produced new universal stationary dressers continuous action inertial friction-type CGP CGP-4-10. Dressers carry dosing, distribution and processing of its seeds nerozpylenym liquid drug with a single working body. These machines implement the process of applying liquid preparations for seed crops due to inertial forces and the use of lateral surface caryopsides as working. As a result, the comparative evaluation of the main technical, technological and operational indicators of various types of dressers can be concluded distinct advantage dressers developed inertial friction-type.

Employees of the department (doc. YO Gumenyuk) studies the dynamics of movement tillage machines, including the adaptation of workers to the soil conditions.

Under the guidance of Professor Voytyuk DG started the study of electromagnetic radiation kraynovysokochastotnoho EHF range on biological objects and study of the physical mechanisms that underlie resonance absorption of information and the impact of microwaves on plants.

Paid great attention to research the history of agricultural machinery, agricultural machinery, engineering philosophy as science and scientific heritage of Ukrainian scientists and technology. Thus, under the direction of Professor DG Voytyuk analyzed the history of the construction of the plow, investigated the activities of prominent scientists in the fields of agricultural mechanics, agricultural mechanization and engineering.

Pryvedeny Main results of scientific-technical activity and ynnovatsyonnoy LAST desyatyletye for the functioning of the department.

Science, Technique, Research, Innovation, Chair.

The basic results of scientific, technical and innovative activity for the last decade of functioning of department are resulted.

Science, machinery, researches, innovations, department.

UDC 631.356.2

Excavation of root crops improvements Vibrating digger ACTION

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Mathematical model of a vibrating digging roots. There vibrate mode, in which

provided accelerated out of root from the soil, which makes it possible to reduce the length of the blade and is an additional factor reducing traction resistance when digging.

Root, soil, digging, working body ploughshare (wedge) resistance, vibration.

Formulation of the problem. Recently, vibrating machines, vibrating and working bodies is widely used in various industries, including the agricultural engineering [1-4].

Analysis of recent research. In scientific literature provided a common approach to the analysis and design of vibration machines, observed benefits of active working body interaction with the environment that is treated, but the reasons for these preferences are not always sufficiently understood. In [5] The possibility of reduction traction resistance to vibration using the example of the working body of the wedge (blade) as part of the basic and advanced digger of root crops, shaped brackets [6]. Mathematical model of cutting soil wedge, moving uniformly in the horizontal direction is given in [7], where the analysis of the relative motion of the volume of soil, which interacts with a wedge, Euler's theorem applied to continuous medium, making it possible to determine the forces that arise in the "wedge-ground."

However, the impact of vibration on the process of removal of root from the soil and the nature of vibration is not entirely clear, because the purpose of research is to create a mathematical model of the process of vibration digging and recommendations of its practical application.

Results. Interaction of vibrating the wedge of soil carried by the design model, shown in Fig. 1. Scheme provides that the wedge is moving in the horizontal direction, has also harmonic oscillations in the direction of the axis OY. It is assumed that for small amplitude ($a = 2...3$ mm) and sufficiently high frequency ωWhich can be realized based on technical and economic opportunities, clipped soil will perform oscillations with a wedge, and the state will get clipped pulse pushes from below, in the direction of the axisOY, and relative (along) a vibrating surface soil will move with the same relative speed as the surface of the wedge, whose fluctuations are absent. Analytical studies have confirmed that in one period of oscillation wedge only a fraction of that time will be in contact with a clipped layer of soil, and only at this time there is a resistance movement, which is significantly lower than in the case of motion, "passive" wedge.

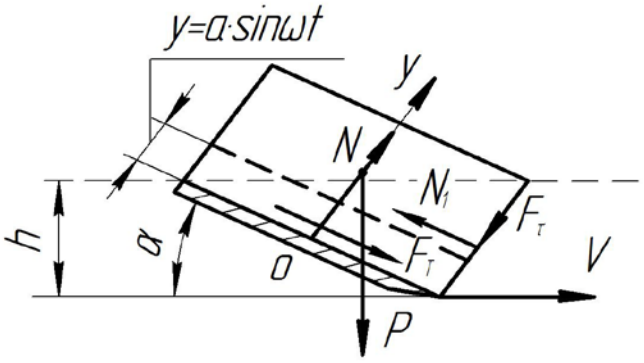

Fig. 1. Scheme of interaction of soil with vibrating wedge.

Consider the effect of vibration on the wedge excavation of root traits. 1. Given that the array is on a wedge of soil in volume, closed with staples side struts and front and back - ground, which does not directly interact wedge conclusions obtained based on the hypothesis of solids, can be extended to the case of homogeneous wet sandy clay soil or plastic. Real ground is more heterogeneous environment that shaped weather and climatic conditions, the top layer of his uschilnyuyuchys changed in the process of growth in its roots. It is easy to predict that the impact of vibration pushes the wedge on the lower part of the array of soil will thicken, and the rest rozkryshuvatymetsya. Elm aggregate between different parts and roots will thus break, which improves the exit to the surface. At the beginning of excavation of root pidrizuyetsya wedge and vibration with every push wedge it as a solid body, will move in the direction of vibration, more vyshtovhuyuchys from the soil, which rozkryshuyetsya. If the wedge has a sufficient length, the root of the staples after completely freed from interacting with it soil. This conclusion can be reached, considering the array of soil movement on the wedge and the movement of beet received after the shock of the wedge (Fig. 2).

