Motivation Parameter Hinge Plate Plow to Vegetable-Growing Tractor Ttz-100sp

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ABSTRACT In the article are brought results called on research work on motivation of the distance on vertically from footprint before lower axis hang up plow to tractor TTZ-100SP.In this direction on the basis of tractors of the Tashkent tractor plant the multifunction vegetable-growing tractor of class 1.4-2 TTZ-100SP with wheel formula 4x4 is created.

KEYWORDS.TTZ-100SP tractor, corner, line, draft, plow, hinge plate, suspension, vegetable-growing, method, agro culture, vertical, horizontal.

I. INTRODUCTION

For the fullest satisfaction of need of the population of the country to food products in recent years in the Republic of Uzbekistan much attention is paid to development of vegetable growing and melon growing. In this direction on the basis of tractors of the Tashkent tractor plant the multifunction vegetable-growing tractor of class 1.4-2 TTZ-100SP with wheel formula 4x4 is created. Now in UZMEI, UZNIIOBKIK and JSC BMKB-Agro cars research and design works on development of domestic farm vehicles to this tractor are conducted.

II. SIGNIFICANCE OF THE SYSTEM

In the article are brought results called on research work on motivation of the distance on vertically from footprint before lower axis hang up plow to tractor TTZ-100SP. 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

Some of these shortcomings were eliminated later in the models of Johnson and Carlson [1]. Using also the equation of conservation of momentum and assuming that the velocity distribution in the boundary layer obeys a logarithmic law, the authors obtained an expression for the friction parameter for the case of fully expressed roughness. However, since the equations were integrated during the wave period, detailed (within the wave cycle) changes in tangential stresses and phase shifts between the maxima of the orbital velocity and tangential stresses were not described. In addition, changes in the boundary [2] layer over time were considered negligible and the integration constant was determined from experimental data.

IV. METHODOLOGY

Results of the carried-out research works on justification of distance down from a basic surface of a plow to its lower axis of a suspension are given in the present article.

IN ACCORDANCE WITH GOST 10677-2001 [1] for ensuring deepening of plows on the set depth and uniformity of their course at this depth the tilt angle of α_y (fig. 1) of their conditional line of thirst in the longitudinally vertical plane, i.e. the πO line passing through the instant center of rotation (ICR) of a plow and a projection of its

lower axis of a suspension to the basic surface of the tractor for the horizon should not exceed an allowable limit, i.e. $\alpha_y \leq [\alpha_y]$ (where $[\alpha_y]$ is permissible value of a tilt angle to the horizon of the conditional line of draft of a plow).

From the scheme in fig. 1

$$\alpha_y = \text{arctg}\,\frac{H_n}{L_n},$$

Where, Hn – distance down from the basic surface of the tractor to instant center of rotation plow, m;
Ln – distance across from a projection of the lower axis of a suspension of a plow on the basic surface of the tractor to its instant center of rotation, m.
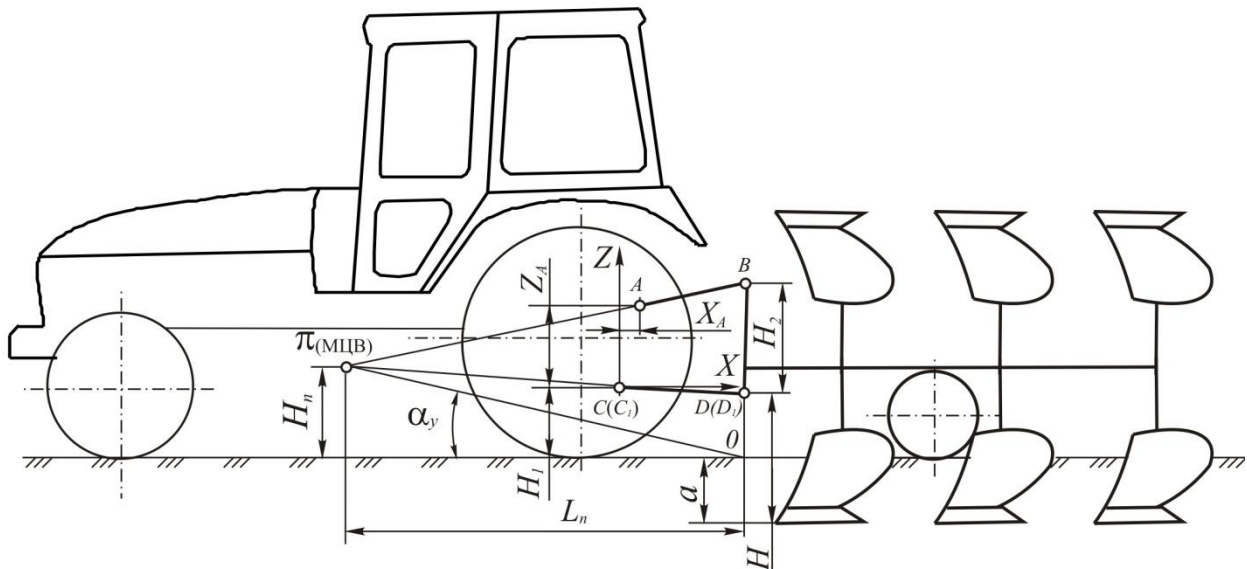

