ISSN: 2776-0960 Volume 2, Issue 7 July, 2021

RESULTS OF APPLICATION OF SOFTENING SPHERICAL DISC WORKING ORGANNI IN FRONT OF THE BASE SMOOTHING BUCKET

Musurmanov Rovshan Kurbanmuratovich
Doctor of Technical Sciences, Prof.

Kuchkarov Jurat Jalilovich
Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, the Republic of Uzbekistan

Ibodov Islom Nizomiy Ugli
Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, the Republic of Uzbekistan.

Najmiddinov Manguberdi Ma'rufjon Ugli
Bukhara branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, the Republic of Uzbekistan.

Annotation

In this paper, based on the experimental results of the application of softening discs' device in front of the straightener shovel, the results of the study of changes in the shape, hardness, volume weight, aggregate composition, level of leveling and tensile resistance in front of the shovel are described, depending on the speed of the aggregate.

Keywords: grader, spherical disc, speed, tensile strength, soil size, fraction, leveling quality.

Abstract:

This article Heights the experiments on the study of the technological process of Workman's softening discs, the shape of a drawing prism, changes in hardware, volumetric weight, soil aggregate composition, field surface alignment and change in traction resistance of the unit at different speeds of its movement.

Base phrases: tequila, spherical disc, speed, tensile resistance, soil volume, fraction, leveling quality.

So far, in the current leveling of the fields, the working body has been used a buldozer-type, that is, a shovel cutting open underground soil with two sides.

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

With such working bodies, it is formed in the transition of the tractor aggregate from one track to three and more times in order to form the plane required in the leveling of crop areas [1,2]. This leads to the condensation of the soil, which, as a result, cannot provide the agro technical demand for crop areas. After such leveling of the crop areas requires additional softening before planting.

From our point of view, it is possible to achieve this by improving the technological process of leveling by pushing the pile of soil that takes place in front of the shovel of the leveler to reduce the number of disruptions. In order to achieve such a goal, a way of experimentation was established by installing working parts with a cord in front of the flatbed shovel [3].

The experiments were conducted on the average sandy areas of the irrigated mechanical composition of the Bukhara region. As a function of conducting experiments, such issues as the technological process of working with a drive mounted on a ground leveler, the structure of the soil pile before the shovel , the bulk weight of the field drive layer, the hardness, the aggregate composition of the soil, the plane of the field surface and the measurement of the resistance of the aggregate to gravity

Yumsh technological working process with softening disk installed in the base ground leveler

Observations of the technology of operation of the working body with a softening disc indicate that the soil formation formed before the shovel with the help of discs soften to a certain depth and the disc itself rotates with the help of an arrow. During the aggregate movement, the discs in front of the flatbed shovel are evenly placed inside the shell from one half to the opposite side, ensuring that the soil pile is evenly spread along the width of the shovel. This will have a positive effect on the leveling of the leveled area. As a result of the friction of the incisors of the soil around the discs to each other, large incisors are crushed, the aggregate content of the soil planting layer is improved.The change in the rate of the leveler aggregate from 0.69 to 2.08 m/s increases the improvement of the processes described above and ensures compliance with the agrotechnical requirements of irrigated lands, which took planting physico-mechanical composition of the soil. During the experiment, a change in the cross-profile of the soil pile at different speeds of the leveling aggregate was studied and seen , a decrease in the high speeds of the cross-sectional profile is observed, changing depending on the speed of the cross-sectional surface of the soil pile.This situation occurs on account of intensive loading of the soil in front of the junction at high speeds of

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

the aggregate. At small speeds, the above process is relatively slow, the loosening of the soil discs is improved, and the blockage of the incisions is almost not observed. The upper part of the pile, formed by filling the upper part of the softened soil shovel, is relatively moist, and the soil pile is wider than the larger speeds of the small speeds of the leveling aggregate. Again, the same thing was observed, in cases where the moisture between the soil discs at high speeds of the aggregate is not at the required level, the rotation intensity of the discs is disrupted, the smooth movement of the soil pile does not occur. This condition requires a separate study of the discs relative to each other, connecting the positioning organ and the diameter of the discs to this state.

The results of the determination of soil hardness, volume weight and aggregate composition depending on the speed of aggregate movement are presented in tables 1,2, and 3 below.

