EURASIAN JOURNAL OF ACADEMIC RESEARCH
Innovative Academy Research Support Center
UIF = 8.1 | SJIF = 5.685 www.in-academy.uz

IMPROVEMENT OF THE SCRAPER WORK EQUIPMENT AND IMPROVING ITS EFFICIENCY

[1]Ruziqulov Jasur Uktam ugli
"TIIAME" NRU "Bukhara Institute of Natural Resources Management, Student of PhD
[2]Kurbonboyev Sindorbek Sarvarbek ugli,
[3]Xusinov Sarvarbek Nodirbek ugli,
[4]Ruziqulova Dilnoza Uktamovna,
Students of "TIIAME" NRU "Bukhara Institute of Natural Resources Management. jasurruzikulov@mail.ru
https://doi.org/10.5281/zenodo.7553934

ARTICLE INFO

Received: 10th January 2023
Accepted: 19th January 2023
Online: 20th January 2023

KEY WORDS

Technique, technology, frame, hydraulic cylinder, softening teeth, energy, power, engine, elevator, chain, drum.

ABSTRACT

In the article, attention is paid to the role and role of scrapers in the execution of earthworks, existing problems in the work process, issues of solving them, issues of increasing the productivity of scrapers.

In the years of independence, based on the real demands of the economy and social life, great work was done on the modernization of the higher education system in our country, the introduction of modern forms and technologies of teaching, and the improvement of specialization areas for the training of specialists [1].

The role of the agricultural industry in the national economy of the country is very important. 63% of the country's population lives in rural areas. 35% of the employment of the working population corresponds to agriculture.

Uzbekistan ranks sixth among the cotton-producing countries in the world. The standard of living of the population of our country, its material well-being depends on the progress of economic reforms in agriculture, the speed and efficiency of its development. In this case, the owners of farms take care of the land, cultivate it in a timely and quality manner, and observe all agrotechnical measures is an important factor in the life of the farm [2,3].

Our country is inextricably linked with increasing the efficiency of production of agricultural products and developing rural infrastructure.

After all, raising the quality of the economic and social infrastructure in the villages to the level of modern requirements cannot fail to have a positive effect on the country's development today.

As the President noted, there is a link in rural economy and social life, as well as in politics, through which the entire republic can achieve prosperity and prosperity.

It is difficult to imagine the production of agricultural products without irrigated lands, because we get more than 90% of our crops from irrigated lands. Therefore, the problems of improving irrigation and land reclamation are crucial for us. In fact, since Uzbekistan is a country specializing in a large agricultural production complex, land reclamation and productivity are of crucial importance. The productivity of lands is mainly related to their

irrigation and conservation. In this regard, our state has been implementing both legal and practical measures since the first days of independence [4,5,6].

Mechanization of the agriculture of our republic in order to ensure the implementation of the decision of the President of the Republic of Uzbekistan Sh. Mirziyoyev "On additional measures to further increase the level of technical equipment of agriculture" PQ-3459, In order to increase the productivity of agricultural products obtained from crops, extensive scientific and innovative works are being carried out, aimed at the application of modern techniques and technologies, which imply the effective use of modern science and technology achievements and the improvement of existing ones [7].

The efficiency of existing scrapers is low. The maneuverability of these scrapers is low, a lot of metal is consumed, and the energy consumption is high, and the work efficiency is low. To solve these problems, it is necessary to improve the working bodies of scrapers. Usually, basic scrapers scrape and level the surface of the earth at a depth of 4-5 cm in one pass. The resistance in this alignment is very high. As a result, the scraper's work speed and quality decrease, and its productivity decreases.

Clay and wet sands stick to the walls of the tank, so the scraper's performance decreases. The use of self-propelled scrapers without a pusher in the processing of dry sands will be ineffective, because the traction force will not be sufficient due to the free engagement of the tracks with the sand.

Taking into account the above, it is urgent to improve the working efficiency of the scraper [7,8].

