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*In the state predlozhen teoretycheskyy podhod for yssledovanyya upravlyaemosty and ustoychyvosty dvyzhenyya mobylnoho selskohozyaystvennoho ahrehata, predstavlennoho in vyde dynamycheskoy systemы, modelyruyuschey His dvyzhenye, kotorыy yspolzuyut for optymyzatsyy protsessa upravlenyya. Эksperymentalnuyu metodyku yspolzuem for opredelenyya uhlov otklonenyya ahrehata in protsesse His rabotы and svoevremennoho obespechenyya optymyzatsyy parametrov upravlenyya.*

***Dynamycheskaya systema, parametrы, modelyrovanye, mobylnыy selskohozyaystvennыy ahrehat, upravlenye.***

*The article suggests theoretical approach to the study of controllability and stability of the motion of mobile agricultural units, presented in the form of a dynamic system, which simulates its movement used to optimize the management process. We use experimental methods to determine the angles of deflection of the machine during operation and timely provision of optimizing the control parameters.*

***Dynamic system parameters modeling, mobile agricultural units, management.***

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## CONDITIONS self-organization TRYBOSYSTEMY "The working body - SOIL"

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*The paper presents conditions samozahostryuvannya (self) blade-lapovyh working bodies tillage machines and set conditions for 5 samozahostryuvannya disk tillage machines working bodies.*

***Soil working body trybosystema, samozahostryuvannya.***

**Formulation of the problem.** In the process of cutting soil working bodies disk blade enters the ground with a large proportion loaded on the cutting edge. Under these conditions of a rapid blunting the edges of the working bodies, bringing the machine quickly loses efficiency.

**Analysis of recent research.** Research author [1] to 4 samozahostryuvannya conditions (self) business of tillage machines:

1. Radius Rk blunt cutting edge of the blade in the process do not exceed permissible Rd, due to the normal flow of the process of cutting the working masses.

2. The thickness of the base layer Knight shift should be as short as possible to ensure the necessary strength rigid layer:

$$Knight\ shift = \delta t K n \delta, \quad (1)$$

where: K - the ratio of strength solid layer, which may, depending on the properties of soil and hard alloy vary over a wide range (for blades clad sormaytom R = 1,0 ... 1,8).

3. Hardness HT wear resistant layer should be at an appropriate ratio of hardness bearing layer:

$$HT = KHn, \quad (2)$$

where K - coefficient that depends on the abrasive properties of soil (K = 1,2 ... 2,8).

4. Strengthen tend to be subject to the line and the blade is subjected to the least wear. If this condition is not fulfilled then the intensity of hard and soft wear layer aligned, which inevitably lead to a blunt blade. In some cases, strengthen hold on the other side of the blade for use on sandy loam and sandy soils.

In [2] expressed doubts as to the correctness of the wording of the fourth samozahostryuvannya conditions. In the US and Canada in certain soil and climatic zones (sandy loam and sandy soils) used for deposition surface that intense wear [1].

Four conditions samozahostryuvannya author [1] were established as a result of the research process, and the clutches of plowshares wear cultivators. Therefore, it is necessary to study the process of working wear circular to clarify the conditions samozahostryuvannya.

**The purpose of research** - justify working conditions samozahostryuvannya of disk tillage tools

**Results.**As noted above, studies V. Tkachev [1] to 4-blade samozahostryuvannya conditions lapovyh working bodies tillage machines. In subsequent studies [3] expressed doubts about the correctness of the 4 conditions samozahostryuvannya as four conditions are not considering all the factors that influence the occurrence and effect samozahostryuvannya require clarifications and additions to the working of disk tillage tools for the following reasons:

- These studies were conducted on the working bodies where the velocity of change in the abrasive mass is small and the speed of the tool with which it coincides in direction (ploughshare, paw cultivator) and during the period of wear load distribution is fixed in nature;
- Does not include the ability to change the type of wear (abrasive to abrasive and shock-shock vtomlyuvalne);
- The intensity of work wear disk tillage implements the order is less than the intensity of wear-blade lapovyh working bodies;
- Angle kryshinnya in working bodies disk tillage implements several times larger than the blade-lapovyh working bodies;
- Does not take into account the impact side and angle sharpening tools working orhanivdyskovyh tillage intensity of wear.

So 4 samozahostryuvannya conditions proposed by V. Tkachev [1] does not fully disclose the nature of forming blades working orhanivdyskovyh tillage tools. The analysis samozahostrennya conditions shows that 2 and 3, the condition is not in doubt, and 1 and 4 require clarifications and additions.

Yes 1 samozahostryuvannya condition states that the radius Rk cutting edge of the blade in the process should not exceed the acceptable value Rk.d caused by the normal flow of the process tillage. Thus limiting the thickness of the blade is blunt $h \leq 2Rk.d$. V. Tkachev said that thick solid layer of bimetallic RO to meet conditions 1 must meet $ht \leq 2Rk.d$ [1]. But this statement, in our view, a fair only if the four conditions samozahostryuvannya, ie when subject and strengthen the line of the blade is subjected to the slightest impact. For working orhanivdyskovyh tillage tools perform four conditions impossible. Strengthening the brink of an edge that is exposed to the least impact, leading to performance solid layer of viscous, and because of the working disk tillage implements high enough probability of dynamic loads, which will inevitably lead to oblomlyuvannya hardened surface. Previous studies have used reinforced layer of uniform thickness on the entire surface, and aggravation spent on the part softer and less durable material. To achieve the effect samozahostryuvannya in working bodies

disk tillage tools necessary to strengthen and sharpen both sides of the blade edge is more intense wear, ie the outer surface (Fig. 1).