From Table 1, which is presented, it is known that with increasing speed of movement, the hardness of the soil decreases when plowing and spreading. The difference in the change in soil hardness, at minimum and maximum speeds in forty: 0-5 CM – 23,5 N/cm2 or 36,2% for the horizon; 5-10 – 18,2 N/cm2 or 23,5% for the horizon, 10-15 cm – 8,5 N/cm2 or 9,6% for the horizon. On average, the difference in depth up to 15 cm is 17,8 N/cm2 or 22,7 μg.With an increase in the depth of the Bunda, the difference in the change in soil hardness decreases between the minimum and maximum speeds.

Thus, the change in the hardness of the soil by law is also observed in the process of spreading at different speeds of the aggregate. But here the finite value of the soil hardness is smaller than the process in the Forties. Because the device with a softening disc when spreading the soil, the pressure of the shovel and soil pile is not transferred to the full soil, but in part there is a decrease in the soil pile.

The difference in soil hardness reduction is as follows at the minimum and maximum speeds of the aggregate in the process of spreading: for the horizon of 0-5 CM – 12 N/sm2 or 36,4%, for the horizon of 5-10cm – 18,5 N/sm2 or 35,9%, for the horizon of 10-15cm – 21,5 N/sm2 or 30,1%. On average, the difference in depth up to 15 cm is 14,1 N/cm2 or 19,3 μg.

Depending on the speed of movement of the working body with a softening disc installed in the base ground leveler, the hardness of the soil

ISSN: 2776-0960 Volume 2, Issue 7 July, 2021

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

Table 1

Horizons, CM	Soil moisture, %	Soil hardness, N/cm2					
		Until the passage	After passing				
			Enhanced speed, m/s				
			0,69	1,05	1,44	1,8	2,08
At an angle							
0-5	10,98	38,9	65,0	65,5	54,8	41,5	41,5
5-10	12,80	53,5	78,0	75,0	65,9	62,5	59,8
10-15	15,56	75,5	88,5	87,0	83,0	81,5	80,0
Average 15cm up to the depth	13,08	56,0	78,2	75,8	67,8	61,9	60,4
Stall							
0-5	10,98	35,5	33,0	25,0	23,0	23,5	21,0
5-10	12,80	50,5	52,5	40,0	39,0	35,8	34,0
10-15	15,56	70,0	71,5	63,5	59,3	50,3	50,0
Up to an average depth of 15cma	13,08	52,1	52,4	42,8	40,5	36,5	35,0

Studies show that the increase in the speed of movement of the leveling aggregate leads to a decrease in the bulk weight of the soil. Table 2 lists the change in the bulk weight of the soil depending on the speed of movement of the working body with the disc. As can be seen from the table, with an increase in the speed of movement of the aggregate, the bulk weight of the soil decreases. The resulting values are 0,69...The 2,08 m/s pegging is considered satisfactory in motion speeds and meets agrotechnical requirements in relation to other movement speeds. The bulk weight of the soil at the minimum and maximum speeds of the leveling process of the leveler aggregate shovel is as follows: for the horizon 0-5 CM – 0,179 g/cm3 or 12,8%, for the horizon 5-10 cm – 0,137 g/cm3 or 9,7% , for the horizon 10-15cm – 0,123 g/cm3 or 8,34%. On average, the difference in depth up to 15 cm is 0,146 g/cm3 or 10,2%.

The above analysis shows that the difference in the bulk weight of the soil in the range of maximum and minimum speeds decreases with an increase in depth so that the change in the bulk weight of the soil is also carried out in the process of spreading, depending on the speed of movement. The difference in the change in the weight of the soil volume is the following in the process of spreading between the minimum and maximum speeds 0-5 CM for the horizon – 0,80 g/cm3 or 6,3%, 5-10cm for the horizon – 0,4 g/cm3 or 3,12%, 10-15cm for the horizon – 0,52

g/cm3 or 3,77%. On average, the difference in depth up to 15 cm is 0,058 g/cm3 or 4,38%.

