European Journal of Emerging Technology and Discoveries
ISSN (E): 2938-3617
Volume 1, Issue 8, November, 2023.

CONSTRUCTIVE PARAMETERS OF EARTHQUAKING UNIT BEFORE SOWING

Kamaljon Mukhamadsadikov
Candidate of Technical Sciences,
Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: k.muxammadsodiqov@ferpi.uz

Abstract
This article presents the results of theoretical studies to determine the force acting on the working body of the pre-sowing leveler, as well as the resistance force appearing from the soil dragging prism when moving in front of the working body of the leveler and the installation angle, height of the working body of the pre-sowing leveler.

Keywords: leveler; slope angle; installation angle; height of the working body; soil drag prism; reaction force; deformation of the soil; absolute speed; traction resistance.

Introduction

Land leveling before planting is one of the agro-technical measures that have a significant impact on increasing productivity in irrigated agriculture [1-4].

By studying the parameters and working speed of the leveling machines and selecting their optimal parameters, it is possible to increase the working efficiency of these machines and ultimately reduce the time, energy consumption and other costs for leveling before planting. To this end, a number of studies have been conducted to reduce the energy consumption and increase the productivity of the land leveling machine before planting [3-8].

Research Methods

Tilling the soil before sowing cotton solves a number of necessary tasks: leveling the field surface, creating favorable conditions for seed germination, ensuring the cleanliness of the field and preventing the appearance of weeds, preserving soil moisture loss, preventing soil erosion [9-14].

The type of tillage machines for processing and their number depends on the soil compaction, the presence of clods, the amount of crop residues, the system of pre-processing for winter crops and the precursor crop. Timely and correct sequence of all pre-sowing cultivation techniques is the main requirement, and the quality of cultivation directly depends on the tillage implements involved in the work [15-21].

Theoretical research was conducted in the following areas:

- study of the forces acting on the working parts of the leveling machine before planting;
- to study the reaction forces acting on the surface of the working part of the leveler from soil deformation;
- study of the resistance force caused by the displacement of the soil pile in front of the working part;

— determine the installation angle and height of the working body of the leveling machine before planting [22-29].

To study the forces acting on the working parts of the leveling machine before planting, a diagram of the forces acting on the working parts of the machine was first formed (Fig. 1).

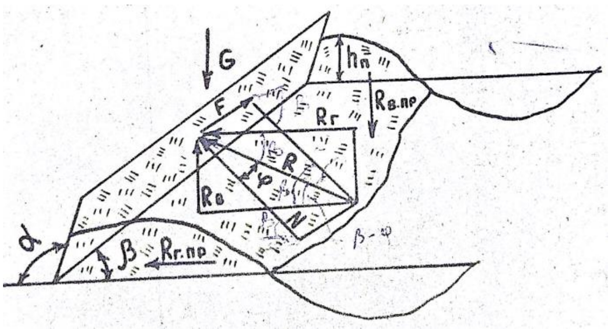

Figure 1. Schematic of the forces acting on the working part of the leveling machine before planting

The following forces act on the working parts of the leveler during the technological process:

R-is the reaction force acting on the surface of the working part of the leveler from soil deformation; N-normal compressive strength; F-is the friction force;

G-gravity of the working part; Rgtek, Rv.single-resistance of the soil pile to sliding in the horizontal and vertical planes; α-is the angle of inclination of the working part;

Reaction forces acting on the surface of the working part of the leveler from soil deformation. The reaction force R on the workpiece is affected when the workpiece moves forward with a straightener at an angle a to the horizon. From reaction 1, the reaction force can be written as follows [27-32].

$$R = \frac{N}{\cos\varphi} \qquad (1)$$

The normal compressive strength received by the workpiece depends on the dynamic and static parameters of the process, the mass of soil moving in front of the workpiece per unit time, the working speed of the leveler[1,2,3].

The normal compressive force acting on the working part of the straightener consists of two parts:

$$N = N_d + N_{st} \qquad (2)$$

in this: Nd -is the force depending on the dynamic parameters of the process;

Nst-goroizontal and vertical directions of the soil crushed the generated power.