Fig. 1. The scheme to definition of a tilt angle of the conditional line of thirst of a plow for the horizon

V. EXPERIMENTAL RESULTS

Using methods of analytical geometry [2] in (1) Hn and Ln we will express through the sizes of a hinge plate of a plow and the hinged device of the tractor and we will receive.

$$\alpha_y = arctg\left\{\left[H_1 - \frac{X_A(H_2+H-H_1-a)-Z_A\sqrt{l_n^2-(H_1+a-H)^2}}{(H_2-Z_A)\sqrt{l_n^2-(H_1+a-H)^2}-X_A(H_1+a-H)}\times(H_1+a-H)\right]:\right.$$

$$\left.:\left[\left|\frac{X_A(H_2+H-H_1-a)-Z_A\sqrt{l_n^2-(H_1+a-H)^2}}{H_2-Z_A-X_A\dfrac{H_1+a-H}{\sqrt{l_n^2-(H_1+a-H)^2}}}\right|+\sqrt{l_n^2-(H_1+a-H)^2}\right]\right\}$$

Where, H_1 – distance down from the basic surface of the tractor to front hinges of the lower drafts of the hinged device of the tractor, m;

Z_A, X_A – according to distance on a vertical and a horizontal between front hinges lower and top drafts of hinged devices of the tractor, m;

H_2–distance down between the lower and top axes of a suspension plow, m;

a – depth of plowing, m;

N – distance down from a basic surface of a plow to its lower axes of a suspension, m;

l_n – length of the lower longitudinal links of the hinged device of the tractor, m.

Follows from the analysis of expression (2) that the tilt angle to the horizon of the conditional line of draft of a plow depends on sizes H and H_2 of its hinge plate and the sizes H_1, ln, Z_A, X_A of the hinged device of the tractor and also depth of plowing and. As the sizes of the hinged device of the tractor and H_2 size of a hinge plate of a plow are standardized and are set [1] for the set processing depth the required tilt angle of the conditional line of thirst of a plow for the horizon is provided due to change of size H of a hinge plate of a plow.

Accepting in accordance with *GOST 10677-2001* and to the *TTZ-100SP H1* tractor = 50 cm, H2 = 57 cm, ZA = 45.7 cm, XA = 21.0 cm and ln = 85 cm and also depth plowing and = 25 cm in fig. 2 according to (2) the schedule of change of α_y depending on N. is constructed of the analysis of this schedule follows that with increases in size H of a hinge plate of a plow the tilt angle of the conditional line of thirst for the tractor decreases.
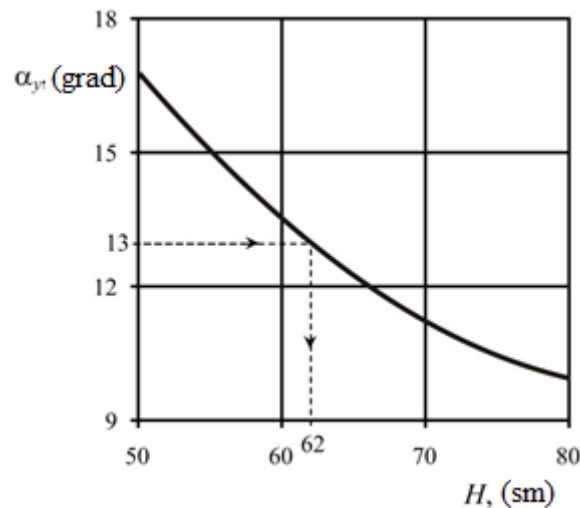
IN ACCORDANCE WITH GOST 10677-2001 for the plows aggregated with class 1.4-2 tractors, the tilt angle to the horizon of their conditional line of draft should not exceed 13. Proceeding from it from fig. 2 we define that the distance down from a basic surface to the lower axis of a suspension of the plow developed to the TTZ-100SP tractor has to be not less than 62 cm. However as showed the carried-out graphic-analytical calculations at $H>70$ sm raising of the hinged device of the TTZ-100SP tractor at full capacity of a rod of its hydraulic cylinder is impossible because of calling of the back hinge of the top draft the tractor zone occupied with a container compartment with the installed accumulator batteries. Therefore it is possible to accept size H of a hinge plate of a plow within 62-70 sm.

VI. CONCLUSION AND FUTURE WORK

Thus on the basis of the conducted researches it is possible to note that the distance down from a basic surface to the lower axis of a suspension of the plow developed to the TTZ-100SP tractor has to be within 62-70 sm.

REFERENCES

[1]. GOST 10677-2001 "Device hinged back agricultural tractors of classes 0,6-8. Types, key parameters and sizes". – Minsk, pp 10, 2001.
[2]. VygodskyM.Ya. Reference book on the higher mathematics. – Moscow: Science, pp 872, 1972.