Theoretically exit to the surface of root can be divided into two stages. In the first stage the soil and roots, having suffered the shock of the wedge bottom, become equal speed in the direction of vibration of the wedge:

$$V_0 = a \cdot \omega + V \sin \alpha, \qquad (1)$$

where: $a\omega$ - Maximum relative velocity of the wedge; V - Speed of the tractor.

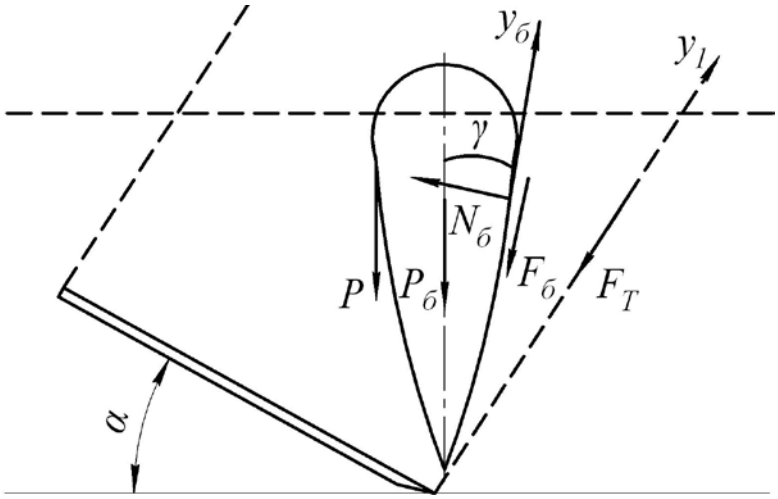

Fig. 2. Scheme of forces acting on the roots and soil on the array wedge after wedge of shock.

The experience of the operation of the wedge, rozkryshenyy soil does not escape from the shock, but intense shear forces halmuyuchys F_T for one oscillation actually moves in the direction of fluctuations in the distance:

$$\Delta y = a + V \cdot 0,25T \sin\alpha. \qquad (2)$$

After the shock beets can separate from the panel, which held back the power F_T the line of cleavage. Differential equations of motion along the axis of beet $y_б$ will look like:

$$m_б \ddot{y}_б = -P_б \cos\gamma - F_б, \qquad (3)$$

where: $F_б$ - Friction; and it will define the equation

$$F_б = f \cdot N_б = f \cdot P_б \sin\gamma. \qquad (4)$$

Then $m_б \ddot{y}_б = -P_б \cos\gamma - f \cdot P_б \sin\gamma,$ which makes it possible to calculate the movement of root for the time during which the wedge make new variations and will next push.

The second phase is due to digging of root shock, which is not provided pidrizayuchym wedge and ground. For this situation, conventional scheme of forces acting on beets shown in Fig. 3. The dynamic pressure of soil on beet defined as

$$F = \frac{\gamma_{об}}{g} S_{np} \cdot V_к^2, \qquad (5)$$

where: $\gamma_{об}$ - Proportion of the soil; S_{np} - Beet area projection on the plane of the wedge; $V_к$ - Speed wedge in the direction of vibration.

normal reaction N, Coulomb friction F_T and dynamic pressure F conventionally shown in Fig. 3. These forces are actually distributed throughout the side surface beet which was adopted by the cone diameter d, height h and obliquity γ. Further strength F_T and N we

assume resultant dynamic pressure of the wedge beet (beet on the left) and the jet pressure of soil on beet case.

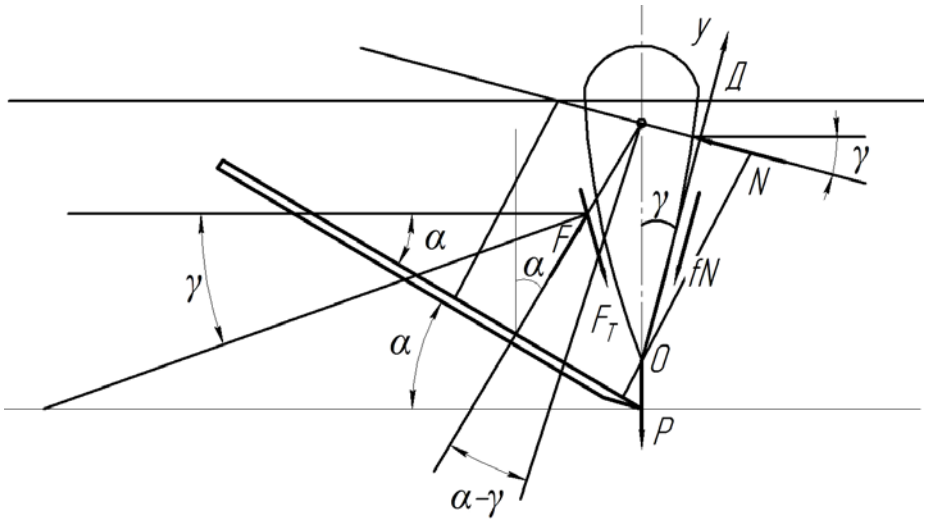

Fig. 3. Scheme of forces acting on a vibrating digging for roots.