Assume that the direction of the absolute velocity of the leveler coincides with the absolute trajectory of the ground motion. It is possible to obtain the absolute velocity constituents by dividing the velocity Vp -in the direction of motion and the velocity VN in the direction of the working part. It can be seen from the figure that the direction of the absolute motion of the velocity VN, the normal component of velocity, deviates from to the angle of friction ph. From this

$$V_N = V_p \sin\beta \qquad (3)$$

ISSN (E): 2938-3617
Volume 1, Issue 8, November, 2023.

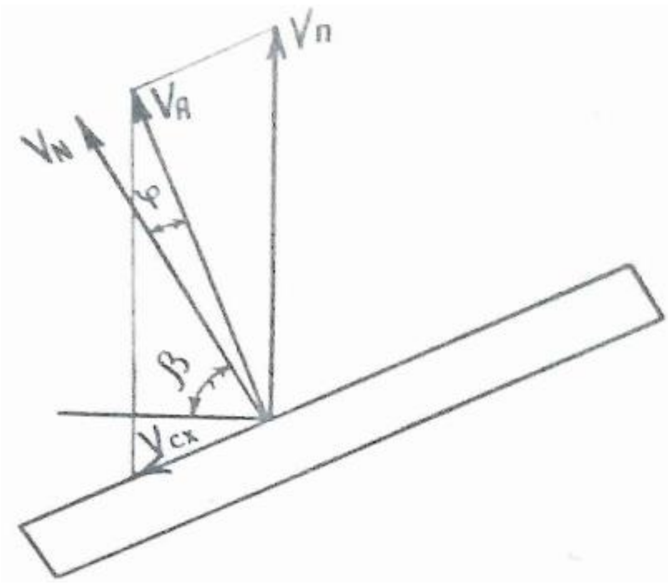

Figure 2. Scheme of separation of soil into components of the absolute velocity of displacement in front of the working part.

Taking into account the width V of the leveler, the working speed V, the bulk density of the soil, the height hp pushed in front of the working part, Nd can be written as follows:

$$V_d = K'VV^2\gamma h_p sin\beta \qquad (4)$$

Kʿ-leveling factor taking into account the location of the working part. It is known that before planting, the working parts of the leveling machine can be installed in 2 or 3 rows.

A special coefficient "Kʿ" was introduced to take into account the actual amount of reaction forces acting on the rectifier. If the workpiece is a row and is perpendicular to the direction of motion of the straightener, the total length of the workpiece is assumed to be 1, and the workpiece is calculated as the second and third rows are at an angle to the direction of movement. It was assumed that Kʿ=1.75 for a 2-row straightener and Kʿ=2.5 for a 3-row straightener.

When the aggregate moves in soft soil, the soil is crushed to a certain distance due to the gravitational force of the aggregate. As a result, the working part is subjected to static compressive forces [30-37

The crushing strength Ns -of the soil is determined as follows;

$$N_c = g_{afraid} G' \qquad (5)$$

in this gafraid-bruising labor component affects the average pressure,MPA;

The area of the working part of the G-leveler is M2 [35-41].

Since the leveler works on soft soils, the static pressure force can be expressed as follows, taking into account the depth of subsidence, the rate of subsidence, the density:

$$N_{st} = \frac{gB\gamma K' h_p h_g}{2(1+\Delta\gamma)} \qquad (6)$$

ISSN (E): 2938-3617
Volume 1, Issue 8, November, 2023.

Substituting (4) and (6) into 2, we obtain the normal compressive force acting on the working part of the straightener;

$$N = K'Bh_p\gamma\left[v^2\sin\beta + \frac{h_p g}{2(1-\Delta\gamma)}\right] \tag{7}$$

based on the above considerations, the normal force acting on the leveling workpiece is determined, and the following expression was obtained to determine the reaction forces acting on the surface of the leveling workpiece from soil deformation;

$$R_r = M\frac{K'Bh_p\gamma\left[v^2\sin\beta + \frac{h_p g}{2(1+\Delta\gamma)}\right]}{\cos\varphi} \tag{8}$$

in this: Rr -the coefficient taking into account the effect of the angle of inclination of the working part of the M-planer on the reaction force;
ν-is the speed of the straightener, m\sec
g-acceleration of free fall m\sec^2;
In the study of the resistance force generated by the displacement of the soil pile in front of the working part, it is assumed that the soil has been ideally dispersed during previous operations. Taking the projections of the stress components on the OX and OY axes and adding them together, the ground shear resistance in the horizontal plane is determined by the following expression;

$$R = \frac{K'Bh_p{}^2\gamma g}{2}A_{pr}(\sin\alpha + tg\alpha) \tag{9}$$

Adding 8 and 9, we obtain an equation representing the total gravitational resistance of the rectifier.

