

RESEARCH ON THE ESTABLISHMENT OF AN IMPROVED TEMPORARY DITCH PRODUCTION DEVICE

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ANNOTATION

The article describes the research on the improvement of the temporary ditching device. In order to reduce the traction resistance of the channels and improve the channels quality, two straight discs are installed in front of the channel. During the excavation, the slope of the temporary ditch was maintained at the required level due to the partial disintegration of the soil layer due to the rotational movement of the disk, and the issue of maintaining the uniformity of the temporary ditch side wall was discussed.

Keywords: Irrigation, temporary ditch, disc, channel digger, deformation, overturning, lemex, base ski.

INTRODUCTION

Agriculture is one of the most important sectors for economic development, employment and income growth. Therefore, measures are being taken in the Republic to develop agriculture on the basis of modern requirements and strategic approaches.

The Address of the President of the Republic of Uzbekistan to the Oliy Majlis of December 29, 2020 emphasizes the further development of agriculture and water management, as well as all other sectors. A number of important tasks have been identified, such as modernization of agriculture, digitization, increase of land productivity, introduction of modern agro-technologies, increase of land area by five times with introduction of water-saving technologies [1].

Today, special attention is paid to further improvement of melioration condition of irrigated lands, development of irrigation network, wide introduction of intensive methods, above all, modern techniques and technologies saving water and resources to the sphere of agricultural

production. In this regard, the application of modern water-saving technologies, the maintenance of irrigation networks in a state of constant technical downtime, the creation and production of energy-saving techniques and technologies is of great importance.

It is known that the improvement of land reclamation, increasing crop yields depends on self-irrigation. Irrigation networks are used to irrigate agricultural crops. Irrigation networks are divided into permanent and temporary networks according to the period of use. Temporary irrigation networks will be removed at the beginning of the irrigation season and leveled at the end of the irrigation season. To dig temporary networks, levelers are used: they make the channel 20 - 40 l / sec. and 100 - 200 l / sec. is selected taking into account the water permeability.

In irrigated lands in Central Asia, the method of irrigation of agricultural crops above the soil level (rut and corridor invasion) is widely used, and interim irrigation networks are placed in cross-and longitudinal schemes on the irrigation site, depending on the states of the location.

Longitudinal positioning schemes are used on lands where the slope is smaller than 0,002 (figure 1.2 a). On such lands, the plot divider is taken in the direction of the largest slope, while the interim arcs are taken in the direction of the slope perpendicular to the height horizons, and the slopes in the direction of the smallest slope. Beshamaks are built on the oars without a parallel, water from each of them is distributed to 5-6 irrigation racks. Watering egos are opened in the direction of a large slope of the place, that is, they are parallel to the direction of the interim arc.

In order to prevent the washing of the soil under the influence of irrigation water on lands with a large slope, interim irrigation networks are placed in a cross-sectional scheme. On such lands, the plot divider is obtained perpendicular or sloping relative to the height horizons. The spikes are taken in the direction at a small angle to the horizons, and the irrigation curves are taken perpendicular to it. Bunda is distributed directly from the oars to the fattening rags.

The recommended moderate dimensions of temporary irrigation networks are given in Table 1 (NT Laktayev).

Table 1 The main indicators of the disease (information NTLaktayev)

Indicators of temporary ditch	Placement scheme	
	longitudinal	transverse
Maximum length, m	600-800	400
Minimum length, m	300-400	300
Maximum water consumption, l / sec.	60	40
Minimum water consumption, l / sec.	10	10
Distance between temporary ditches, m	70	according to the length of the edge

The depth of the ditch should not exceed 30 cm and the walls should be horizontal, ie the slope should be around 1: 4, so that agricultural machinery can pass through the temporary networks.

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agriculture of the country, ditches KOP-500A, KZU-0.5, KPU-2000A, KBN-0.35, KZU-0.3 are used.

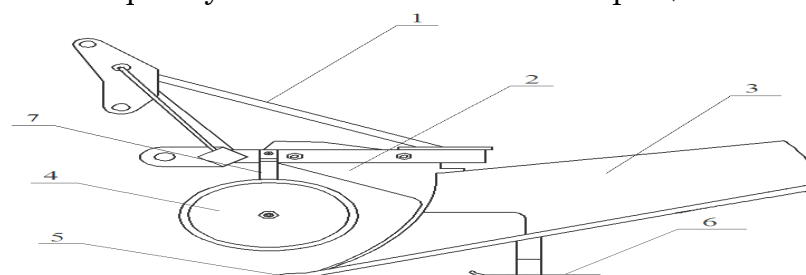
UKP-rated thresholds and interim channel forming device are aggregated in the position of the tractor - trailer, applied in order to open the interim ditch or form thresholds in irrigation areas on account of changing the working body condition. Depending on whether the dimensions of the formed interim slab or pawl are installed in RAM, respectively, the depth of access to the soil is adjusted by the recessed pull above the device.