Under the influence of forces F and N beet will vyshtovhuvatysya, and the friction forces arise F_T and N_T, which are defined as follows:

$$N_T = f \cdot N; \qquad F_T = f \cdot F \cos(90^o - \alpha - \gamma). \tag{6}$$

Assuming that the beet digging will move along the line OD, consider the balance of power in the direction of the force N.

$$N - F \sin(\alpha - \gamma) - F_T \sin 2\gamma - P \sin \gamma = 0, \tag{7}$$

or given formula (6), we find:

$$N = F\left[\sin(\alpha - \gamma) + f \cos(90^o - \alpha - \gamma)\sin 2\gamma\right] + P \sin \gamma.$$

Differential equations of motion in the direction of the axis of beet OY becomes:

$$m\ddot{y} = F \cos(\alpha - \gamma) - P \cos \gamma - f\, N - F_T \cos 2\gamma. \tag{8}$$

In determining force F be aware that the wedge when interacting with a ground speed:

$$\dot{y} = a \cdot \omega + V \sin \alpha,$$

then

$$F = \frac{\gamma_{об}}{g} S_{пр} \left[a \cdot \omega + V \sin \alpha\right]^2. \tag{9}$$

Integrating equation (8) on the basis of expressions (7) and (9) an opportunity to get one of root movement impulse transmitted soil. As follows from the above calculations, the vibration of the wedge in the direction perpendicular to its surface, provides, in addition to lifting the soil at a given height, even pushing him to the surface of root. In this way a wedge that makes vibrations vykopuvatyme root rather than passive wedge, and its length can be reduced. With this modification of the

working body shaped staples will interact with less soil, resulting in reduced resistance to its movement.

Conclusion. The mathematical model of vibration digging of roots allows for specified characteristics fluctuations efficiently alter the geometric characteristics improved digger Root shaped staples, including reducing the length of the blade pidrizayuchoho. The consequence of this change is an additional reduction of traction resistance digger shaped staples at digging roots.

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Proposals matematycheskaya process model vybratsyonnoho vыkarыvanyya korneplodov. Predusmotren vibration mode, when Kotor obespechyvaetsya uskorennыy vыnos korneploda IZ soil, something daet Ability umenshyt dlynu Lemekh, and serve dopolnytelnыm Resistance Reduction factor at vыkarыvanyy.

Korneplod, Soil, Vыkarыvanye, Rabochy body Lemekh (wedge), Resistance, Vibrate.

It is given a mathematical model for root crops digging vibrating process. It is used such vibration mode, which provides a rapid removal of root crops from the soil. This makes it possible to reduce the length of the blade, which is an additional factor in resistance reducing during the digging process.

Root crop, soil, digging out, working body, wedge bar, resistance, vibration.

UDC 338.433.4

Features Formation ЭFFEKTYVNOHOVTORYCHNOHO market PODERZHANNOY SELSKOHOZYAYSTVENNOY techno complex in AHROPROMЫSHLENNOM

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In Article pryvedenы Basic principles and motivation creation and the formative vtorychnoho market poderzhannoy technics in ahropromыshlennom complex.

Motivation, Update, respondentы, modernization, poderzhannaya technics, MONITORING, hospodderzhka, portals, information.

Production problems STATUS tractor fleet (ICC) AIC Russia and Republic of Belarus vыdvyhaet vazhneyshuyu task of development and bыstreysheho Almost Using vtorychnoho market poderzhannoy selskohozyaystvennoy technology. So in Russia AIC Volume tractor fleet sostavljaet prymerno 50% of technological and normatyvnoy the needs, yznos

Technics ripened 70-75% from deystvuyuscheho park. Obespechennost AIC country on tractors snyzylas 2.9 times over-harvesting zernouborochnыm 3.5 times, on kormouborochnыm 4 times [1].

Reduction park selskohozyaystvennoy technics, growth fyzycheskoho yznosa and moral conduct for abuse tehnolohycheskyh processes, production Reduction obъemov selskohozyaystvennoy production Increase ee sebestoymosty Reduction and competitiveness. For Improvement Measures pervoocherednыe situation neobhodymы Manual for Protection Against otechestvennoho market selskohozyaystvennoy technology. But This process us one year.