The disadvantage of scrapers is that when the working equipment of the scrapers is rotated from top to bottom according to the principle of milling hard and frozen soils, significant dynamic loads appear on the soil-cutting working equipment. Secondly, the teeth of milling cutters carry the cutting soil only to the front part of the working equipment, it enters the ground and does not ensure complete filling of the working equipment. The main task of this work equipment offered by us is to improve the efficiency of scrapers in hard and frozen soils in order to solve the above problems.

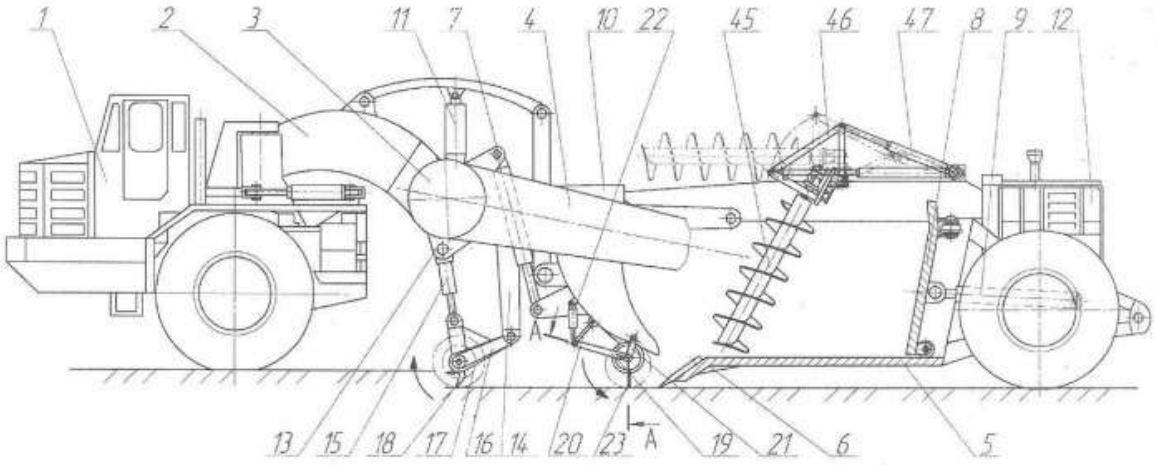
This problem is a soil conditioner with a gear that is wide enough to match the width of the implement and the work equipment axle of the implement is mounted by turning with the help of soil softeners with a gear driven by an additional engine located on the side and soil softener with a cross gear of a traction frame with the ability to raise and lower and between the hydraulic cylinders, ground entry and cutting equipment and the blade of the working equipment, that is on the outer side of the shock absorber, a support device is installed using a blade device and hydraulic cylinders corresponding to the width of the working device. It is also controlled by an additional lifting-lowering motor. It has the ability to move the loosened soil from top to bottom by the soil softener equipped with gears and feed it to the front of the scraper under the screw elevators. Advanced implement includes high-torque hydraulic motor, drum rotation chain drive with implement supports, two mounting points in the middle section, two guide holes in the drum and it is driven by two mechanisms located in the diametrical plane of the drum and the rollers for the supporting blade.

An improved working device for scrapers, shown here (Fig. 1) from the side during soil loosening and digging. (Fig. 2) shows the top view of the improved working equipment and

EURASIAN JOURNAL OF ACADEMIC RESEARCH
Innovative Academy Research Support Center
UIF = 8.1 | SJIF = 5.685 www.in-academy.uz

the movement of the blades of the working equipment that softens the soil under the influence of the installed mechanism.