$$R = K'Bh_p\gamma\{\frac{M\left[v^2\sin\beta + \frac{h_p g}{2(1+\Delta\gamma)}\right]}{\cos\varphi} + \frac{h_p}{2}A_{pr}(\sin\alpha + tg\varphi\cos\alpha)\} \tag{10}$$

this expression allows you to analytically determine the gravitational resistance of the leveler, depending on the coverage width of the leveler, the speed of movement, the thickness of the sliding soil, the physical and mechanical properties of the soil [42-49]
In order to obtain the required flatness in one pass on the leveling machines before planting, the working parts of the knife-type leveling machines mounted on the existing frame are mounted in three rows. The working parts of the first and second rows are mounted at an angle to the direction of movement of the machine, and the third row is mounted perpendicular to the direction of movement [48-54]. The workpieces, set at an angle to the direction of movement, move the soil in two directions, filling the microns, and the last row completely flattens the microns. Therefore, researching the installation angle of working parts moving at an angle to the direction of movement of the machine and determining the optimal option will improve the quality of the leveling process before planting and reduce energy consumption. The angle between the projection of the workpiece on the horizontal plane and the forward direction of

movement of the unit is called the installation angle of the workpiece. The quality of the alignment depends in many ways on the value of this angle.

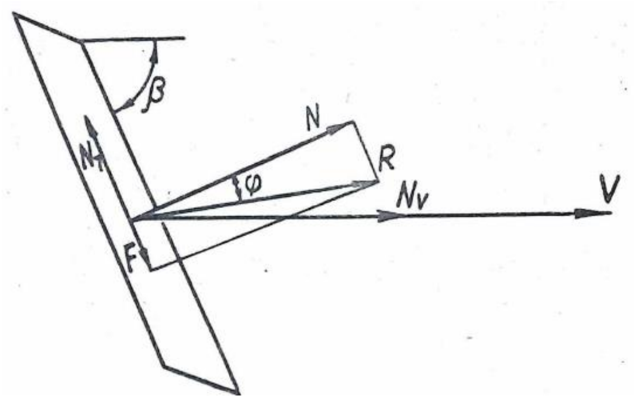

Figure 3. Schematic for determining the installation angle of the leveling workpiece.

A number of researchers studied the working part of a leveling machine and set its installation angle at 30-500. The presence of such a large range of installation angle of the working part of the ground leveling machine before planting made it necessary to study the optimal option of the installation angle of the working part of the ground leveling machine before planting this angle [52-58].

Research Results

In front of the work piece mounted at an angle to the direction of movement, the soil moves in transverse and longitudinal directions. Assume that the soil moves perpendicular to the direction of motion and at an angle b. We divide the normal force N acting on the soil by the working part into two, Nv and Nt, respectively, which are formed by the movement of the leveler in the direction of movement V and in front of the working part (Fig. 3). In addition to the normal force N, the friction force F on the soil is affected. The forces N and F give the resulting force R, which deviates from the normal force at an angle ph. Therefore, it is possible to set the following two modes of operation of the leveling unit before planting:

The soil slides in front of the working part. In case β it can be clearly observed;

$$B < \frac{\pi}{2}$$

The soil slides along with the working part and falls asleep in front of the working part. The maximum alignment of the soil in front of the working part can be observed at b = 90 0 . In this case, there is no transverse movement of the soil in front of the working part. [1,2,3,4]

The soil may slide in front of the working part if the force of the normal compressive force is greater than the frictional force:

$$N_T > F_{max} \quad \text{but} \quad N_T = Ntg\left(\frac{\pi}{2} - \beta\right) \quad F_{max} = Ntg\varphi \quad \frac{\pi}{2} - \beta > \varphi \qquad (10)$$

From this the condition of sliding the soil in front of the working part will have the following appearance.

$$Ntg\left(\frac{\pi}{2} - \beta\right) > Ntg\varphi \quad \text{or} \quad \left(\frac{\pi}{2} - \beta\right) > \varphi \qquad (11)$$

ISSN (E): 2938-3617
Volume 1, Issue 8, November, 2023.

