APPLICATION OF IMPROVED WORKING EQUIPMENT OF A SINGLE-BUCKET EXCAVATOR IN EXCAVATING OPEN DRAINS.

Halimov Tilavjon, *basic doctoral student "TIIAME" NRU Bukhara Institute of Natural Resources Management*
Safarov Shermurod, *teacher of "TIIAME" NRU Bukhara Institute of Natural Resources Management*
Amrullayev Timurbek, Hakimov Akobir, *master's students of the "TIIAME" NRU Bukhara Institute of Natural Resources Management*

Annotation: The article presents the results of research on the development of improved working equipment for single-bucket excavators in the excavation of open channels and collectors, and based on the results of the research, a structural scheme of the machine was developed.

Keywords: nozzle, fauna, flora, bank, channel, grassy field, ditch, ditch.

A number of resolutions and decrees have been developed to create the necessary conditions for further sustainable development of agricultural production, improvement of the land reclamation condition, increase of their productivity and, on this basis, increase of agricultural crop yields, as well as improvement of the mechanism of organization and financing of land reclamation works. In particular, great attention is also being paid to the water sector in connection with the implementation of the Decree of the President of the Republic of Uzbekistan No. PF-5853 dated October 23, 2019 "On approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030". The fact that billions of soums are being allocated for the repair, restoration and reconstruction of the water management system in our republic shows how urgent the issues of increasing the technical reliability of hydraulic structures, their operational efficiency, extending the terms of their current and capital repairs, and the effective use of water resources are[1].

Currently, it is necessary to ensure the effective operation of the construction and repair of open drainages based on the improvement of new modern techniques and technologies. This, in turn, is carried out by developing a system of machines for the construction and repair of open drainages.

The existing technology and system of machines are partially recommended for some zones with high humidity and elevated groundwater levels. When constructing and using open ditches, it is necessary to take into account the specific hydrogeological, soil and climatic conditions of the area. Given the fact that our republic is in a saline and irrigated zone, the development of a system of machines for the construction and repair of open drainages in such zones is relevant today.

All drainage and irrigation canals are subject to weed growth, especially during the initial period of operation of new canals at high temperatures. The growth of aquatic plants on the bottom and sides of the canal is the most damaging. It reduces the flow of the water in the canal's cross-section, increases the roughness coefficient, reduces its velocity and permeability, and increases siltation.

Figure 1. The appearance of the channels of the collector-drainage system after the annual drying out and formation of a blockage due to the formation of vegetation

Prevention and control of vegetation growth in the fields.

When examining the channels of irrigation and drainage networks in Uzbekistan, it was shown that 65-70% of the length of the main channels, and up to 90-95% of the length of the channels of internal drainage and irrigation networks were overgrown with vegetation. Plants growing in the channels of drainage networks are mainly divided into three groups:

• Group I: aquatic plants with stems, roots and leaves in the water (black grass, bottom plant, wild grass, grass growing in the field, etc.) Figure 1;

• Group II: semi-aquatic plants with roots in water and stems above water (reeds, sedges, sugar cane, etc.). They grow underwater at depths of less than 30 cm and can grow up to 45 cm in length in a month (Figure 2).

Figure 2. Appearance of coarse-stemmed plants growing in the marshes

• Group III: weeds growing along the banks of the canals and in the adjacent areas (coastal plants) (Figure 3);

Fig. 3. Appearance of weeds growing along the banks of the Zovur and adjacent lands

Several methods have been developed in our republic and abroad to combat the growth of plants in the channels of drainage and irrigation networks. Among them: - mechanical methods - periodic mowing, pulling (dragging) chains;

• biological methods - cattle grazing, fish breeding (feeding) (white amur, largemouth bass, etc.). These fish can weigh 5 kg or more. They reproduce quickly, but for fish to reproduce, the channels must have a constant and sufficient water level and be equipped with nets and other barrier devices that prevent water from entering and passing through. Five-year experience of using fish to clean irrigation canals from plants has given positive results in the irrigation systems of Turkmenistan (Karaqum Canal, etc.), Uzbekistan (hydro-reclamation canals in Mirzachul);

• fire method - destruction of the above-water part of plants by burning them with fire sprinklers and treatment with petroleum products (various used and waste oils). This method has not been widely used due to the high cost of petroleum products and the fact that they can only destroy the above-water part of plants for a certain period of time (about 1 year);

• chemical method - based on the destruction of the above-water part and roots of plants by treating them with chemicals (herbicides). However, these substances have been used only within the framework of scientific research programs in the Syrdarya and Jizzakh regions, as they cause a sharp deterioration in the ecological state of groundwater and surface waters through waterways (destroying flora and fauna species, regardless of their usefulness or use).