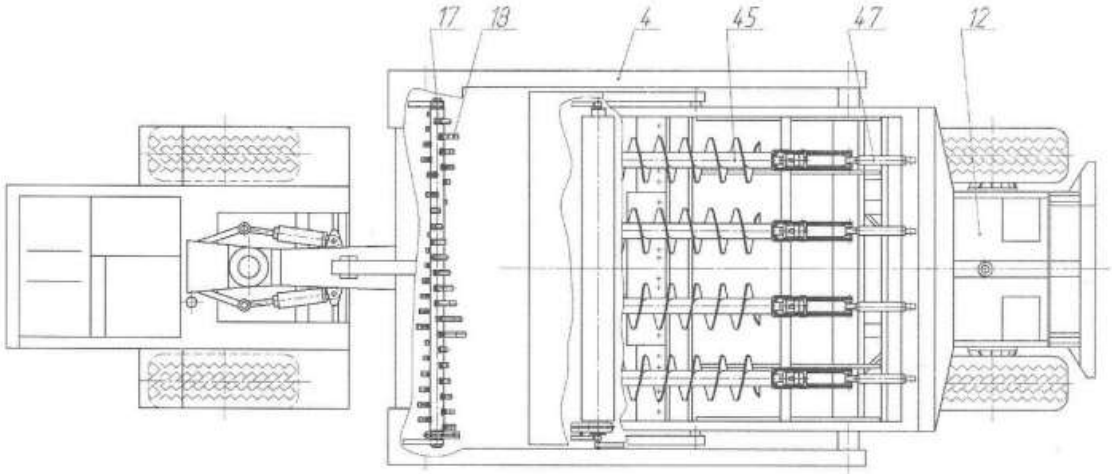
The scraper consists of a main tractor 1, a frame 3 and a draw frame 2 with a drawbar, a working device 6 with blades 5 and a hydraulic lifting-lowering mechanism of the working device 7, a rear wall 8 hydraulic mechanism. Its movement consists of 9, a shock absorber with a hydraulic lifting-lowering mechanism 10-11, an additional replaceable engine 12. In the cross-section frame 3 and drawers 4, hydraulic cylinders 13 and 14, cylinders 15 and two-part hydraulic cylinders 16, softening teeth 18 are installed.



1 – picture. General view of the improved scraper

The movement of the working equipment 24 is installed at the intersection of the axes of the working equipment 19, 20 and the axes of the hydraulic cylinders 22. A high-torque hydraulic motor 25 is connected to the drive shaft 24, which receives energy from the additional alternating power.

The scraper works as follows. If it is necessary to work on hard (frozen) soils or on ice, a soil-cutting and softening device 23, as well as an additional engine 12, are installed. Before digging, the working device 17 with softening teeth 18 is started. With the help of hydraulic cylinders 15 and two-handed levers 16, the rotary cutter 17 is lowered and enters the ground, providing cutting (loosing) of the soil from the bottom up.



2 – picture. Top view of the improved scraper

Next, the tractor 1 starts to move and the softening working device 17 ensures softening of the soil and the blade 5 of the scraper working device 6 lowered by means of the hydraulic lifting-lowering mechanism 7 is inserted into it.

Simultaneously with the start of tractor 1, the drives of the support device 23 and the screw elevators 45 are started.

The shock absorber 10 together with the softening device 23 is lowered from the completely intact massif to the loose soil without touching the harrow blade 37 using the hydraulic lifting-lowering mechanism 11. At the same time, there is a space between the blades of the working equipment for the soil to pass into the bucket. The working device of the scraper 23 is powered by a high-torque hydraulic motor 25, which rotates the drive shaft 24 with the teeth 26 of the drive chains 27 and 28. Through chains 27 and controlled softener 31, the torque is transmitted to the controlled.

Since the connecting working device 35 is hinged to the fingers 36, which are firmly attached (welded) to the harrow blade 37, the latter rely on reducing friction, and the drum 39 is on the plane of the diameter, that is Performs mutual movement in slots up to 38. Simultaneously with mutual movements, the harrow blade 37 rotates together with the drum 39. Since the pitch circle diameter of the proposed gear 41 is twice that of 31, the drum 39 driven shafts 30 rotate at twice the angular speed.

