7. Bereka AM ozonation efficiency of grain in strong electric fields / OM Bereka, S. Usenko // Scientific Bulletin of National University of Life and Environmental Sciences of Ukraine. - 2010 - Vol. 148 - S. 92-97.

Abstract.*Predstavlenы results of the study on barley Effect humidity concentrations of ozone in the pod zernovoy Mass action of strong electric fields and razrabotannuyu nomohramu for definitions of time, neobhodymoho to implement the Effective dozы obezzarazhyvayuscheho obrabotku barley.*

Keywords: sylnoe the electrical field obezzarazhyvayuschee obrabotku, zernovaya Massa, nomohramma dose obrabotku, ozone, Exposition obrabotku

Annotation.*Results of the study of the effect of moisture barley in the amount of ozone in the grain mass under the action of strong electric fields and nomohramu designed to determine the time required to ensure effective dose of disinfecting treatment of barley.*

Key words: strong electric field, disinfecting processing, grain weight, nomogram dose treatment, ozone exposure treatment

UDC 693,546

SYNTHESIS CAM DRIVE MECHANISM ROLLER MOLDING INSTALLATION WITH COMBINED DYNAMIC DRIVING MODE

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Abstract.*The design roller molding installation with cam drive mechanism and built the cam profile for the combined dynamic mode reciprocating molding cart.*

Keywords: roller molding installation mode motion cam, drive

Formulation of the problem. In installations roller forming concrete products during their work there are significant dynamic loads in elements of the drive mechanism and the elements forming carts[1-6]. Despite the rather extensive study of the process of forming concrete products bezvibratsiynym roller method [13]So far not been investigated dynamics of forming the trolley and its impact on the development. Few paid attention to driving mode and molding cart efforts arising in the elements of the drive mechanism.

Analysis of recent research. The existing theoretical and experimental research machines roller forming concrete products proved their design parameters and performance [1-3]. However, not enough attention is paid to study acting dynamic loads and modes movement, which largely affects the operation of the installation and the quality of the finished product. During the regular puskohalmivnyh modes of movement there are significant dynamic loads in elements of the drive mechanism and the elements forming the trolley, which can lead to premature failure of the installation [1-6]. So important is the task of improving the drive mechanism roller molding installation to ensure this mode of movement forming a trolley in which decreased to dynamic loads in elements of installation and increased durability.

The purpose of research is improving the design of the drive mechanism roller molding installation to improve its reliability and durability.

Results. For roller molding installation with earthen advisable to have constant speed reciprocating forming carts throughout the area that would have a positive impact on the quality of the finished product. However, in practice such a regime can not make a motion because it lacks plot acceleration and braking, without which there can be cyclical movement. It is therefore proposed to implement a regime of movement during its formative cart moving from one extreme position to another, which would be the areas of acceleration and deceleration with minimal dynamic loads and site traffic at a constant speed.

Accepting the movement forming a trolley from one extreme position to another $t_з$It can be divided into three parts: the acceleration time - t_p; a steady movement - t_y; braking - $t_г$. To ensure earthen molding cart at a constant speed on most of its working stroke take a steady traffic, for example, $t_y = \frac{2}{3} \cdot t_з$Then, wondering condition equal time acceleration and braking, they can determine the appropriate expressions: $t_p = \frac{1}{6} \cdot t_з$ and $t_г = \frac{1}{6} \cdot t_з$.

The process of acceleration and braking molding cart invited to perform at their optimal dynamic mode motion [7]. The rate of change of the trolley mold smoothly without creating significant dynamic loads in the installation and jerk has a constant value, which in turn positively affects the durability of the installation.

With optimal dynamic overclocking mode of forming the trolley from rest to enter the steady movement coordinate displacement, velocity, acceleration and jerk his center of mass described by equations [7]

$$x_p = x_{0p} + \dot{x}_y \cdot \left(\frac{t^2}{t_p} - \frac{t^3}{3 \cdot t_p^2} \right); \qquad \dot{x}_p = \dot{x}_y \cdot \left(2 \cdot \frac{t}{t_p} - \frac{t^2}{t_p^2} \right);$$
$$\ddot{x}_p = 2 \cdot \dot{x}_y \cdot \left(\frac{1}{t_p} - \frac{t}{t_p^2} \right); \qquad \dddot{x}_p = -\frac{2 \cdot \dot{x}_y}{t_p^2} = const, \tag{1}$$

where: x_{0p} - Coordinate the initial position of the center of mass of the trolley during acceleration; t - Time; t_p - The length of acceleration forming the trolley from rest to enter the steady movement; $\dot{x}_y$ - Speed of the molding to cart steady.