There are a number of problems in cleaning water ditches and ditches with single-bucket excavators available in our republic. In particular, during the cleaning of ditches with water and weeds, more water-mixed sludge sticks to the bucket. As a result, water can occupy up to 30% of the bucket volume, and wet soil sticks to the walls and bottom of the bucket. The improved working equipment washes away the soil stuck to the

walls of the bucket when cleaning the trenches. Using a special water sprayer mounted on the excavator's bucket, water is sprayed under pressure onto the walls of the bucket after the soil is released, and as a result, the wet soil stuck to the walls of the bucket is completely washed away.

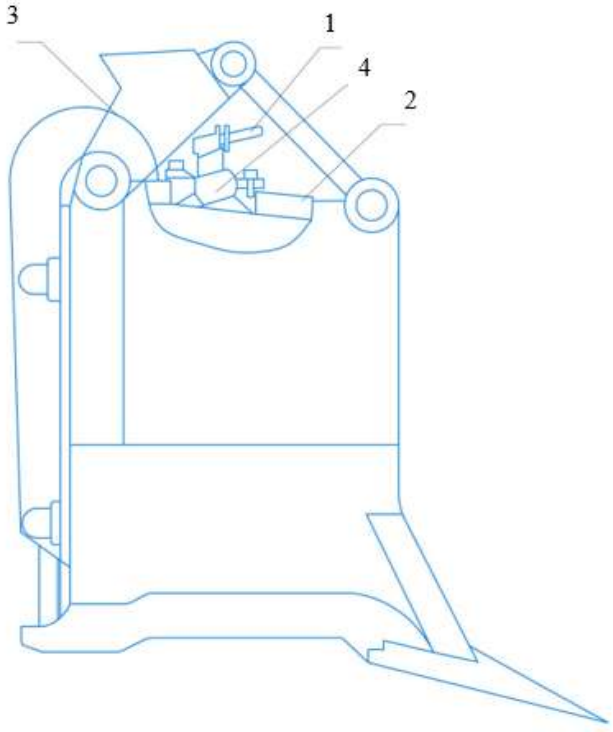

Figure 4. Improved bucket equipped with a water spray device

1-nozzle; 2-back wall of the bucket; 3-fixing bolt; 4- spherical rotating device.

This device is equipped with a special water spray device for washing away soil adhering to the excavator bucket during excavation of wet and sticky soils. The water spray device consists of a nozzle 1 mounted on a rotating spherical rotating core, a pump supplying water, pipes and a liquid tank. The water spray device is mounted in the center of the back wall of the bucket, in a slot equal to its diameter, on the surface of the wall surface using fastening bolts. The rotary movement of the water sprayer is carried out by a spherical rotating device.

An excavator bucket with a water spray has the following advantages:

• completely washes away residues remaining in the bucket during excavation of wet or sticky soils;

• when digging wet and sticky soils using a spray bucket device, it is absorbed in 2-3 times less time than the usual method;

• the duration of the water spraying equipment continues until the bucket soil discharge period ends and the excavation period begins, which in turn reduces excess fluid consumption;

• due to the simultaneous implementation of two technological processes, the cleanliness of the working equipment is maintained, which in turn ensures long-term operation of the unit;

• as a result of periodic cleaning of the bucket in the excavated area using an improved bucket, work efficiency increases and a large amount of work is completed in a short time.

In conclusion, in order to increase the productivity of single-bucket excavators used in the process of opening open trenches, it was observed that a small hydromonitor device installed on the working equipment of the excavator increased by 12% compared to existing single-bucket excavators.

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