If β, the forces $\frac{\pi}{2} - \beta < \varphi$ and F are mutually balanced, no displacement of the soil in front of the working part is observed, and the direction of movement of the soil coincides with the direction of movement of the working part, and the only driving force is Nv.In this case, the soil moves with the working part in the direction of its movement, the working part pushes the formed soil pile in front of it. The condition of landslide in front of the working part at an angle to the direction of movement can be expressed as follows;

$$(\frac{\pi}{2} - \beta) > \varphi \qquad (12)$$

in this β is the installation angle of the working part of the leveler , grad;

φ-angle of friction of the soil in steel. Therefore, b =ph can be taken as the lower limit of the installation angle of the straightening workpiece. Depending on the type and physical-mechanical properties of the soil, the lower limit of the installation angle can be taken β=22-300 We find the upper limit of the working part installation angle using the soil displacement rate. Depending on the installation angle of the workpiece, the speed at which the soil exits the workpiece area will vary. As a result of friction, the movement of the soil is delayed, resulting in a decrease in the rate of subsidence of the soil along the working part. Assume that the direction of absolute velocity VA corresponds to the absolute trajectory of ground motion, and dividing the velocity $V_{A \text{ by the}}$ velocity $V_{t \text{ in the}}$ direction of motion and the velocity in front of the workpiece V_{sx} we obtain the component of absolute velocity [3,4].

In this case, the velocity VAdeviates from the normal of the working surface by the angle of friction. As can be seen from Figure 3, Vsx and V t are interconnected as follows;

$$\frac{V_{sx}}{\sin[90-(\beta+\varphi)]} = \frac{V_t}{\sin[90-(\varphi)]} \qquad (13)$$

After the mathematical changes, we get the following.

$$V_{sx} = V_t \frac{\cos(\beta+\varphi)}{\cos\varphi} \qquad (14)$$

Table 1 shows the calculated values of the soil exit velocity from the working part depending on the installation angle.

Table 1.Installation angle of V $_{sx}$ and ground leveler Values depending on the speed of movement

Installation angle of the working part, grad	The speed of the workpiece is m \ s		
	1.66	2.55	3.3
60	0.24 \ 0	0.37 \ 0	0.49 \ 0
55	0.40 \ 0.16	0.60 \ 0.25	0.80 \ 0.33
50	0.55 \ 0.33	0.83 \ 0.5	1.10 \ 0.66
45	0.69 \ 0.49	1.05 \ 0.74	1.39 \ 0.99
40	0.84 \ 0.65	1.25 \ 0.97	1.67 \ 1.30
35	0.97 \ 0.81	1.46 \ 1.26	1.93 \ 1.61
30	1.10 \ 0.40	1.66 \ 1.44	2.19 \ 1.90

As can be seen from the table, as the installation angle decreases, the soil projection velocity Vsx increases regardless of the speed of the ground leveler [1,2,3,4]. Excessive increase in the soil outlet angle causes the soil to pass through the top of the working part and as a result the quality of field leveling is impaired. Therefore, the value of the installation angle should be chosen so that it allows the soil to move normally at high speeds of the leveler. As can be seen from the table, the soil ejection velocity is 0 when the installation angle is b = 600 and ph= 300. Based on the above, it can be said that the leveling angle of the leveling machine before planting should be in the range of 50 ... 55 when operating at high speeds. One of the factors influencing the quality and productivity of the leveling machine before planting is the height of the working part. During the operation of the unit, the working part cuts the soil and moves a certain amount of soil collected in front of it. In order for this soil volume to shift at the required level, the height of the working part must be chosen so that during the work the soil is pushed in front of the working part without passing through the top of the working part [1,2,3,4].

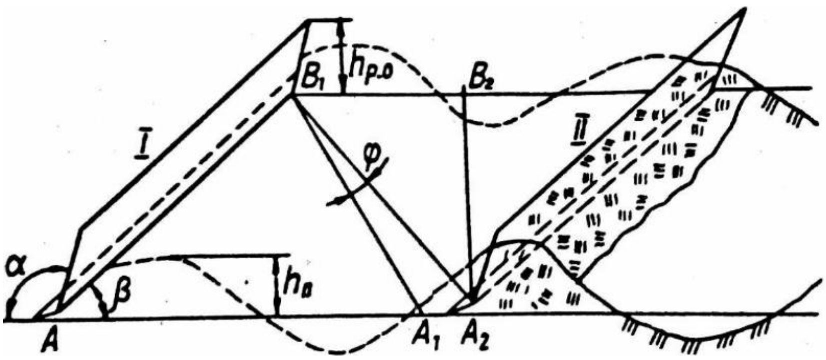

Figure 4. Schematic for determining the height of the working part of the leveler.