At steady state traffic molding cart coordinate movement and speed of its center of mass described by equations [7]

$$x_y = x_{0y} + \frac{(x_{1y} - x_{0y}) \cdot t}{t_y}; \qquad \dot{x}_y = \frac{(x_{1y} - x_{0y})}{t_y} = const; \qquad \ddot{x}_y = 0; \qquad \dddot{x}_y = 0, \tag{2}$$

where: x_{0y} and x_{1y} - Coordinates of initial and final provisions Center weight trolley with steady motion; t_y - The duration of the steady motion.

In dynamic mode optimum braking molding cart after steady movement to a complete stop coordinate displacement, velocity, acceleration and jerk his center of mass described by equations [7]

$$x_г = x_{1г} - \dot{x}_y \cdot \left(\frac{2}{3} \cdot t_г - t + \frac{t^3}{3 \cdot t_г^2} \right); \qquad \dot{x}_г = \dot{x}_y \cdot \left(1 - \frac{t^2}{t_г^2} \right);$$
$$\ddot{x}_г = -2 \cdot \dot{x}_y \cdot \frac{t}{t_г^2}; \qquad \dddot{x}_г = \frac{-2 \cdot \dot{x}_y}{t_г^2} = const, \tag{3}$$

where: $x_{1г}$ - Coordinate the final braking process; $t_г$ - Braking duration since the steady movement to a complete stop.

In (1) - (3) coordinate the initial position of the center of mass of the trolley during acceleration x_{0p} coordinate and final braking process $x_{1г}$ meet its extreme positions, but the unknown is the speed of movement $\dot{x}_y$ mold trolley to steady state, the initial coordinates x_{0y} and final x_{1y} provisions of the center of mass of the trolley during steady motion. divide move S forming a trolley from one extreme position to another in three areas: 1 - dispersal area, it corresponds to displacement S_p; 2 - steady traffic area, it corresponds to displacement S_y; 3 - part braking, it corresponds to displacement $S_г$. Subject dependencies (1) - (3) Expressions movement in each section can be represented as:

$$S_p = \int_0^{t_p} \dot{x}_p \, dt = \dot{x}_y \cdot \int_0^{t_p} \left(2 \cdot \frac{t}{t_p} - \frac{t^2}{t_p^2} \right) dt = \dot{x}_y \cdot \left(\frac{t^2}{t_p} - \frac{t^3}{3 \cdot t_p^2} \right) \Bigg|_0^{t_p} = \frac{2}{3} \cdot \dot{x}_y \cdot t_p ; \tag{4}$$

$$S_y = \int_0^{t_y} \dot{x}_y \, dt = \dot{x}_y \cdot t \Big|_0^{t_y} = \dot{x}_y \cdot t_y ; \tag{5}$$

$$S_г = \int_0^{t_г} \dot{x}_г \, dt = \dot{x}_y \cdot \int_0^{t_г} \left(1 - \frac{t^2}{t_г^2} \right) dt = \dot{x}_y \cdot \left(t - \frac{t^3}{3 \cdot t_г^3} \right) \Bigg|_0^{t_г} = \frac{2}{3} \cdot \dot{x}_y \cdot t_г . \tag{6}$$

Then look overall movement forming the trolley can be represented as:

$$S = S_p + S_y + S_г = \frac{2}{3} \cdot \dot{x}_y \cdot t_p + \dot{x}_y \cdot t_y + \frac{2}{3} \cdot \dot{x}_y \cdot t_г = \dot{x}_y \cdot \left(\frac{2}{3} \cdot t_p + t_y + \frac{2}{3} \cdot t_г \right). \tag{7}$$

Substituting the previous expression $t_p = 1/6 \cdot t_з$, $t_y = 2/3 \cdot t_з$, $t_г = 1/6 \cdot t_з$ and the amplitude of movement of the trolley from one extreme position to another $\Delta x = S$, We get:

$$\Delta x = \dot{x}_y \cdot \left(\frac{2}{3} \cdot \frac{1}{6} \cdot t_з + \frac{2}{3} \cdot t_з + \frac{2}{3} \cdot \frac{1}{6} \cdot t_з \right) = \frac{8}{9} \cdot \dot{x}_y \cdot t_з \quad \Rightarrow \quad \dot{x}_y = \frac{9 \cdot \Delta x}{8 \cdot t_з} . \tag{8}$$