As a result, in one rotation of the drum 39, the harrow blade makes two reciprocal movements and its end faces are close to each other and describe corresponding trajectories at upper and lower points (positions). Softened soil entering the front part of the working equipment is taken by the blades of screw elevators 45. After the working device 5 is filled with soil, the cutter 17 is lifted by hydraulic cylinders 15, and the harrow device 23 is lifted by hydraulic cylinders.

In summary, a scraper with improved working equipment has the following advantages:

- which will fall into the scraper cavity due to the rotation of the proposed working equipment and reduces the dynamic loads on the entire implement, which ensures the opposite cutting of the soil from the bottom up;
- the front part of the scraper working equipment is not blocked, because the soil entering the working equipment is picked up by the blades of the auger elevators;
- the proposed soil loosening gear prevents the formation of soil piles in front of the implement, and greatly improves the efficiency of the scraper implement.

References:

1. Imomov Sh., Jurayev A.., Ruziqulov J., Kurbonboyev S., Ruziqulova D., Xusinov S., Madadkhonov T. (2022). THEORETICAL STUDIES ON THE DESIGN OF TRENCHER WORK EQUIPMENT. Eurasian Journal of Academic Research, 2(12), 989–996. https://www.in-academy.uz/index.php/ejar/article/view/6504

2. Sh.J.Imomov, J.U.Ruzikulov, S.S.Kurbanbayev, H.S.Safarov, K.S.Sobirov, and Z.Sh.Isakov “Technological process of provisional dig a ditch”, Proc. SPIE 12296, International Conference on Remote Sensing of the Earth: Geoinformatics, Cartography, Ecology, and Agriculture (RSE 2022), 1229600 (6 July 2022); https://doi.org/10.1117/12.2642980

3. Sh.J.Imomov, J. U. Ruzikulov, S.S. Kurbanbayev, H.S. Safarov, K.S.Sobirov, Z.Sh.Isakov, "Technological process of provisional dig a ditch" Proc. SPIE 12296, International Conference on Remote Sensing of the Earth: Geoinformatics, Cartography, Ecology, and Agriculture (RSE 2022), 1229600 (6 July 2022); doi: 10.1117/12.2642980
4. I.S.Hasanov, J.U.Ruzikulov, F.A.Ergashov, M.J.Toshmurodova, M.R.Sotlikova, IOP Conf. Series: Earth and Environmental Science 868 (2021) 012091
5. Ruzikulov Jasur Uktam ugli, Kurbanbayev Sindorbek Sarvarbek ugli, Nasrullayev Alpomish Anvarjon ugli, Safarov Khusniddin Sirojiddin ugli, Research on the establishment of an improved temporary ditch production device, Galaxy international interdisciplinary research journal (GIIRJ), Volume 9, Issue 11, November, 2021
6. Ruziqulov Jasur Uktam ugli, Isakov Zafarjon Shuxrat ugli, Qurbonboyev Sindorbek Sarvarbek ugli, Ruziqulova Dilnoza Uktamovna, Xusinov Sarvarbek Nodirbek ugli. (2022). INCREASING THE WORKING PRODUCTIVITY OF THE CASE 1150 L BULLDOZER BY IMPROVING THE WORKING EQUIPMENT. Neo Science Peer Reviewed Journal, 4, 87–90. Retrieved from https://www.neojournals.com/index.php/nsprj/article/view/83 .
7. Imomov Shavkat Jakhonovich, Murodov Tohir Faxriddin ugli, Isakov Zafarjon Shuxrat ugli, Ochilov Nuriddinjon zokirovich, Iskandarov Johongir Ochil ugli, & Ruziqulova Dilnoza Uktamovna. (2022). LOCAL FERTILIZER MACHINE WITH AUGER. Neo Science Peer Reviewed Journal, 4, 91–93. Retrieved from https://www.neojournals.com/index.php/nsprj/article/view/84