The height of the working part of the leveler can be found by equalizing the volume of soil moving in front of it as a result of the movement of the working part, the size of the soil prism that can be placed in front of it. Assume that the working part of the leveler is located at an angle b to the direction of movement and the depth of the moving soil is sunk to ht. When the working part moves from position I to position II, the ground triangle moves from position AV1 A1 to position A2 V1 V 2. Thus, in front of the working part will be a constant pile of soil, the size of which is determined by the following expression.

$$W' = \frac{h_t l AA_2 \sin\beta}{2} \qquad (15)$$

The volume of soil that can be placed in the form of a prism in front of the working part:

$$W = \frac{H^2}{tg\mu} lK \qquad (16)$$

Where is the cross $\frac{H^2}{tg\mu}$ -sectional area of the soil prism, M2 ;
μ - angle of inclination of the soil prism, grad;
l- length of one section of the working part, m=1m.
Cross section of the ground prism in front of the working part
We imagine it in the form of a triangle as shown in Figure 5.

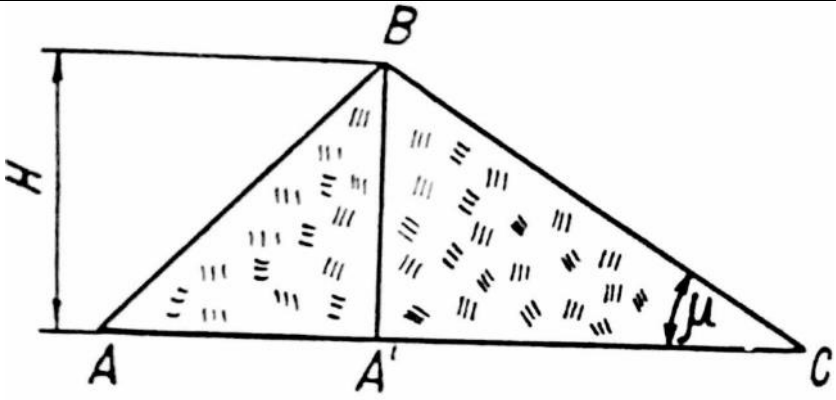

Figure 5. Cross section of the soil pile in front of the work piece.

The slope of the leveling work is part of the soil cross-sectional area A VS, the inclination angle of 900, which is equal to the area of a triangle ABC. From this

$$\theta = \frac{S\Delta_{AVS}}{S\Delta_{A'VS}} \qquad (17)$$

$$h = \sqrt{\frac{h_t b \sin\beta tg\mu}{2\theta}} \qquad (18)$$

Given the angle of inclination of the workpiece, its height can be found from the following expression.

$$h_{iq} = \frac{1}{\sin\alpha}\sqrt{\frac{h_t b \sin\beta tg\mu}{2\theta}} \qquad (19)$$

Conclusion

It can be seen from this expression that the height of the working part depends mainly on the dimensions of the mobile soil layer and its physical-mechanical properties (μ).
The angle of inclination of the working part a = 1200, its installation angle
When b = 50-550, μ = 30-320, the height of the working part of the leveling machine before planting is 0.164-0.172 m.

References

1. Mukhamadsadikov, K., & Ortiqaliyev, B. (2022). Constructive Parameters of Earthquake Unit Before Sowing. Eurasian Journal of Engineering and Technology, 9, 55-61.
2. Mukhamadsadikov, K. J. (2022). Determination of installation angle and height working body of the preseeding leveler. American journal of applied science and technology, 2(05), 29-34.
3. Axunboev, A., Muxamadsodikov, K., Djuraev, S., & Musaev, A. (2021). Analysis of the heat exchange device complex in rotary ovens. Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali, 1(5), 127-132.
4. Abdukakhorovich, A. H., & Muhammadsodikov, K. D. (2021). Improving the design of internal plates in columnar apparatus. The American Journal of Engineering and Technology, 3(05), 1-8.