Position coordinates forming the trolley that determines end areas of acceleration and top plot steady movement x_{0y} Can be determined from the expressions (4) and (8):

$$x_{0y} = \frac{2}{3} \cdot \dot{x}_y \cdot t_p = \frac{2}{3} \cdot \frac{9 \cdot \Delta x}{8 \cdot t_з} \cdot \frac{1}{6} \cdot t_з = \frac{1}{8} \cdot \Delta x , \tag{9}$$

and coordinate that defines the end of the steady traffic areas x_{1y} land and the start of braking can be determined from expressions (5), (8) and (9):

$$x_{1y} = x_{0y} + \dot{x}_y \cdot t_y = \frac{1}{8} \cdot \Delta x + \frac{9 \cdot \Delta x}{8 \cdot t_з} \cdot \frac{2}{3} \cdot t_з = \frac{7}{8} \cdot \Delta x . \tag{10}$$

Substituting (8) - (10) in equation (1) - (3) displacement amplitude and zadavshys molding cart $\Delta x = 0{,}4 м$ and a total time of its movement from one extreme position to another $t_з = 3 с$ Was calculated kinematic characteristics combined dynamic motion mode forming carts. The calculations graphs combined dynamic regime change movement (Fig. 1, a), velocity (Fig. 1b), acceleration (Fig. 1,) and jerk (Fig. 1, d) the motion forming a trolley from one extreme position to another. Turning the first equation expressions (1) - (3) for the case where the origin is measured from the middle position moving mold carts considering expressions (8) - (10) we get:

– the section of acceleration:

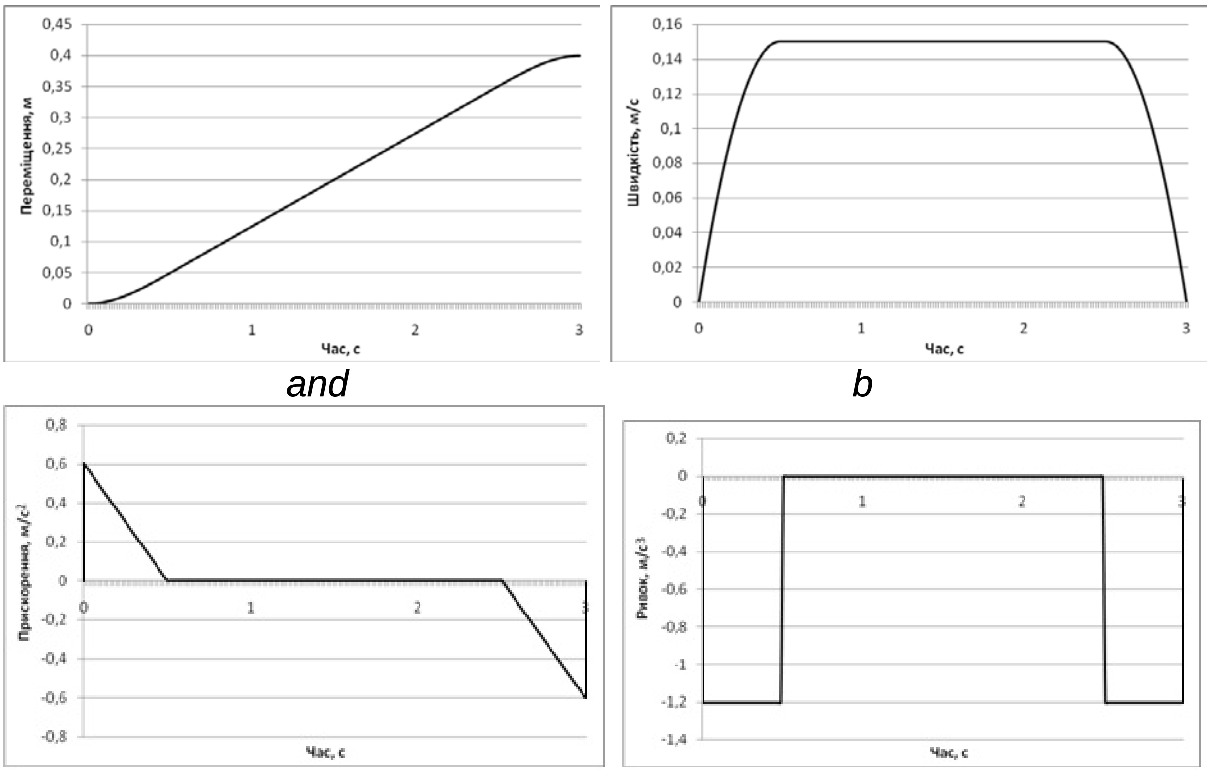
$$x_p = \frac{27}{4} \cdot \Delta x \cdot \left(1 - 2 \cdot \frac{t}{t_з} \right) \cdot \frac{t^2}{t_з^2} - \frac{\Delta x}{2} ; \tag{11}$$