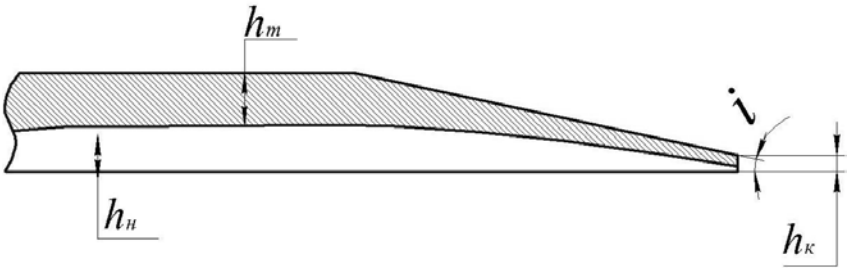


Fig. 1. Change the thickness of the carrier and the hardened layer: HT - hardened layer thickness, hn - thickness of the base layer, HK - cutting edge thickness, and - sharpening angle.

The thickness of the hardened layer should vary from the edge of the blade towards its increase. The thickness of the base layer should prevent protrusion strengthened and therefore it oblomlyuvannya.

Value thickness and hardened base layer is defined by the following conditions: the ratio of hardness and hardened bearing layers; the intensities working party wear orhanivdyskovyh tillage tools. In case of equal thickness ratio of the carrier and the hardened layer should be 1:

*Iim/Nm* = IV*t/IVm* = 1, (3)

Where: HT Nm and - according hardness and hardened base layer; IVt, IVm - in accordance with the intensity of wear and hardened base layer.

In the real world to achieve such a relationship is difficult, therefore, to determine the ratio of the thickness of the hardened layers and bearing wear, consider the intensity of the internal and external surfaces.

In the works of Khrushchev and MA Babichev [6] received directly proportional relationship between intensity and volume wear normal load:

*IV*= CN, (4)

where: s - proportionality factor that depends on the material properties and erasing properties of the abrasive surface.

Therefore, to identify the wear rate ratio of internal and external parties working orhanivdyskovyh tillage implements examine the interaction force working body in the operation of the ground, taking in mind that:

*Nsum / RΣ = IVt/IVm*And (5)

where RΣ - total load on the internal surface of the disc; Nsum - total load on the outer surface of the drive that needs to be strengthened.

As the experimental studies, the ratio Nsum / RΣ no clear changes of character and a wide range depending on the conditions (soil hardness, speed, radius of curvature, the diameter of the disk and so

on.). Accordingly, the design work of samozahostryuyuchyh disk tillage tools necessary to determine the initial parameters of the job and working conditions which will be of use. As noted above, an important value to determine the thickness and hardened bearing layers is the ratio of hardness. Given the variety of ways to strengthen and different ratio of hardness bearing and hardened layers should try to reduce the thickness of the base layer. To achieve the effect must be considered samozahostrennya initial angle sharpening job orhanivdyskovyh tillage tools. In the works of F. Strelbitskiy [4, 5] noted that two-layer blade sharpening at an angle 17˚ (corner sharpening homogeneous series of working bodies) was oblomlyuvannya edge blade protrusion through solid hardened layer of the bearing. To maintain the original sharpening angle must sharpen outside of the working orhanivdyskovyh tillage implements an angle of 28 ... 30° [3]. Thus, we specified the conditions for working samozahostrennya of disk tillage tools are the following:

- The ratio of the thickness of the reinforced base layer and a lifetime must provide the following condition: the radius of blunting be less acceptable range, which is due to the normal flow process (Rk <Rk.d.). For disk tillage implements this condition can be realized by changing the thickness of the hardened layer from the edge of the base drive to equalize wear hardened layer of the bearing to preserve the original shape;
- A base layer thickness should be as short as possible, while providing the necessary increase strength hardened layer;
- Strengthening and aggravation shall be subject to the working surface of the blades, which wear out more quickly;
- Hardness hardened layer should be at an appropriate ratio ((1,4 ... 1,8): 1) a base layer hardness depending on the abrasive properties of soil;
- Sharpening the blade angle must be at i = 28°... 30°.

**Conclusion.** As you can see for job of disk tillage tools necessary to satisfy the conditions of 5, the second and the third condition suggested by V. Tkachev for blade-lapovyh working completely fair and working bodies disk tillage implements, the first condition is somewhat refined and 4 opposite condition is reversed.

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*In the work predstavlenы terms samozatachyvanyya lemeshno-workers lapovыh organs soil-cultivating machines installed and 5 uslovyy for workers samozatachyvanye dyskovыh organs soil-cultivating machines.*

***Soil, Rabochy body trybosystemы, samozatachyvanye.***

*The paper presents the conditions of self-sharpening plow-tine working organs of tillers and set the conditions for self-sharpening 5 disk working organs of tillers.*

***Soil, working part, tribosystem, self-sharpening.***