5. Sadullaev, X., Muydinov, A., Xoshimov, A., & Mamarizaev, I. (2021). Ecological environment and its improvements in the fergana valley. Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali, 1(5), 100-106.
6. Sadullaev, X., Alimatov, B., & Mamarizaev, I. (2021). Development and research of a high-efficient extraction plant and prospects for industrial application of extractors with pneumatic mixing of liquids. Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali, 1(5), 107-115.
7. Sadullaev, X., Tojiyev, R., & Mamarizaev, I. (2021). Experience of training bachelor-specialist mechanics. Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali, 1(5), 116-121.
8. Хусанбоев, М. А., Алиматов, Б. А., & Садуллаев, Х. М. (2022). Высокоэффективная конструкция барботажного экстрактора.
9. Алиматов, Б. А., Садуллаев, Х. М., & Хошимов, А. О. У. (2021). Сравнение затрат энергии при пневматическом и механическом перемешивании несмешивающихся жидкостей. Universum: технические науки,(5-5 (86)), 53-56.
10. Тожиев, Р. Ж., Садуллаев, Х. М., Сулаймонов, А., & Герасимов, М. Д. (2019). Напряженное состояние вала с поперечным отверстием при совместном действии изгиба и кручения. In Энерго-ресурсосберегающие технологии и оборудование в дорожной и строительной отраслях (pp. 273-281).
11. Алиматов, Б. А., Садуллаев, Х. М., Каримов, И. Т., & Хурсанов, Б. Ж. (2008). Методы расчета и конструирования жидкостных экстракторов с пневмоперемешиванием.
12. Tojiev, R. J., & Sadullaev, X. M. (2018). Determination of the angle of capture of the crushing chamber of a cone crusher, taking into account the kinematics of the rolling cone. Scientific-technical journal, 22(3), 55-60.
13. Тожиев, Р. Ж., Садуллаев, Х. М., & Исомиддинов, А. С. (2016). Детонацияга асосланган зарбли тўлқин берадиган генератор қурилмасини халқ хўжалигининг айрим соҳаларига қўллаш ва синаб кўриш. Фар ИТЖ, 4, 21-26.
14. Тожиев, Р. Ж., Садуллаев, Х. М., Миршарипов, Р. Х., & Ражабова, Н. Р. (2019). Суюқланма материалнинг кристалланиши ва қуритиш жараёнларининг ўзига хослиги. ФарПИ ИТЖ (STJ FerPI),–2019,–24 №, 1, 46-58.
15. Axunboev, A., Muxamadsodikov, K., & Qoraboev, E. (2021). Drying sludge in the drum. Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali, 1(5), 149-153.
16. Mukhamadsadikov, K. J., & Ortikaliev, B. S. U. (2021). Working width and speed of the harrow depending on soil resistivity.
17. Ахунбаев, А. А., & Хусанбоев, М. А. У. (2022). Влияние вращения сушильного барабана на распределение материала. Universum: технические науки, (4-2 (97)), 16-24.
18. Davronbekov, A., & Khusanboev, M. (2023). Study of hydrodynamic regimes in internal pipe profiles in shell-and-tube heat exchangers. European Journal of Emerging Technology and Discoveries, 1(2), 54-59.
19. Adil, A., Bobojon, O., Abdusama, M., Avzabek, X., Ismoiljon, X., Bekzod, A., ... & Abdulloh, A. (2022). Drying in the apparatus with a quick rotating rotor. Conferencea, 182-189.

