. (2022). Моделирования смешанных течений земляных каналов. In Актуальные проблемы науки и образования в условиях современных вызовов (pp. 160-167).

8.Эшев, С. С., Каримов, Э. К., Бобомуродов, Ф. Ф., & Маматов, Н. З. (2022). Боғланган грунтлардаги бирикиш кучининг ўзан ювилишига таъсирини баҳолаш. Инновацион

технологиялар, 3(3 (47)), 76-82.

9.Eshev, S. S., Avlakulov, M., & Bobomurodov, F. F. (2022). Assessment of the effect of the physical properties of bonded grunts on the process of self-washing. Innovation of technology, 3, 47.

10.Eshev, S. S., Bobomurodov, F. F., Isakov, A. N., & Mamatov, N. Z. (2022). Evaluating the effect of cohesive strength on self-leaching in bonded soils. International Journal of Advanced Research in Science, Engineering and Technology, 9(8), 19636-19641.

11.Khazratov, A. N., Bazarov, O. S., Jumayev, A. R., Bobomurodov, F. F., & Mamatov, N. Z. (2023). Influence of cohesion strength in cohesive soils onchannel bed erosion. In E3S Web of Conferences (Vol. 410, p. 05018). EDP Sciences.

12.Sobir, E., Israil, G., Ashraf, R., Furqat, B., & Dilovar, A. (2023). Calculation of parameters of subsurface ridges in a steady flow of groundwater channels. In E3S Web of Conferences (Vol. 410, p. 05022). EDP Sciences.

13.Eshev, S., Mamatov, N., Bobomurodov, F., Usmonov, R., & Makhmudov, U. (2023). Sho‘rlangan bog ‘langan grunt namligining yuvilishga qarshilik qilish ta’sirini baholash. Innovatsion texnologiyalar, 51(03), 70-76.

14.Рахимов, А. Р., Назаров, О. О., Исаков, А. Н., & Бобомуродов, Ф. Ф. (2021). Динамически устойчивые сечения крупных каналов с учетом ветрового волнения. Инновацион технологиялар, (Спецвыпуск 1), 82-89.

15.Bobomurodov, F. F., & Erkinov, S. (2023). Evaluation of the physical properties of ground and bound in o'zan wash. Intent Research Scientific Journal, 2(6), 10-17.

UO‘K 631.356.4.02

## GIDROTEXNIKA INSHOOTLARINING MEXANIK JIHOZLARINI AVTOMATLASHTIRISH USULLARI

**E.S.Nabiyev** - dotsent
*Qarshi muhandislik-iqtisodiyot instituti*

**Annotatsiya.** Texnologik jarayonlarni boshqarish funksiyalarini almashtirish va ularning oqimini inson aralashuvisiz amalga oshirish. Avtomatik qurilmalar (qurilmalar to‘plami) tomonidan bajariladigan operatsiyalarning xarakteri va hajmiga qarab quyidagi turdagi avtomatik tizimlarga amalga oshiriladi. Shu maqsadda gidrotexnik inshootlar va ularda qo‘llaniladigan zatvorlar va ularni avtomatik boshqaruv sxemalarini tahlil etib chiqamiz.

**Kalit so‘zlar:** Avtomatik qurilmalar, zatvorlar, qoplama, gidrotexnika inshootlari.

Gidrotexnika inshootlarining mexanik jihozlari deganda inshootdan suvni o‘tkazish va inshootdan foydalanishdagi boshqa funksiyalarni tezkor bajarishni ta’minlovchi konstruksiya va qurilmalar majmuasi tushuniladi.

Mexanik jihozlarga zatvorlar, suvdagi turli oqiziqlarni ushlab qoluvchi panjaralar, to‘sinlar, zatvorlarni ko‘tarib-tushiruvchi qurilmalar, nasos stansiyalari va yirik gidrouzellardagi statsionar kranlar va boshqalar kiradi.

