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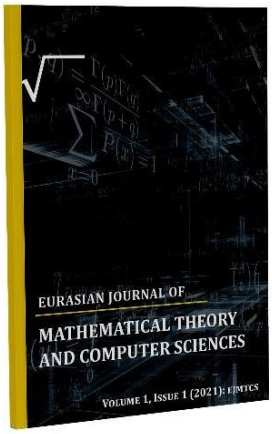

IMPROVING THE EFFICIENCY OF THE BASE LEVELER IN THE CURRENT LEVELING OF CROP FIELDS

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work efficiency, current leveling, disc softener, soil erosion rate, unevenness

ABSTRACT

The article analyzes the results of experiments on the application of a basal leveler equipped with a disc softener to the base leveler in the preparation of lands for planting wheat and secondary crops. It based on a 20.8% reduction in direct (operating) costs per hectare of land tillage compared to existing equipment.

The leveling of irrigated lands will increase the productivity of agricultural crops, reduce labor costs and water consumption during irrigation by 2-2.5 times, high-quality tillage between rows and high quality harvesting by machine.

Repeated tillage and irrigation of the soil result in the following types of field irregularities: long ridges and furrows formed during the plowing process, highs and lows after irrigation, and residual unevenness of the previous year. In addition, in certain parts of the area, repeated watering can lead to subsidence and subsidence of the soil. All such irregularities eliminated by applying the current (operational) leveling in the process of preparing the area for planting.

The current leveling process carried out in a short agro-technical period. At the same time, the low efficiency of existing leveling machines makes it difficult to perform the current leveling in a timely manner, that is, to create a horizontal plane that meets the agro-technical requirements in 3-5 passes along the surface of the field.

Such a problem solved by a method of increasing the working efficiency of long-base leveling machines.

Based on these assumptions, an analysis of the literature and studies have shown that sufficient research to increase the work efficiency of longitudinal straighteners has not scientifically studied. When researching the use of a softening disc device on a leveler and improving its operation, the placement of an additional softening disc device on the front of the leveling bucket reduces energy consumption and increases the efficiency and quality of work due to crushing plant debris or rhizomes and large lumps. For this device and leveling technology, the Intellectual Property Agency of the Republic of Uzbekistan has received a patent for a

utility model ("Long base leveler" (FAP 01235, 2017).

Experimental studies with this device were perform to study the effect of disc softener parameters on the quality of soil compaction, the height of field surface irregularities, and their resistance to gravity (Table 1). The experiments conducted in a plowed field after the fall of the winter wheat. Prior to the experiments, the soil moisture in layers 0-5, 5-10 and 10-20 cm was 11.9, respectively; 15.0; 17.1 percent, hardness 0.63; 1.12; 1.71 MPa, density 1.06; 1.16; 1.28 g / cm3.

Table 1

The effect of the mounting angle α on the performance of the disc softener discs relative to the direction of movement

Mounting angle relative to the direction of movement of the disc softener discs, grad	Percentage of soil fractions, %			The height of the irregularities on the surface of the treated field, cm	Comparative resistance of the disc softener to traction, kN/m (kilonyuton-meter)
	fraction sizes, mm				
	>50	50-25	<25		
V=6 km / hour					
20	1,8	23,3	74,9	4,48	1,69
25	1,6	21,3	77,1	4,12	1,51
30	1,4	18,8	79,8	3,88	1,27
35	1,1	18,1	80,8	3,72	1,19
40	1,0	17,2	81,8	3,56	1,09
V=8 km / hour					
20	1,5	21,5	77,0	4,60	1,81
25	1,3	19,3	79,4	4,27	1,60
30	1,1	16,1	82,8	3,96	1,47
35	0,7	15,5	83,8	3,84	1,32
40	0,4	15,1	84,5	3,64	1,27

The data in Table 1 show that an increase in the mounting angle of the disc softeners relative to the direction of movement from 20° to 35° leads to an improvement in the quality of soil compaction at both speeds, i.e.