20. Adil, A., Abdusamad, M., Abdulloh, A., Avzabek, X., Ismoiljon, X., Bekzod, A., ... & Bobojon, O. (2022). Modernization of working blades of the construction glass shell mixing device. Conferencea, 199-206.
21. Abdulloh, A., Gulnora, G., Avzabek, X., Ismoiljon, X., Bekzod, A., Muhammadbobur, X., ... & Abdusamad, M. (2022). Kinetics of drying of spray materials. Conferencea, 190-198.
22. Adil, A., Abdusamad, M., Abdulloh, A., Avzabek, X., Ismoiljon, X., Bekzod, A., ... & Bobojon, O. (2022). Drying of mineral fertilizersresearch of hydrodynamic processes. Conferencea, 158-165.
23. Adil, A., Muhammadbobur, X., Ortiqaliyev, B., Abdusamad, M., Abdulloh, A., Avzabek, X., ... & Bekzod, A. (2022). Roasting of nickel hydrocarbonate. Conferencea, 174-181.
24. Adil, A., Abdulloh, A., Gulnora, G., Ismoiljon, X. A. X., Bekzod, A., & Muhammadbobur, X. (2022). Study of longitudinal mixing in a drum apparatus. Conferencea, 166-173.
25. Ergashev, N. A., Davronbekov, A. A., Khalilov, I. L. C., & Sulaymonov, A. M. (2021). Hydraulic resistance of dust collector with direct-vortex contact elements. Scientific progress, 2(8), 88-99.
26. Ахунбаев, А. А., & Хусанбоев, М. А. (2022). Барабаннинг кўндаланг кесимида минерал ўғитларнинг тақсимланишини тадқиқ қилиш. Yosh Tadqiqotchi Jurnali, 1(5), 357-367.
27. Хусанбоев, М. (2022). Термическая обработка шихты стеколного производства. Yosh Tadqiqotchi Jurnali, 1(5), 351-356.
28. Axunboev, A., & Muxamadsodikov, K. (2021). Drying fine materials in the contact device. Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali, 1(5), 133-138.
29. Mukhamadsadikov, K., Ortiqaliyev, B., Olimova, D., & Isomiddinova, D. (2021). Mathematical analysis of determining the parameters of the working part of the planting plant before planting. Scientific progress, 2(7), 699-708.
30. Мухамадсадиков, К. Д., & Давронбеков, А. А. (2021). Исследование влияния гидродинамических режимов сферической нижней трубы на процесс теплообмена. Universum: технические науки, (7-1 (88)), 38-41.
31. Тожиев, Р. Ж., Ахроров, А. А., & Исомидинов, А. С. (2020). Analyze of contact surface phases in wet type rotor-filter gas collector. Ученый XXI века. Междунар
32. Эргашев, Н. А., Маткаримов, Ш. А., Зияев, А. Т., Тожибоев, Б. Т., & Кучкаров, Б. У. (2019). Опытное определение расхода газа, подаваемое на пылеочищающую установку с контактным элементом, работающим в режиме спутникового вихря. Universum: технические науки, (12-1 (69)), 29-31.
33. Ergashev, N., & Halilov, I. (2021). Experimental determination length of liquid film in dusty gas cleaner. Innovative Technologica: Methodical Research Journal, 2(10), 29-33.
34. Ergashev, N. A., Mamarizayev, I. M. O., & Muydinov, A. A. O. (2022). Kontakt elementli ho 'l usulda chang ushlovchi apparatni sanoatda qo 'llash va uning samaradorligini tajribaviy aniqlash. Scientific progress, 3(6), 78-86.
35. Ergashev, N., Ismoil, K., & Baxtior, M. (2022). Experimental determination of hydraulic resistance of wet method dushanger and gas cleaner. American Journal Of Applied Science And Technology, 2(05), 45-50.