**MUNDARIJA**


| | | |
|---|---|---|
| O.Sh.Bazarov. **Tabrik so‘zi** | | 3 |
| **1-shu’ba. YERGA ISHLOV BERISHNING RESURTEJAMKOR YANGI TEXNIKA VA TEXNOLOGIYALARNI ISHLAB CHIQISHDAGI ILMIY MUAMMOLAR VA ULARNING YECHIMLARI** | | |
| 1 | X.A.Fayzullaev. **Chuquryumshatkichlar orasidagi ko‘ndalang masofani qurilmaning ish ko‘rsatkichlariga ta’siri** | 4 |
| 2 | X.B.Utaganov., A.T Musurmonov. **Toklarni ko‘mish mashinasi sxemasini asoslash** | 7 |
| 3 | N.Q.Ravshanov. **Yopiq va yarim ochiq kesish sharoitida egatsiz tekis shudgorlaydigan pluglarning ishlash jarayoni tahlili** | 10 |
| 4 | A.Q.Karimov. **To‘rt g‘ildirakli universal chopiq traktori rul yuritmasini optimallashtirish** | 14 |
| 5 | Sh.A.Berdiev. **Kultivator ishchi organlariga kimyoviy termik ishlov berish** | 17 |
| 6 | Sh.A.Berdiev. **Kultivator ishchi organlarining ishlash muddatini kamayishiga ta’sir etuvchi omillar tahlili** | 19 |
| 7 | D.Z.Xidirova, S.H.Muradov. **Sanoat korxonalari rahbar va mutaxassislarining mehnat muhofazasi bo‘yicha bilimlarini tekshirishni raqamli texnologiyalar asosida tashkil etishning ahamiyati** | 22 |
| 8 | S.J.Toshtemirov, G‘.X.Ergashov, U.I.Qodirov. **Paxtadan bo‘shagan dalalar tuprog‘ining fizik-mexanik xossalarini o‘rganish natijalari** | 25 |
| 9 | Sh.B.Qurbanov. **Frontal plugga burchakkeskich tanlash bo‘yicha o‘tkazilgan eksperimental tadqiqotlar natijalari** | 28 |
| 10 | И.Т.Эргашев, Б.Р.Таштемиров. **Обоснование параметров прикатывающего катка комбинированного орудия для посадки сеянцев фитомелиорантов** | 32 |
| 11 | S.M.Badalov, D.B.Raxmatov. **Tekis shudgorlashda palaxsaning ag‘darilishi** | 35 |
| 12 | I.G‘. Temirov. **Ikki yarusli plug yuqori korpusining sinov natijalari** | 38 |
| 13 | I.G‘. Temirov. **Ikki yarusli plug g‘o‘zapoya maydalagichning agrotexnik ko‘rsatkichlari** | 40 |
| 14 | Sh.P.Sharipov. **Kombinatsiyalashgan mashinaning takomillashtirilgan tekislagichi** | 42 |
| 15 | S.U. Ochilov. **G‘o‘zapoyali dalalarni shudgorlaydigan plug** | 45 |
| 16 | O.T.Mamadiyorov. **Kuzgi bug‘doy ekish uchun yerni tayyorlash bo‘yicha tavsiyalar** | 48 |
| 17 | F.U.Karshiyev, Y.J.Shamayev, F.M.Davlatov. **Chorvachilik sohasida ozuqa bazasini yaratishda muammolar** | 51 |
| 18 | Ш.А.Бердиев. **Электро кристаллизация металлического молибдена из расплавов солей** | 58 |
| 19 | L.Ashurova. **Qishloq xo‘jalik mashinalari fanidan o‘quv mashg‘ulotlarida loyiha metodidan foydalanish metodikasi** | 60 |
| 20 | З.Х.Алимова, Т.Х.Раззаков, К.Г. Каримова. **Влияние смазывающих свойств моторных масел на техническое состояние двигателя** | 63 |
| 21 | K.G‘.Karimova, I.G‘.Ubaydullayev. **Qishloq ko‘cha yo‘llarida avtomobillar harakatlanishi natijasida hosil bo‘ladigan zararli zarrachalarning hosil bo‘lish manbalari** | 66 |
| 22 | N.B.Tur‘gunova. **Qishloq xo‘jaligi mahsulotlarini yetishtirish uchun yarim o‘tkazgichli termoelektrik materiallarni ishlab chiqish** | 73 |