Change in the weight of the soil volume depending on the speed of movement of the working body with a softening disc installed in the base ground leveler

Table 2

Horizontal line	Soil moisture, %	Soil bulk weight, g/cm3					
		Until the passage	After passing				
			Enhanced speed, m/s				
			0,69	1,05	1,44	1,8	2,08
At an angle							
0-5	12,48	1,121	1,400	1,349	1,270	1,262	1.221
5-10	14,80	1,155	1,412	1,315	1,314	1,303	1,275
10-15	16,18	1,265	1,473	1,406	1,381	1,399	1,350
Average 15cm up to the	14,49	1,180	1,428	1,357	1,322	1,321	1,282
Stall							
0-5	12,48	11,21	12,70	12,50	12,21	11,95	11,90
5-10	14,80	11,55	13,15	13.20	12,90	12,89	12,74
10-15	16,18	12,65	13,81	13,92	13,53	13,40	13,29
Average 15cm up to the	14,49	11,80	13,22	13,21	12,88	12,74	12,64

It is known that the aggregate composition of the soil is one of the main indicators of quality in the process of planting agricultural crops. Therefore, in its study, when analyzing the decomposition of the soil fraction, again such a process was observed, the increase in the rate of action of the aggregate in the aggregate leads to the fragmentation of soil fractions and high pollination, which can lead to soil erosion.

Table 3 presents a change in the aggregate composition of the soil, depending on the speed of movement of the working body of the smoothing disc.

Changes in the composition of the soil aggregate depending on the speed of movement of the working body with a softening disc installed in the ground leveler

Table 3

Movement speed, m/s	Fractions in quantity, % mm in size			
	100 -50	50 - 10	10 - 0,25	< 0,25
Until the passage of the aggregate				
	28,62	50,82	19,42	1,72
After passing the aggregate				
0,69	28,41	48,38	20,25	2,59
1,05	26,81	48,81	24,36	1,92
1,44	19,76	47,73	30,17	2,21
1,8	16,00	50,72	30,25	3,05
2,08	13,41	47,98	34,99	3,69

ResearchJet Journal of Analysis and Inventions
https://researchjet.academiascience.org

As can be seen from the table above , large incisors (Ø100 - 50mm) are crushed by increasing the speed of movement of the working body with the disc softening the incisors formed during the annealing, the average incisors (Ø50 - 10mm) practically do not change – this happens when large incisors to the average incisors, and the average incisors to the average incisors take small forms. Aggregates of small structure (Ø 10...0,25 mm) increase in size. The change in the minimum and maximum movement speeds of the amount of soil fraction occurs in the following form in the table: large incisors Ø50 - 10mm – 52.8%, average incisors Ø50 - 10mm –the content of the quantity remains almost unchanged. The required small-sized aggregates (soil fractions) increase by 10% in the size of Ø 0,25 - 72 mm. The fact that the composition of the fraction was Ø<0,25 mm in size is almost imperceptible, and this changed within the limits of the allowable agrotechnical requirements.

The result of the above research work will be to ensure satisfactory transfer of agrotechnical cases of irrigated land before sowing and reduce the cost of the application of machines necessary for crushing large and medium-sized incisors against the background of planting Aldi. The study of the technological processes of the leveling aggregate is one of the main factors in improving the quality of leveling of the longitudinal profile of the leveling area.

The variation of the longitudinal profile of the area by the degree of leveling depending on the aggregate speed is presented in Table 4.

Change of the leveling level of the field longitudinal profile depending on the aggregate speed

Table 4

Level of leveling	Movement speed, m/s				
	0,69	1,05	1,44	1,8	2,08
$\sigma_д$	9,94	11,05	10,80	10,30	10,10
$\sigma_п$	7,89	8,27	7,32	6,82	6,84
K (%)	20,6	25,1	32,2	33,8	32,2

Σd–the height of the average arithmetic unevenness of the deviation of the average squares before the passage of the leveler, CM; σp – so after the passage of the leveler itself, CM; K-in percentage of the level of levelling.

As can be seen from the table, the level of leveling of the longitudinal profile of the leveled area increases with the increase in the speed of the actuation of the disc

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

working body leveler. This position leads to the crushing of large incisions of the soil in the operation of discs, which are made inside the shell from half equal to the location on one axis. Aggregate 1,8...At movement speeds of 2,08 m/s, the level of leveling is achieved, which is higher than other speeds. This condition is characterized by several stagnant operation of the working body at high speeds. Also, the increase in the speed at the specified limit leads to the crushing of large and medium incisors of the soil heap. The operation of the softening discs ensures an even distribution of the soil at the transition width, which improves the quality of leveling.