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a decrease in fractions larger than 50 mm and less than 25 mm in the treated layer. Led to an increase in fractions. At the same time, the height of the unevenness of the treated field surface decreased, and the traction resistance of the disc softener increased. The main reason for this is that increasing the mounting angle of the disc softeners relative to the direction of movement accelerates their impact on the soil and leads to an increase in the surface area of the cross-sections of the discs they cut. In addition, as this angle increases, the soil particles thrown sideways and higher along the surface of the disc. At α=20-35°, the highlighted performance of the disc softener varied rapidly, while at α=35-40 °, it varied slightly.

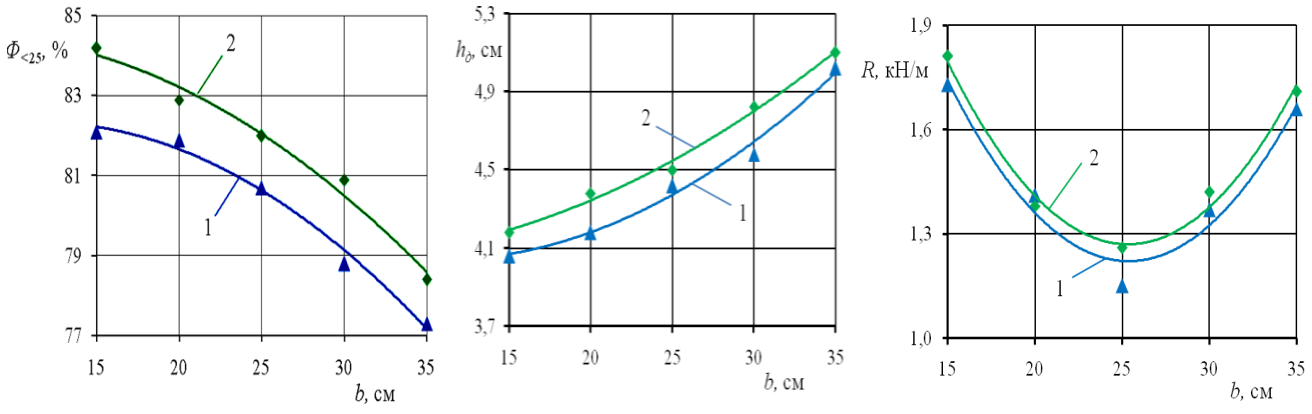
This is due to the fact that with an increase in the cross-distance between the working bodies, due to an increase in the surfaces of the cross-sections of the pellets processed by the discs, the size of large fractions increased and the size of small fractions

In short, in order for a disc softener to provide high performance with low energy consumption, its discs must be mount at an angle of 25-30 ° to the direction of movement.

The results of experiments in which the degree of soil compaction, the height of the unevenness of the treated field surface, and the specific gravity resistance of the disc softener to the transverse distance between its discs are shown in Figure 1. Analysis of the data shows that the change in the transverse distance between the disc softener discs from 15 cm to 35 cm led to a deterioration in the quality of soil compaction, so, the amount of fine fractions decreased and the amount of large lumps increased.

decreased as a result of the migration of large incisions from the soil.

With the increase in the transverse distance between the working bodies, the height of the irregularities



a) B)

C)

FIGURE 1. GRAPHS OF CHANGES IN THE DEGREE OF SOIL COMPACTION (A), THE HEIGHT OF THE

on the treated field surface increased. This explained by the deterioration of the quality

of soil compaction because of the increase in the transverse distance between the

working bodies. As the transverse distance between the disc softeners increases, the specific drag resistance of the device decreases first, then increases. The minimum specific resistance was observe when this distance was 25 cm.

In short, according to the results of the study, the transverse distance between the disc softeners of the base leveler should not exceed 25 cm.

Experienced determination of determination of technical and economic performance of a base level equipped with disked software. Disks are equipped with softeners not repeat the leveling of grain, and other agricultural crops fields are preparing to plant 1 hectare cost of direct costs by 20.8% percent. The annual economic effect on a single base equipment equipped with a disk softer is 32369268 sums (UZS).

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