| | | |
|---|---|---|
| 23 | Z.X.Alimova, T.X.Razzaqov, S.J.Aktamova. **Qishloq sharoitida dvigatelning ishlash jarayonida moy sifatini yomonlashish sabablarini o‘rganish va oldini olish usullari** | 77 |
| 24 | M.X.Shomirzaev. **Umumkasbiy fanlarini o‘qitishda qishloq xo‘jaligidagi muammolarni innovatsion texnologiyalar yordamida yechimini yoritish** | 79 |
| 25 | N.I.Maxmatqulov, B.X.Jurayev. **O‘zbekiston tuproqlari tarkibiy xususiyaatlari** | 82 |
| 26 | N.Sh.Rashidov. **Nishablik dalalarda tuproqni eroziyadan himoyalash** | 85 |
| 27 | S.J.Toshtemirov, G‘.X. Ergashov. **Tuproqni poliz ekinlari ekishga tayyorlash texnologiyalari** | 90 |
| **2 – shu’ba. O‘ZBEKISTON TUPROQ IQLIM SHAROITIGA MOS KARTOSHKA YETISHTIRISH MASHINALARI VA TEXNOLOGIYALARINI YARATISHDAGI MUAMMOLAR VA ULARNING ILMIY YECHIMLARI** | | |
| 1 | D.R.Norchayev, B.B.Jurayev, R.Norchayev, N.R.Rustamova. **Kartoshka kovlash mashinasining elaklash ishchi organi parametrlarini asoslash** | 93 |
| 2 | F.U.Karshiev, A.A.Buritoshev. **Qishloq xo‘jaligida klaster xo‘jaliklarining ahamiyati** | 96 |
| 3 | K.M.Tadjiev, Sh.Ch.Tursunov. **Ingichka tolali g‘o‘zaning o‘sishi, rivojlanishi va hosil to‘plashiga tuproq unumdorligining ta’siri** | 98 |
| 4 | F.U.Karshiyev, Y.J.Shamayev, Q.Jo‘rayev. **Donni maydalash qurilmasining texnik tasnifi** | 101 |
| 5 | F.M.Mamatov, A.A.Karimov. **Faol ishchi organli kartoshka qazgichning texnologik ish jarayoni va parametrlari** | 104 |
| 6 | Sh.P.Sharipov**. Kombinasiyalashgan mashina tekislagichining tuproq surgichi ochilish burchagini uning ish ko‘rsatkichlariga ta’siri** | 110 |
| 7 | Sh.B.Qurbanov. **O‘z egati chegarasida aylanadigan palaxsaning siqilgan qirrasi kengligini aniqlash** | 113 |
| 8 | S.M.Badalov.**Qalqovichli meyorlagichdan foydalanish istiqbollari** | 116 |
| 9 | Э.С.Набиев. **Влияния грунта с боков на подземных жестких труб** | 119 |
| 10 | T.X.Razzaqov, U. I.Qodirov, Z.M.Razzaqov. **Piyodalar harakat xavfsizligini oshirish muammolari** | 123 |
| 11 | S.T.Razzaqova, Z.X.Alimova, T.X.Razzaqov. **Ekologiyaga salbiy ta’sir qiluvchi omillar va ularni kamaytirish yo‘llari** | 125 |
| 12 | Р.Х.Чоршанбиев. **Обоснование параметров рабочего органа морковокопателя.** | 128 |
| 13 | Р.Х.Чоршанбиев. **Sabzi va uning pushtasi tuprog‘ini fizik-mexanik xossalarini o‘rganish orqali sabzi kovlagich mashinasi texnologik ish jarayonini asoslash** | 134 |
| 14 | E.U.Eshdavlatov, A.A.Suyunov. **G‘o‘za qator oralariga ishlov berish samaradorligini oshirish** | 138 |
| 15 | S.U.Ochilov**. G‘o‘zapoyali dalalarni shudgorlaydigan plug sferik diskining parametrlari** | 141 |
| 16 | SH.B.Qurbanov, S.U.Ochilov. **G‘o‘zapoyali dalalarni shudgorlashning afzalligi va uni amalga oshiradigan takomillashgan plug** | 144 |
| 17 | Н.Б.Равшанова, Г.Х.Эргашев, Х.И.Илхомов. **Новый способ подготовки почвы под посев бахчевых культур** | 146 |

