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Traction Resistance Of The Equalizer

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ABSTRACT. The article summarizes the results of theoretical studies that determine the minimum level of resistance of the leveling device for landing. According to the results of 1,67-2,5 m/s (6-9 km/h), the resistance of the leveling device to the operating time should be 2,30-2,38 kN/m.

KEYWORDS: gravity resistance, cutting blades, length of cutting blades, width, soil density, soil moisture, external friction angle, side wall angle.

I. INTRODUCTION

As you know, one of the main tasks of preparing the land for planting is to straighten the field before planting just before planting, to tighten it at the required level, as well as crushing large lumps and forming a soft soil layer to ensure high-quality seeding and smoothness of seeds.

II. SIGNIFICANCE OF THE SYSTEM

The article summarizes the results of theoretical studies that determine the minimum level of resistance of the leveling device for landing.The study of literature survey is presented in section III, methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and conclusion

III. LITERATURE SURVEY

Mala levelers are mainly used in irrigated agriculture zones, particularly in Central Asia, Afghanistan, Pakistan, India and the Middle East. In these countries, the creation of mala-levelers and the study of their parameters involvedImomkulov K.B., Abdulkhaev H.F., Khalilov M.M [1].

IV. METHODOLOGY

Based on these highlights, our institute has developed a device consisting of platinum and a slotted cylinder (Fig. 1) with a cutter of the working surface and the study of its parameters [1].

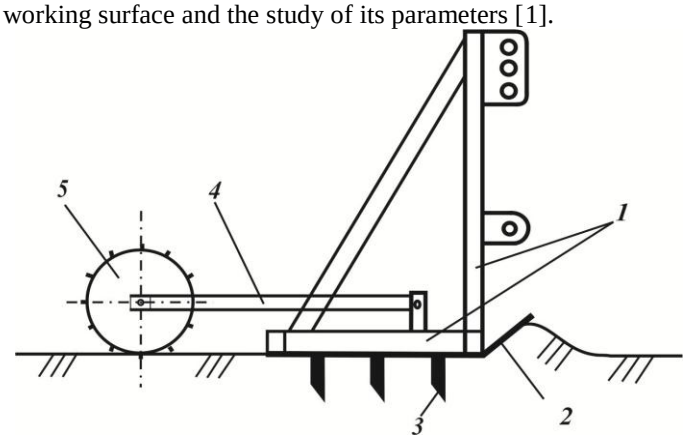

Fig. 1 Landing plan for land preparation for sowing
1- frame is equipped with a nozzle; 2-level; 3 cutting blades; 4- exercise; 5-blow

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V. EXPERIMENTAL RESULTS

The developed device is used to prepare the land for grain and crops. It stabilizes the surface of the field in one pass, crushes and crumbles large lumps, forming a soft layer of soil, that is, ready for planting soil.
This article summarizes the results of a survey conducted to determine the minimum level of resistance of the device. You can specify the total resistance of the flat lubricant (Fig. 2).

$$R_y = R_1 + R_2 + R_3, \tag{1}$$

in which R_1 is a simplifying plate resistor;
R_2 is the resistance of the gradient sealing part;
R_3 - cutting blade resistance.
Based on previous studies [2,3].

$$R_1 = \frac{1}{2} f_2 \rho_0 g B h_{np}^2 (ctg\mu - ctg\beta)\left(1 + \frac{W}{100}\right); \tag{2}$$

$$R_2 = \frac{1}{2} B q_0 h_1^2 \left(1 - \frac{\rho_o}{\rho}\right)^2; \tag{3}$$

$$R_3 = \frac{B}{l_1}\left[\frac{S^2(2h_n - l_0)^2 q_0 \cos\varphi}{16 h_n \sin\gamma \cos(\gamma+\varphi)} + h_n^2 \rho V^2 \left(1 + \frac{W}{100}\right)\sin\gamma\ tg\psi_б\right]\frac{\sin(\gamma+\varphi)}{\cos\varphi}, \tag{4}$$

Fig. 2 Aircraft capture detection scheme

where f_2- is the friction coefficient of the soil; g acceleration free sweep; h_{np}- is the height of the prism of the earth adapted to the leveler; f-coefficient of rubbing the soil into the work surface; S - is the width of the cutting blade; q_0 – coefficient of volcanic soil erosion; l_0 - the length of the lower sharp edge of the cutting blade; ρ_0- is the density of the soil before leveling the plate, ρ - is the density of the soil after leveling; h_1 - The thickness of the soil layer, which is flat and flattened; μ- is the angle of inclination of the soil formation, B-formed in front of the plane; W is the width of the leveling pad; h_1- is the immersion depth of the cutting blade; μ - is the width of the cutting blades; β - the angle of inclination relative to the compressor leveling plate; γ - Angle of sharpening knives at an angle; V - aggressive speed of the unit; φ is the outer rubber corner; ψb - the angle of the side wall of the soil; W-is soil moisture; h_n- is the length of the cutting blade.
Adding the values (1) to the values of R_1, R_2, R_3 (2), (3) and (4), we get the following end result.

$$R_y = B\left\{\left[\frac{1}{2} f_2 \rho_0 h_{np}^2 g(ctg\mu - ctg\beta)\right]\left(1 + \frac{W}{100}\right) + \frac{1}{2} q_0 h_1^2 \left(1 - \frac{\rho_0}{\rho}\right)^2 +,\right.$$
$$\left. + \frac{1}{l_1}\left[\frac{S^2(2h_n - l_0)^2 q_0 \cos\varphi}{16 h_n \sin\gamma \cos(\gamma+\varphi)} + h_n^2 \rho V^2 \left(1 + \frac{W}{100}\right)\sin\gamma\ tg\psi_б\right]\frac{\sin(\gamma+\varphi)}{\cos\varphi}\right\}, \tag{5}$$

As can be seen from this statement, the resistance of the blade to gravitational attraction depends on its parameters, the physicomechanical properties of the soil, and the speed of movement of the aggregate.

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(5) both sides of the expression V, which determines the resistivity of the alignment matrix to the width of the unit width

$$R_y^c = \frac{1}{2}\left[f_2 \rho_0 h_{np}^2 g\left(ctg\mu - ctg\beta\right)\right]\left(1+\frac{W}{100}\right)+\frac{1}{2}q_0 h_1^2\left(1-\frac{\rho_0}{\rho}\right)^2+,$$

$$+\frac{1}{l_1}\left[\frac{S^2\left(2h_n - l_0\right)^2 q_0 \cos\varphi}{16h_n \sin\gamma\cos\left(\gamma+\varphi\right)}+h_n^2\rho V^2\left(1+\frac{W}{100}\right)\sin\gamma\ tg\psi_б\right]\frac{\sin\left(\gamma+\varphi\right)}{\cos\varphi}, \quad (6)$$

VI. CONCLUSION AND FUTURE WORK

Literary sources [2-4] and on the basis of our ρ_o=1000 kg/m^3; ρ=1200 kg/m^3; $h_{пр}$=0,1 m; $h_п$=0,06 m; h_1=0,30m; l_0=0,02 m; l_1=0,1m; S=0,05m; f_2=0,8; g=9,81m/s^2; $\psi_б$=45°; β=125°; μ=30°; φ=30°; W=18%, γ=30°; q_0=1·10^6 H/m^3, according to calculations, the resistance of the leveling device at a speed of 1,67-2,5 m/s (6-9 km/h) is in the range of 2,30-2,38 kN/m

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