

EDGELESS FLAT PLOWING STEP PLUG WITH DISK ANGLE CUTTER

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Received: November 03, 2023; Accepted: November 04, 2023; Published: November 06, 2023;

Abstract: The article presents information about the construction scheme of the step-shaped plow with a disk-shaped angle cutter, designed to prepare the soil for plowing without an edge in one pass, and the technological process it performs.

Key words: flat ploughing, disc harrow, step plough, open plow, marza, ploughshare, aggregate, zaplujnik, technological process, energy and resource.



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High-quality plowing of the land and timely and high-quality execution of the technological processes are of great importance for obtaining abundant harvests from agricultural crops. After all, a high-quality plow creates a thorough ground for next year's harvest. In order to achieve high-quality and high-yield plowing of land, tractors and plows must be prepared and adjusted in advance, and fields must be prepared for plowing, and plowing must be properly organized.

Data and their analysis. On the surface of the plowed field based on the existing traditional land tillage technology, open fields and fields are formed. According to the results of the conducted research, on the surface of the plowed field there are piles (marza) with a width of 120...150 cm, a height of 28...30 cm and open fields with a width of 120...210 cm and a depth of 30...36 cm (ditches) are formed. Open fields in the field worsen the working conditions of machine-tractor units, increase the resistance of machines and weapons, make harvesting difficult, and do not allow the units to work at high speed. Open fields, especially on slopes, lead to the development of water erosion. The plow layer in open fields and marshes is very different from the plow layer in flat plowed lands and has a great impact on the development and productivity of plants. In addition, the seeds are not buried well in the area of open meadows, as a result of which their germination and development deteriorates. It is known from the experiments that wheat productivity decreases by 30-40% in the 3 m wide area of the open field.

According to the inspections, the total surface of open fields and marzas, which have a negative impact, is from 6.5% to 19.5% of the total surface of the field.

Aggregates are passed over the surface of the field 2-4 times in order to smooth out unevenness in the area of open fields and marshes, and to fully prepare the land for planting. However, it is not possible to level the surface of the earth with this method. In irrigated areas, unevenness formed after plowing is leveled with special machine-grader blades GN-2,8 and GN-4. In addition, it is required to carry out field leveling with a long-base leveler P-2.8A every three years. As a result, under the influence of the walking parts of heavy tractors and tillage machines, the soil is compacted, its physico-chemical properties, water and air exchange processes deteriorate, productivity decreases,

productivity decreases up to 12...30%, due to the rapid decomposition of organic matter the erosion process increases.

Additional processes for leveling the field surface, along with increasing expenses, significantly lengthen the period of preparation of the field for planting, lead to rapid drying of the soil and additional water consumption.

When the flat plowing technology is used, the above-mentioned negative aspects are eliminated, borders and ridges are not formed on the field surface, the flatness of the field surface is preserved, additional work is not performed to prepare the land for planting, favorable conditions are created for the next technological process, labor productivity increases. increases, the time until planting the second crop is significantly reduced, energy and resources are saved, moisture accumulation in the soil layer receiving root nutrients is improved, soil is protected from water and wind erosion, productivity increases by 3...7%, simultaneously with plowing it is also possible to carry out planting work, there will be a chance to harvest twice from the land.

According to the research carried out in the world practice, one of the important ways to improve the quality of plowing in soil cultivation, reduce energy and resource consumption, and increase work productivity is to create and use flat plow plows.

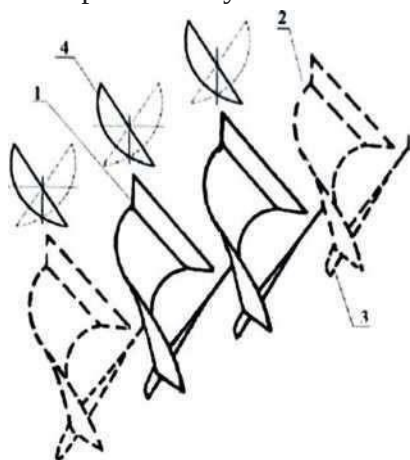


Figure 1. Construction scheme of a step-shaped plow with a disc-shaped angle cutter for flat plowing. 1 - ploughshare, 2 - turner, 3 - zaplujnik, 4 - disk angle cutter.

A unique feature of the step-shaped plow with flat plowing is that the soil plow is laid in its place by turning it completely 180° without moving the center of gravity transversely. When the soil plows are turned over, the surface of the plow is flat, there are no heaps and open fields. It is possible to create complex aggregates, embodied on the basis of technical tools based on the technology of flat plowing, by turning the center of gravity of the soil blade 180° without shifting it to the transverse direction, performing several technological processes in one pass. In the conditions of Uzbekistan, it is advisable to use flat plows on a large scale, especially in the cultivation of repeated crops.