| | | |
|---|---|---|
| 18 | Ф. М. Маматов, Г.Х.Эргашев, Н. Б. Равшанова. **Обоснование параметров корпуса комбинированного агрегата для посева бахчевых культур** | 150 |
| 19 | Ю.К.Рахманова**. Межпредметные связи английского, узбекского и русского языков при обучении студентов сельскохозяйственных направлений** | 153 |
| | **3-shu'ba. TUPROQNI EKISHGA TAYYORLASH JARAYONINI MEXANIZATSIYALASHTIRISHDAGI MUAMMOLAR VA ULARNING ILMIY YECHIMLARI** | |
| 1 | M.D.Bo‘riyev. **Plug-yumshatkichli tayanch tekislaydigan g‘altak diametri qiymatlarini aniqlash** | 156 |
| 2 | O.J.Xamroyev. **Texnik obyektlarni neft qoldiqlaridan tozalashning biologik usulini yaratish haqida umumiy mulohazalar** | 158 |
| 3 | Sh.N.Otaxonova, D.E.Qurbonboeva. **Tuksiz chigitlarni geometrik o‘lchamlari tahlili** | 160 |
| 4 | Z.X.Alimova, T.X.Razzaqov, S.J.Aktamova. **Dvigatelning ishlash jarayonida moy sifatini yomonlashish sabablarini o‘rganish va oldini olish usullari** | 164 |
| 5 | S.U.Mustapaqulov. **Qishloq xo‘jaligi mashinalardagi shesternya materiallarining yeyilishga bardoshligini baholash** | 167 |
| 6 | S.U.Mustapaqulov. **Qishloq xo‘jaligida ishlatilayotgan avtomobillardan chiqayotgan chiqindi gazlardan atrof muhitning zararlanish holati tahlili** | 171 |
| 7 | A.S.Eshev, J.S.To‘rayeva. **Increasing the competitiveness of agricultural products and its strategic approaches** | 173 |
| 8 | L.X.G‘ulomov. **Lalmi yerlardan foydalanishni tashkil etish istiqbollari** | 176 |
| 9 | E.U.Eshdavlatov, A.A.Suyunov, Sh.N.Shodiyev. **Ozuqa aralashtirgich qopqog‘i parametrlarini aniqlash** | 178 |
| 10 | D.N.Choriyeva. **Burchakkesgichli pog‘onasimon plugning eksperimental tadqiqot natijalari** | 183 |
| 11 | R.X.Chorshanbiyev. **Elevator yo‘naltirgichi parametrlarini nazariy asoslash** | 186 |
| 12 | S.U.Ochilov. **G‘o‘zapoyali pushta tuprog‘ini egatga ag‘daruvchi ishchi organlar tahlili** | 191 |
| 13 | F.X.Boymuratov. **Muhandislik va kompyuter grafikasi fanini o‘qitish texnologiyalari** | 194 |
| 14 | Ш.А.Бердиев. **Регулируемая технология нитрооксидирования низколегированной стали** | 198 |
| | **4- shu'ba. SUVNI TEJASHDAGI INNOVATSION TEXNOLOGIYALARI** | |
| 1 | И.Х.Гайимназаров, М.И.Рахматов, Г.И.Рузиева, И.О.Сатторов. **Натурные исследования по определению расхода наносов в условиях нестационарного течения** | 204 |
| 2 | B.Sh.Ashirov **Amudaryo daryosining gidrologik va gidravlik rejimining xususiyatlari** | 208 |
| 3 | F.F.Bobomurodov, D.D.Dilshodova, S.Kh.Kulmatov, I.O.Sattorov, A.R.Khazratov **Evaluating the influence of irrigated soil physical properties on its settling process** | 212 |
| 4 | E.S.Nabiyev. **Gidrotexnika inshootlarining mexanik jihozlarini avtomatlashtirish usullari** | 218 |

