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ORGANIZATIONS OF TECHNICAL SERVICE OF MELIORATIVE AND CONSTRUCTION MACHINES

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Abstract

In recent years, consistent reforms have been implemented to ensure the efficient use of land and water resources, improve the water resources management system, modernize and develop water management facilities, including systematic repair and restoration of irrigation and reclamation facilities. When performing mechanized work, maintaining the performance of construction and reclamation machines is of paramount importance. But poor-quality or uncoordinated work of service centers will lead to the loss of working hours of the production cycle due to machine downtime.

When providing services, the logistics component of production processes occupies a significant part, since the formation of an exchange fund, storage, supply, and transportation are elements of this chain.

This article provides recommendations on the organization of technical service for reclamation machines, taking into account logistics operations. Based on the difficult working conditions, labor intensity, geographical location of irrigation and drainage facilities and the intensity of machine failures, the location of strongholds was justified using the example of the Tashkent region.

Key words: *technical service, failure, logistics, transport, warehouse, failure rate, exchange office, unit, repair, technological equipment.*

Introduction. In recent years, consistent reforms have been implemented to effectively use land and water resources, improve the water management system, modernize and develop water management facilities. Based on this, priorities were identified for the implementation of a number of tasks that should increase the efficiency of irrigation systems from 0.63 to 0.73, as well as for the systematic repair and restoration of irrigation and reclamation facilities [1].

When performing mechanized work, maintaining the performance of construction and reclamation machines is of paramount importance. But poor-quality or uncoordinated work of service centers will lead to the loss of working hours of the production cycle due to machine downtime.

When providing services, the logistics component of production processes occupies a significant part, since the formation of an exchange fund, storage, supply, and transportation are elements of this chain.

At present, the water industry uses construction and land reclamation equipment supplied by the unitary enterprise "Uzmeliomashlizing" created in order to stimulate the renewal of the existing and the formation of a diversified fleet of modern land reclamation and other equipment, machinery, equipment and other mechanization in the interests and taking into account the needs of construction organizations, specialized on the performance of land reclamation and other water management works, operating water management organizations, associations of water users and farms, as well as other organizations [2].

To provide a corporate service for these machines, a subsidiary company, Meliomashlizingservice, was organized. The scope of this enterprise is the provision of services throughout the territory of our Republic. And in the early years, several regional centers covering the techniques of a number of regions of Uzbekistan were organized.

In order to ensure the reliability and efficient operation of the supplied reclamation equipment, machines and other means of mechanization, in December 2011, on the basis of the Protocol of the Cabinet of Ministers of the Republic of Uzbekistan dated December 26, 2011, a subsidiary company "MELIOMASHLEASINGSERVICE" and its branches in all regions of the republic. "MELIOMASHLEASINGSERVICE" since March 2012 began the formation of the personnel base of the head office and branches: the conclusion of labor contracts with the heads of departments, heads of branches, specialists, engineers, mechanics. In mid-May 2012, the personnel of the enterprise was finally formed. All branches were provided with premises, production facilities and primary supplies. In June 2012, MELIOMASHLEASINGSERVICE purchased and distributed 13 vehicles among its branches for prompt maintenance of the supplied reclamation equipment, machines and other mechanization equipment. "MELIOMASHLEASINGSERVICE" together with the specialists of the unitary enterprise "Uzmeliomashleasing" carried out a full-scale monitoring of the intended use and maintenance of the delivered reclamation equipment, machines and other means of mechanization to the water management organizations of the republic. The range of services provided by "MELIOMASHLEASINGSERVICE" covers almost all types of land reclamation equipment, machines and other mechanization tools [2-3].

But so far, the infrastructure of this organization has not been planned based on logistical concepts and principles.

When organizing regional centers, it is necessary to take into account such parameters as: the type of work performed, their volume, malfunctions, the probability and frequency of failures. And also an increase in the number of strong points will lead to an increase in the cost of the production process and storage costs, but thereby they will significantly reduce transportation costs and will also help to minimize the number and downtime of machines.

Materials and methods. When providing corporate technical services, the most common is a two-level production organization system. Since, the system consists of a regional center and strongholds connected to it. Features of the organization of two systemic regional centers were substantiated in a number of works by foreign researchers [4-7].

The emergence of branded technical service is due to the specifics of the functioning of a market economy, in

which the manufacturer of agricultural machinery, in order to promote and consolidate its products, creates functional units that help them gain competitive advantages through a more efficient organization of after-sales service. Corporate technical service is carried out by organizing dealer centers that sell equipment from manufacturers, carry out pre-sale preparation of equipment, service it during the warranty and post-warranty period, and also monitor the quality of the equipment and spare parts sold [7].