– at the site of steady movement:

$$x_y = \frac{1}{8}\cdot\Delta x\cdot\left(1+9\cdot\frac{t}{t_з}\right)-\frac{\Delta x}{2}; \qquad (12)$$

– braking at the site:

$$x_г = \frac{\Delta x}{2}-\frac{9}{8}\cdot\Delta x\cdot\left(\frac{1}{9}-\frac{t}{t_з}+12\cdot\frac{t^3}{t_з^3}\right). \qquad (13)$$



and *b*

in *g*

Fig. 1. The schedule change movement - but speed - would accelerate - in and jerk - Mr. dynamically with the combined traffic molding cart.

The law of motion of the trolley described by equations (11) - (13) can be made with the drive cam (Fig. 2) reciprocating cart. This movement of the trolley in one direction is carried out by turning the cam 1 by half a turn (ie $\varphi=\pi$) And in the opposite direction for another half a turn; full cycle of movement of the trolley - for one rotation of the cam. The implementation of the law described the movement of the trolley is necessary to increase the radius of the cam consistent rate of movement of the trolley. According to the variable cam radius is determined by the relationship:

– the section of acceleration:

$$\rho = \frac{b}{2}+\frac{27}{4}\cdot\Delta x\cdot\left(1-2\cdot\frac{t}{t_з}\right)\cdot\frac{t^2}{t_з^2}-\frac{\Delta x}{2}; \qquad (14)$$

– at the site of steady movement:

$$\rho = \frac{b}{2} + \frac{1}{8} \cdot \Delta x \cdot \left(1 + 9 \cdot \frac{t}{t_{з}}\right) - \frac{\Delta x}{2}; \qquad (15)$$

– braking at the site:

$$\rho = \frac{b}{2} + \frac{\Delta x}{2} - \frac{9}{8} \cdot \Delta x \cdot \left(\frac{1}{9} - \frac{t}{t_{з}} + 12 \cdot \frac{t^3}{t_{з}^3}\right), \qquad (16)$$

where: b - The distance between the pushers 2 (Fig. 2).

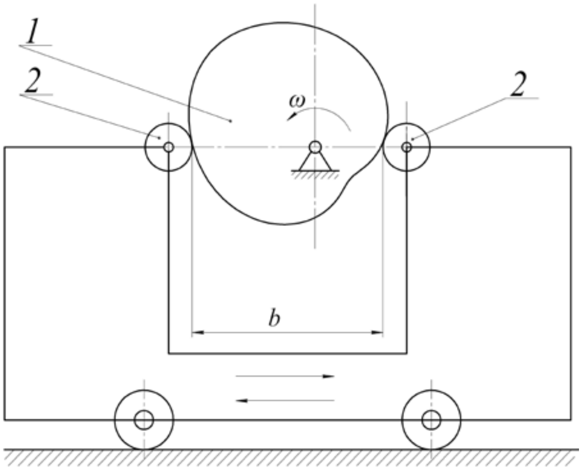


Fig. 2. Scheme of the cam mechanism driven reciprocating cart.

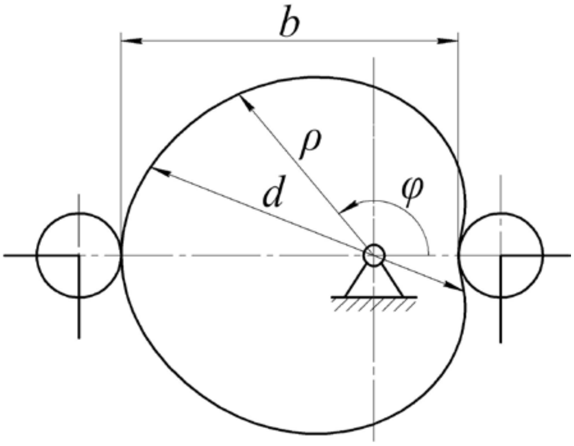


Fig. 3. The cam profile which implements the dynamic mode of movement combined molding cart.