| | | |
|---|---|---|
| 5 | A.T.Umirov. **Soyaning fizik-mexanik va o‘lcham-massa ko‘rsatkichlarini o‘rganish** | 221 |
| 6 | N.Sh.Rashidov, B.Aliyev. **Suv eroziyasi va uni ekinlarga ta’siri** | 226 |
| 7 | N.I.Maxmatqulov, B.X.Jurayev. **O‘zbekistonda sug‘orma yer resurslardan unumli foydalanish muammolari** | 228 |
| 8 | N.SH.Rashidov, A.A.Safarov. **Suv eroziyasiga qarshi tuproqqa asosiy ishlov berish tahlili** | 231 |
| 9 | B.Sh.Ashirov. **Taxiatosh gidrouzelidan foydalanishni yaxshilash bo‘yicha ko‘rilgan tadbirlar** | 234 |
| 10 | M.I. Rahmatov, A.R. Hazratov, I.O.Sattorov**. Dinamik mustahkam grunt o‘zanli kanallarni gidravlik hisoblash usulini takomillashtirish** | 237 |
| 11 | B.Sh.Ashirov. **Taxiatosh gidrouzelidagi gidrotexnik inshootlarining texnik holati** | 240 |
| 12 | T.O. Doniyorov, M.F.Muxitdinov, I.O.Sattorov **Nasos stansiyalaridan fodalanishdagi ayrim muammolar va ularning yechimlari.** | 243 |
| 13 | Sh.A.Latipov, U.X.Maxmudov, Sh.H.Jo‘rayeva, I.O.Sattorov, M.B.Uzoqova **O‘zan tub osti oqiziqlar transporti hisob usullarining tahlili** | 247 |
| 14 | T.O.Doniyorov**. O‘rtacha sho‘rlangan og‘ir mexanik tarkibli yerlarning meliorativ holatini yaxshilash usullari** | 251 |
| 15 | O.B.Ochilov. **Zatvordan chiqayotgan suv energiyasidan foydalanish** | 256 |
| 16 | M.I.Ergashev, D.I.Ergasheva. **Shaharlarda transportlarning oqimini boshqarish asoslari** | 259 |
| 17 | I.Y.Babajanova, M.I.Raxmatov, F.Ch.Sobirov, B.B.Eshonov. **Ochiq o‘zanli kanallarda suv taqsimoti masalalari** | 263 |
| 18 | A.R.Rakhimov, D.D.Dilshodova, N.J.Raimova, S.Kh.Kulmatov, I.O.Sattorov, A.R.Khazratov **Erosion processes due to surface waves in the coastal side slope of earthen channels** | 269 |
| 19 | А.Н.Исаков, Д.Д. Дилшодова, Н.Ж. Раимова, Ж.Н.Исоков, И.О.Сатторов. **Обоснование критериев моделирования несвязных и связных грунтов, слагающих нижний бьеф** | 273 |
| 20 | A.R.Rakhimov, D.D.Dilshodova, N.J.Raimova, S.Kh.Kulmatov, I.O.Sattorov, A.R.Khazratov. **Calculation of the friction parameter in the unsteady flow border layer** | 278 |
| 21 | B.Urishev, U.J.Quvatov, U.I.Xidirova. **Nasos stansiyalarning energiya samaradorligini oshirish** | 282 |
| 22 | I.K.Xolmamatov, D.D.Dilshodova, N.J.Raimova, M.Q.Imomova, I.O.Sattorov. **Oqimlarning qo‘shilishi jarayonidagi deformatsiyasini tadqiq qilish** | 285 |
| 23 | Ф.Ф.Бобомуродов, А.Н.Хазратов, Ф.Ч.Собиров, Б.Б.Эшонов. **Особенности физико-механических характеристик связного грунта в процессе размыва каналов.** | 290 |
| 24 | F.J.Do‘siyorov, A.J.Norchayev. **Qashqadaryo viloyatidagi Paxtaobod kanalining foydallanish samaradorligini aniqlash** | 295 |

Muharrir: B. Musayev

Texnik muharrir: K. Qudratova

Kompyuterda sahifalovchi: F. Akramova

Bosishga ruxsat etildi: 31.05.2024 y.

Ofset qog‘oz. Qog‘oz bichimi: 60x84 1/16.

“Cambria” gar. Ofset bosma.

Hisob nashriyot t.: 32,44. Shartli b. t.: 32,50.

Adadi: 15 nusxa. Buyurtma №66

---

QarMII kichik bosmaxonasida chop etildi.

180100. Qarshi shahri, Mustaqillik ko‘chasi, 225 – uy.

Telefon 91-466-80-32.