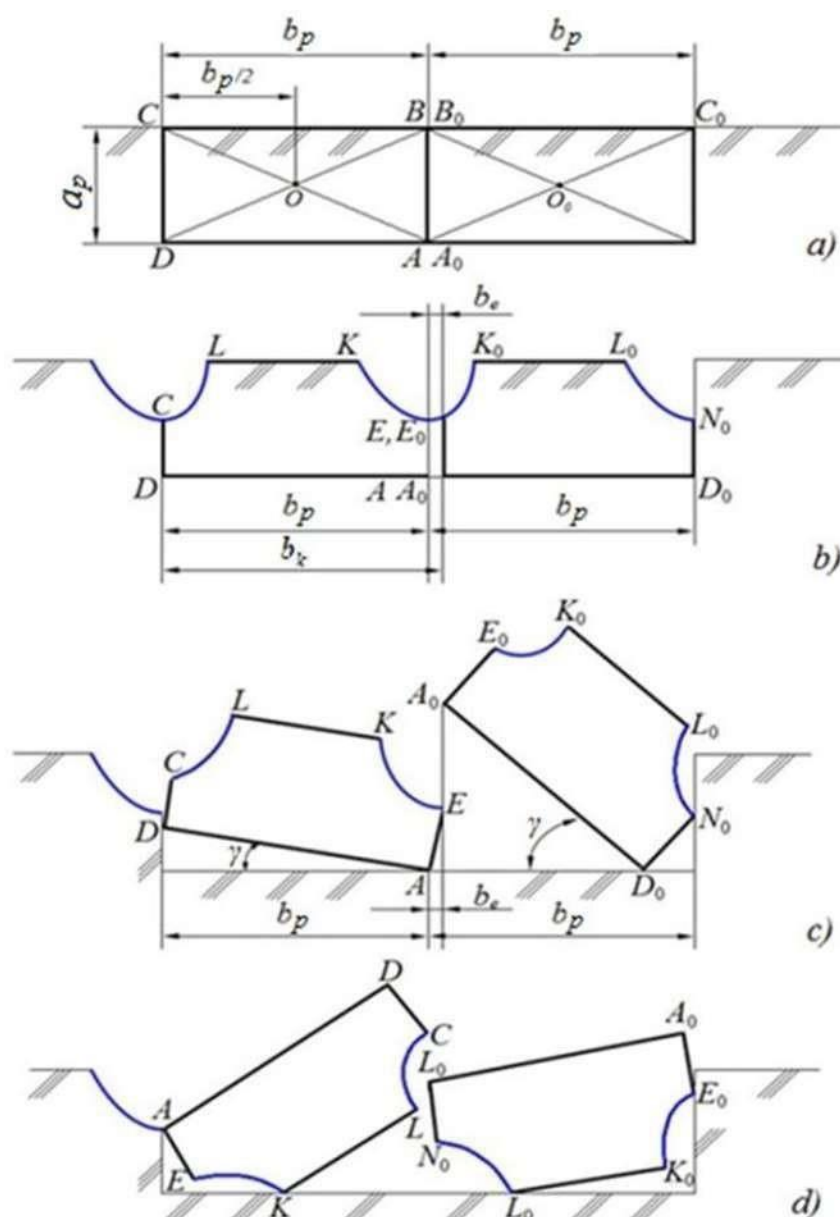


Figure 2. The scheme of the technology of turning the soil slabs by 180° at the edge of their edge.

a - cross-sectional view of the field before processing;

b - the view of the cross section of the field after the right and left edges of the fields are cut with spherical disks; s and d are the schemes of overturning of slabs at the limit of their edge.

In the advanced plowing technology, the right and left edges of the upper part of the plows are cut into a polygonal shape before the plows are turned 180° at the edge of the edge and then turned over at the edge of the edge (Fig. 2). . In addition, the width of the egata is greater than the width of the palaxa. As a result, a semi-free space is formed on the side of the left SD side edge of the palaxa, and a complete free space is formed on the right side AV side. In this case, the blade SD is rotated around the support edge with less deformation, and the blade is less compressed in the first stage of overturning. This reduces the energy consumption for turning the blade. In order to ensure the formation of an open egate by the guide plate, the egate width for the housings after the first housing should be greater than the width of the blade.

The new technology of flat plowing has the advantages of a stepped plow with a disc angle cutter compared to traditional plows:

agrotechnical - provides a well-structured open field and a continuous flat plow surface without borders, increases productivity by 15...18%;

ecological - erosive soil particles are buried in the bottom of the soil, soil aggregates of 0.25...10 mm size are formed in the surface layer;

energetic - fuel consumption is 25...28% less. Due to the reduction of additional operations performed after the plow to prepare the soil for planting, the time and energy consumption for preparing the field for planting is reduced by 1.5 - 1.8 times;

construction - material capacity is 50...80% less;

ergonomic - lack of complex hydromechanical systems, high maneuverability. The optimal shuttle movement method in the field creates comfort and safe working conditions for the operator;

economical - due to the small material volume and optimal design, the price is 1.5-2 times lower than rotary plugs, and 1.3 times lower than traditional plugs.

Great economic efficiency is achieved due to low fuel consumption, high working speed and work efficiency.

Production of the proposed new machine using local raw materials will create additional jobs, bring additional funds to enterprises and, as a result, lead to their comprehensive development. In agricultural production, work quality and productivity will increase, fuel and labor consumption will decrease, crop productivity will increase, and expenses for their cultivation will be reduced. It will create the ground for practical and innovative projects, and will serve to significantly increase the area and efficiency of agricultural crops in the future.

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