36. Мухамадсадиков, К., Ортикалиев, Б., Юсуов, А., & Абдупаттоев, Х. (2021). Ширина захвата и скорости движения выравнивателя в зависимости удельного сопротивления почвы. Збірник наукових праць SCIENTIA.
37. Исомиддинов, А. С., & Давронбеков, А. А. (2021). Исследование гидродинамических режимов сферической углубленной трубы. Universum: технические науки, (7-1 (88)), 53-58.
38. Davronbekov, A., Qoxorov, I., Xomidov, X., & Maxmudov, A. (2021). Systematic analysis of process intensification in heat exchange products. Scientific progress, 2(1), 694-698.
39. Davronbekov, A. A., & Isomidinov, A. S. (2022, November). Analysis of requirements for modern heat exchangers and methods of process intensification. In international conference dedicated to the role and importance of innovative education in the 21st century (Vol. 1, No. 7, pp. 174-183).
40. Davronbekov, A. A., & Isomidinov, A. S. (2022, November). Systematic analysis of the working parameters of a floating head shell-tube heat exchanger. In international conference dedicated to the role and importance of innovative education in the 21st century (Vol. 1, No. 7, pp. 3-15).
41. Davronbekov, A. A. (2022). Sferik botiqli quvirda tajribaviy tadqiqotlar otkazish usullari va natijalari. Yosh Tadqiqotchi Jurnali, 1(5), 211-220.
42. Ахунбаев, А. А., & Давронбеков, А. А. (2022). Минерал ўғитларни қуритиш объекти сифатида таҳлили. Yosh Tadqiqotchi Jurnali, 1(5), 221-228.
43. Abdurasul, D. (2022). Investigation of heat transfer rate in smooth turbulizer pipes. Universum: технические науки, (6-6 (99)), 59-62.
44. Ахунбаев О.А., & Мамасалиев Н.С. (2022). Влияние анемии на течение сердечно-сосудистых заболеваний. Экономика и социум, (6-2 (97)), 329-332.
45. Ugli, A. A. A. (2022). Study Of The Mass Transfer Process In The Wet Treatment Of Waste Gases Generated In The Production Of Superphosphate. International Journal of Advance Scientific Research, 2(11), 11-19.
46. Rasuljon, T., Azizbek, I., & Akmaljon, A. (2021). Analysis of the dispersed composition of the phosphorite dust and the properties of emission fluoride gases in the production of superphosphate mineral fertilizers. Universum: химия и биология, (6-2 (84)), 68-73.
47. Тожиев, Р. Ж., Исомиддинов, А. С., & Ахроров, А. А. У. (2021). Исследование пленочного слоя на рабочей поверхности роторно-фильтрующего аппарата. Universum: технические науки, (7-1 (88)), 42-48.
48. Ахроров, А. А. (2022). Исследование слоя плёнки водного раствора технической соды на рабочей поверхности роторного фильтрующего аппарата.
49. Тожиев, Р. Ж., Исомиддинов, А. С., Ахроров, А. А. У., & Сулаймонов, А. М. (2021). Выбор оптимального абсорбента для очистки водородно-фтористого газа в роторно-фильтровальном аппарате и исследование эффективности аппарата. Universum: технические науки, (3-4 (84)), 44-51.
50. Ergashev, N., & Tilavaldiev, B. (2021). Hydrodynamics of Wet Type Dusty Gas Collector. International Journal of Innovative Analyses and Emerging Technology, 1(5), 75-86.

ISSN (E): 2938-3617
Volume 1, Issue 8, November, 2023.

51. Эргашев, Н. А. (2020). Исследование гидравлического сопротивления пылеулавливающего устройства мокрым способом. Universum: технические науки, (4-2 (73)), 59-62.
52. Ахроров, А. А. У. (2022). Исследование массообменного процесса при мокрой очистке газов в роторно-фильтрующим аппарате. Universum: технические науки, (4-8 (97)), 23-29.
53. Akhrorov, A. K. M. A. L. J. O. N. (2021). Study of mass taransfer process in rotary-filter gas cleanaer. Austrian journal of technical and natural science,(11-12), 3-19.
54. Ахроров, А. А. У., Исомиддинов, А. С., & Тожиев, Р. Ж. (2020). Гидродинамика поверхностно-контактного элемента ротор-фильтрующего пылеуловителя. Universum: технические науки, (8-3 (77)), 10-16.
55. Rasuljon, T., Akmaljon, A., & Ilkhomjon, M. (2021). Selection of filter material and analysis of calculation equations of mass exchange process in rotary filter apparatus. Universum: технические науки, (5-6 (86)), 22-25.
56. Ergashev, N. A., Xoshimov, A. O. O. G. L., & Muydinov, A. A. O. (2022). Kontakt elementi uyurmali oqim hosil qiluvchi rejimda ishlovchi ho ‘l usulda chang ushlovchi apparat gidravlik qarshilikni tajribaviy aniqlash. Scientific progress, 3(6), 94-101.
57. Ergashev, N. A. (2020). Determination hydraulic resistance of device that has the vortex flow creating contact element. Austrian Journal of Technical and Natural Sciences, (3-4), 15-22.
58. Эргашев, Н. А., Алиматов, Б. А., Герасимов, М. Д., & Дикевич, А. В. (2018). Повышение эффективности пылеулавливания в производстве дорожно-строительных материалов. In Энерго-, ресурсосберегающие машины, оборудование и экологически чистые технологии в дорожной и строительной отраслях (pp. 228-232).