One of the main tasks of the experimental research program is to determine the tensile resistance of a smoothing disc working body, which is recommended. The results of the study are presented in Table 5. the relation of the working body of the annealing disc to the resistance of the annealing Motion Rate to the concretion.

As can be seen from the table, the change in the movement speed of the leveler to 2,08 m/s leads to an increase in the resistance to gravity by 38,4%.

The wheelbarrow changes the traction resistance depending on the speed

Table 5

Speed of movement, m / s	0,69	1,05	1,44	1,8	2,08
Traction resistance, kN	3,32	3,59	3,95	4,20	4,60

The theoretical research carried out above shows that the softening disc device installed in the base leveler prepared using the values from the calculations shows that the work efficiency in the levelling is high, as well as the energy consumption is low. From the result of the research work, the following should be stated.

1. Observations of the technological working process of the smoothing disc with a working body indicate that during the movement of the aggregate, a uniform distribution of the soil sacs by crushing and passing width is achieved. Increasing the speed of movement up to 2,08 m/s leads to intensification of the above processes, as well as a qualitative change in the aggregate composition of the soil and improvement of the quality of leveling .

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

2. The change in the speed of the smoothing disc with a working body from 0,69 to 2,08 m/s leads to a decrease in soil hardness. At minimum and maximum movement speeds, the decrease in soil hardness at depths of 0-15 CM of soil is 17,8 N/cm2 or 22,7%, while at spreading is 17,4 N/cm2 or 32,2%.

3. The change in the speed of movement from 0,69 to 2,08 m/s leads to a decrease in the bulk weight of the soil. Planting Aldi layer is reduced from 1,4 to 1,221 g/cm3 or 12,8%. Bunda ensures compliance with the agrotechnical requirements of the planting Aldi layer, which is reduced in relation to the bulk weight of the soil.

4. Changing the speed of movement from 0,69 to 2,08 m/s leads to a change in the aggregate composition of the soil. Large incisors are reduced by 52,8%, the fact that the middle incisors remain almost unchanged is characterized by the transformation of large incisors into medium incisors, small to medium incisors.

5. Increasing the speed of movement from 0,69 to 2,08 m/s increases the level of leveling in the longitudinal direction, this condition is achieved by crushing large incisions of the soil and evasion of the stable movement of the aggregate at high speeds.

6. Further studies are aimed at studying the dimensions of the working body with a softening disc and the effective use of a straightener sink.

Used Literature

1.M. Akhmedjanov. Planirovka oroshaemix zemel.Tashkent "Cocktail".The 1991s., 52.

2.I.S.Khasanov, P.G.Khikmatov."Izuchenie effektivnosti primeneniya planirovochnix mashin i vibor tipa orodiya dlya fermerskix khozyayst Bukharskoy region. Touched mejdunaronoy nauchno-prakticheskoy conference.The stone., Tashkent, 2003, s.221.

3.No, it's not.A.Shevnin,G.G.Burmisky. Poti povisheniya effektivnosti zemleroyno-planirovochnix mashin rabot v stroitelstve i selskom hozyaystve. Tashkent., 1990, s.27.

4. Issues of agriculture management and electrification. Viison.Publishing house " Fan " Tashkent 1970.

5. I Khasanov 1 , J Kuchkarov and H Diva. Efficiency of irrigated land reclamation through the usage of fixing software disk device to base leveler. IOP Conf. Series: Materials Science and Engineering 883 (2020) 012174.

ResearchJet Journal of Analysis and Inventions
https://reserchjet.academiascience.org

6. Kuchkorov J J, Musurmanov R K, Hasanov I S. The research results of fixing disc device in base land straightener scoop. International Journal of AdvancedResearch in Science Engineering and Technology Vol. and Athers 2019.
7. Kuchkarov Jurat Jalilovich, Nuriddinov Xurram, Ibodov Islom Nizomiy. Theoretical Approach To Determining The Demand For Land Leveling In The Bukhara Region. International Journal of Engineering and Information Systems (IJEAIS). Vol. 5 Issue 2, February - 2021, Pages: 162-164.