The KPU-2000 A duty pawl - forming device has universal RAM, which can be replaced by working bodies, that is, a two-way submersible channel digger, a two-way submersible pawl forming machine, a sink and a recessed working bodies. This device is aggregated in the trailer position to 4-5 class tractors, such as DT-54, DT-75, t-750 mm. it is used in the formation of pawls with a height of up to working depth is up to 300 mm; the working volume is 1,2-1,6 km/h.

Currently, the KZU – 0,3 Δ threshing device is widely used in the separation of fields into small contours with the help of thresholds in order to prepare the fields emptied from the crop and plowed for autumn saline washing and spring irrigation. This device is aggregated to MTZ-80.1, DT-54 A, MXM-140 and other similar types of 3-4 class tractors, and the working output is 1.2 km/h (figure 1.4) [6].

Trailer-mounted channel digging machines are mainly in the grills of the first group, with a depth of 0,8...Eni of the channel bottom of 1,2 m 0,2...It is designed for digging channels up to 0,4 m.

These dredgers are required to dig the soil, lift the excavated soil and place it on the edge of the canal and push it, as well as level and smooth its surface, as well as ensure its slope. Analysis of these ditches shows that digging ditches in hard areas requires a lot of energy, in areas with low humidity, the increase in the amount of large lumps and the loss of geometric shape of the work equipment as a result of deformation, the large amount of energy required to pull the work equipment during the digging of the ditch, the magnitude of soil resistance. In view of the above, in order to increase the work efficiency of the temporary ditch, straight discs were installed on the front of the dump to reduce the soil softening resistance and improve the quality of soil fraction and slope. (Picture 1) In view of the above, in order to increase the efficiency of the temporary ditch excavator, straight discs were installed on the front of the dump to reduce the soil softening resistance and improve the quality of the soil fraction and slope. (Figure 1) In view of the above, in order to increase the efficiency of the temporary ditch excavator, straight discs were installed on the front of the dump to reduce the soil softening resistance and improve the quality of the soil fraction and slope. (Picture 1)



Picture 1. General view of an improved temporary ditch.

Advanced ditch frame 1, main working equipment frame 2, overturner 3, straight discs 4, lemex 5, ski 6, disc o mounted on its front at a distance of 30 - 35 cm from each other The installed racks consist of 7. The straight discs are mounted to the racks 7 using a mounting bracket - arrow. The technological process of operation of the advanced trench is as follows: the trench is mounted on the back of the tractor and put into operation. Due to the forward movement of the tractor, the working equipment is lowered to the ground at a certain depth. In the process of digging a temporary ditch, the cutting straight discs placed at a certain distance from each other sink into the ground and cut the soil in front of the overturner at a specified depth by rotating around its axis as a result of contact with the soil.

The force required to cut the soil using discs can be determined by the following formula:

$$P = T + rp_1(\cos\theta_2 - \cos\theta_3) + rp_2(\cos\theta_2 - \cos\theta_1) + rp_1(1 - \cos\theta_1) + f_1rp_1(\sin\theta_2 - \sin\theta_3) + f_1rp_1 \cdot \sin\theta_1$$

here $T = 2fqS$ - friction force on the side surfaces of the disc cutter (kg);

(q is the normal pressure of the soil on the side surface kg/sm^2);

S is the segment surface (cm^2) determined by the depth of sinking of the disc cutter;

f - coefficient of soil friction with metal);

r - disc cutter radius (cm);

p_1 - specific pressure at sliding by cutting using a cutter (kg/sm);

p_2 - specific pressure at shear without shear (kg/sm);

f_1 - coefficient of friction of peat soil along the cutter ;

$\theta_1, \theta_2, \theta_3$, - central angles determined by the following dependencies:

$$\cos\theta_0 = \frac{r}{r + \Delta r}, \quad \cos\theta_1 = \theta_0 - \phi_1, \quad \theta_2 = \theta_0 + \phi_1, \quad \cos\theta_3 = \frac{r - h}{r},$$

Them $\Delta r = \frac{Er}{1 - E}$, - the distance from the lower end of the base diameter to the instantaneous rotation pole (E - slip coefficient, ϕ_1 - angle of friction of the peat along the cutter, h - depth of run with a disc cutter, cm).

The formula allows you to determine the total amount of cutting movements with discs, as well as its components - cutting with a knife and frictional movements on the side surfaces of the cutter. As the diameter of the discs increases, the cutting action of the soil decreases unless other conditions change. Spherical discs (concave) rotate freely around the horizontal and oblique axis under the influence of the reactive resistance of the soil during the input movement of the device. The speed of any point on the disk can be determined by geometrically adding the input speed of the device and the rotational speed of that point around the instantaneous rotation pole.

As a result, the tensile strength of the unit is reduced during operation. During the excavation of the ditch, a quality ditch is formed as a result of ensuring the uniformity of the slope and geometric shape of the side of the ditch due to the cutting of the soil layer using discs. An improved ditch allows for an 8-10% increase in work efficiency while reducing energy consumption when creating a temporary ditch.

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