Time t You can exclude from the dependencies (14) - (16) as $t = \varphi/\omega$ and $t_{з} = \pi/\omega$. Here φ - Angular coordinate rotation cam, and ω - Angular velocity of the cam. Since the time of acceleration determined dependence molding cart $t_p = 1/6 \cdot t_{з}$, The acceleration process will be carried out when turning the cam angle in between $\varphi = 0$ to $\varphi = \pi/6$; a steady movement - $t_y = 2/3 \cdot t_{з}$ Then steady movement of the trolley will be provided for the rotation of the cam angle between $\varphi = \pi/6$ to $\varphi = 5\pi/6$; braking - $t_{г} = 1/6 \cdot t_{з}$ While braking process will be carried out when turning the cam angle in between $\varphi = 5\pi/6$ to $\varphi = \pi$. After appropriate transformations radius cam that describes its profile is associated with an angular coordinate the following expression:

$$\rho = \frac{b}{2} + \frac{27}{4} \cdot \Delta x \cdot \left(1 - 2 \cdot \frac{\varphi}{\pi}\right) \cdot \frac{\varphi^2}{\pi^2} - \frac{\Delta x}{2}, \qquad 0 \le \varphi \le \frac{\pi}{6}; \qquad (17)$$

$$\rho = \frac{b}{2} + \frac{1}{8} \cdot \Delta x \cdot \left[1 + 9 \cdot \left(\varphi - \frac{\pi}{6}\right) \cdot \frac{1}{\pi}\right] - \frac{\Delta x}{2}, \qquad \frac{\pi}{6} < \varphi < \frac{5\pi}{6}; \qquad (18)$$

$$\rho = \frac{b}{2} + \frac{\Delta x}{2} - \frac{9}{8} \cdot \Delta x \cdot \left[\frac{1}{9} - \left(\varphi - \frac{5\pi}{6}\right) \cdot \frac{1}{\pi} + 12 \cdot \left(\varphi - \frac{5\pi}{6}\right)^3 \cdot \frac{1}{\pi^3}\right], \qquad \frac{5\pi}{6} < \varphi \le \pi. \qquad (19)$$

Similarly, the cam profile is determined by the section of its rotation π to 2π Which describes the radius changing dependencies:

$$\rho = \frac{b}{2} - \frac{27}{4} \cdot \Delta x \cdot \left[1 - 2 \cdot \frac{(\varphi - \pi)}{\pi} \right] \cdot \frac{(\varphi - \pi)^2}{\pi^2} + \frac{\Delta x}{2}, \qquad \pi \le \varphi \le \frac{7\pi}{6}; \tag{20}$$

$$\rho = \frac{b}{2} - \frac{1}{8} \cdot \Delta x \cdot \left[1 + 9 \cdot \left(\varphi - \frac{7\pi}{6} \right) \cdot \frac{1}{\pi} \right] + \frac{\Delta x}{2}, \qquad \frac{7\pi}{6} < \varphi < \frac{11\pi}{6}; \tag{21}$$

$$\rho = \frac{b}{2} - \frac{\Delta x}{2} + \frac{9}{8} \cdot \Delta x \cdot \left[\frac{1}{9} - \left(\varphi - \frac{11\pi}{6} \right) \cdot \frac{1}{\pi} + 12 \cdot \left(\varphi - \frac{11\pi}{6} \right)^3 \cdot \frac{1}{\pi^3} \right], \qquad \frac{11\pi}{6} < \varphi \le 2\pi. \tag{22}$$

To prevent strikes against the cam pushers when the direction of movement of the trolley described by equations (17) - (22) of the cam profile (Fig. 3) has a vision that in any position of the diameter d - Constant and equal to the distance between the pushers b **(**$d = b$**).**

To reduce the dynamic loads in elements of the installation and to improve its reliability invited to design the installation with a drive mechanism for dynamic mode combined reciprocating forming trolley (Fig. 4). Drivers designed as pivotally mounted on the portal of the cam in contact with pushers rigidly attached to the molding cart. Set contains mounted on a stationary portal molding cart 1 2, which contains the feeding hopper 3 and 4 ukochuvalni rollers and makes reciprocating motion in the guide 5 of the mold cavity 6. cart driven by reciprocating with two drives 7, attached to the portal 1 in two cam rotating at a constant angular velocity ($\omega = const$), But for different directions, and contact with two pushers 8 are rigidly connected to the trolley 2. Having two pushers 8 on each side molding cart 2 allows you to create a chain of hard power at its forward and reverse course.

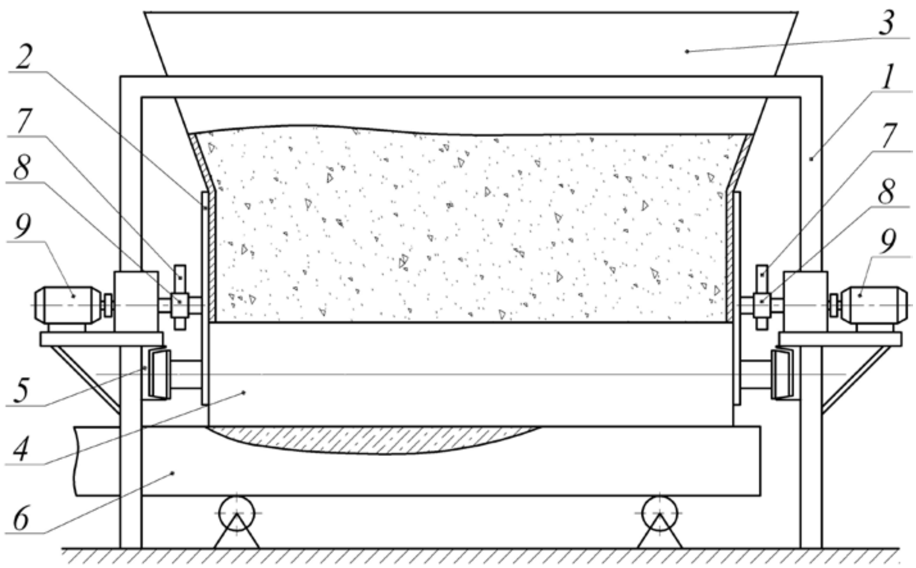


Fig. 4. Forming Roller unit with cam drive mechanism.

When used to install cam drive mechanism on each side forming it impossible cart axial distortion, increased surface quality of machined concrete mix, reduced dynamic loads in elements drive devastating reduces unnecessary load on the frame structure and accordingly increases durability installation as a whole.

Conclusions

1. As a result of research to increase the reliability and durability of roller molding installation design developed it over as a cam mechanism and cam profile built for dynamic mode combined reciprocating molding cart.
2. The construction molding installation with a roller cam drive mechanism on either side molding cart eliminating axial distortion, which in turn leads to improve the quality of the treated surface of the concrete mix, reducing dynamic loads in elements drive devastating reducing unnecessary loads on the frame structure and thus to improve the longevity of the installation as a whole.
3. The results may be useful in the future to refine and improve existing engineering methods for calculating the drive mechanism roller forming machine as the stages of design / construction and real operation.

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Abstract.*Constructions is designed rolykovoy formovochnoy installation with kulachkovыm pryvodnыm Mechanism and postroen Profil cam kombynyrovannoho to implement the Dynamic mode oscillating-motion postupatelnoho formovochnoy trolley.*

Keywords: rolykovaya formovochnaya setting mode motion, drives, cam mechanism

Annotation.*The design of roller forming installation with the cam driving mechanism is developed and the cam profile for providing the combined dynamic mode of back and forth motion of the forming cart is constructed.*
Key words: roller forming installation, movement mode, drive, cam mechanism

UDC 631.4 + 526 (075)

EVALUATION OF spatial heterogeneity of soil PLAIN-steppe

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Abstract.*The proposed evaluation of spatial heterogeneity of soil lowland areas with typical black earth. To justify its mistsevyznacheni used field data from the depth of the carbonate horizon in the soil profile. The concept of "heterogeneity factor" state of soil and the proposed procedure for its calculation. Practical use of "heterogeneity factor" is effective in implementing precision farming technology, with many years of agronomic research, and to adjust the detailed soil maps.*
Keywords: mikrozapadyny, ground cover, black, carbonate, rate heterogeneity

Formulation of the problem. Right-bank Forest Steppe in Ukraine on flat terrain unique role in shaping the landscape and soil cover mikrozapadyny play. Their nature and characteristics of the operation has not investigated [1], and importance in the formation of soil and its agricultural use underestimated [7-9]. Especially important to consider the role mikrozapadyn fields, where the long-term agronomic research. In Soil overwhelming emphasis on well visible in relief mikrozapadynam ("saucer") depth 1-2 meters. They examine the redistribution of moisture precipitation, moisture levels most of the surrounding valleys and plains territory, filtering ground water. Takes into account the complexity of agricultural production in these fields by prolonged waterlogging bottom and slopes of valleys and through different soil properties on their morfoelementah