An analysis of international experience shows that in the conditions of Uzbekistan, the organization of two-level regional centers is optimal, since an increase in the number of strongholds requires huge investments and will lead to a decrease in the workload of special technological equipment, as well as to a shortage of relevant highly qualified specialists.

With a two-system regional service, the location and number of strong points is determined based on the amount of equipment in the region, the types of technical services provided to them, and also the frequency. And repair centers in this case will be considered as elements of the second system and will include storage points (warehouses) and exchange of spare parts or parts, maintenance departments and regional workshops.

In a two-system form of regional service, it is recommended to divide the malfunctions encountered in reclamation machines into three points:

1. A malfunction that is eliminated in the field using the capabilities of the service team of the strong point, and is carried out by carrying out the next maintenance.

2. If, in the field or stationary conditions, the service groups of the strong points do not have enough capacity to eliminate the malfunction, then in this case the regional center is informed about this and the malfunction is eliminated with the help of their resources.

3. In some cases, if the repair resources of the services of regional centers are unable to eliminate the malfunction, then in this case the machine or unit is sent to the factory to the manufacturers.

On average, annually in the annual plan, the company's specialists provided services to more than 838 pieces of equipment, including 629 excavators and 104 bulldozers. When analyzing the production process of the technical service enterprises of Meliomashleasingservice LLC, it was revealed that the seasonality of work and the geography of the distribution of equipment by objects increases the downtime of machines in case of failures and discrepancies in the frequency of regulated work provided, lead to a decrease in the reliability of machines.

We made theoretical calculations to determine the number of services for the existing technique [8-9].

Results and discussion. In planning the annual scope of work for each type of machine, the amount of overhaul and current repairs and maintenance is taken into account. During the calculation, the number of maintenance and repairs for one cycle of repair work and their labor intensity are taken from the regulations.

In domestic practice, the organization of maintenance and repair of machines began to be formed separately, since the introduction of a branded service led to ambiguity. Since the existing overhaul enterprises could not be integrated and did not meet the requirements of Western firms. But during operation, after some time, it was necessary to organize the repair of equipment by the method of aggregate repair, in which the cost increased tenfold.

Figure 1. Location and interconnection of regional technical service centers of Meliomashlizingservice LLC

Created branded services or enterprises began to organize the production cycle for the overhaul of units and machines. Therefore it should be recommended, not to try to separate maintenance and recycling from each other, but to understand them as close "relatives" or at least sympathetic "neighbors" with the process of repairing as their common border or junction line. This connection between maintenance and recycling has in the meantime also become accepted by the relevant national and international standardization organizations [10].

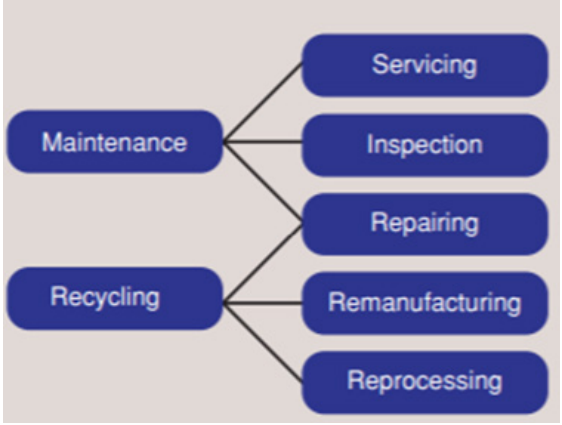


Figure 2. Maintenance and Recycling Belong Together

The quantities of technical and repair services provided to machines are calculated using the following formula [9]:

$$n_к = [m_к \cdot N \cdot K_к]; \; n_j = [m_j \cdot N \cdot K_к]; \; n_m = 2 \cdot N \quad (1)$$

nк; nj; nм is the number of major repairs, maintenance for a certain period of time;

Kк is capital repair coverage ratio;

mk; mj is the number of repeated overhauls and maintenance for one corresponding repair cycle;

N is the number of cars of the same brand in the magazine.

The coverage ratio for major repairs is determined [9]:

$$K_к = \frac{W_y}{W_к} \cdot \eta \cdot P_z, \quad (2)$$

η a coefficient taking into account the operation of machines in different conditions and for different purposes, as well as deleting incapacitated machines from the lists;

P_z – coefficient taking into account the location of the enterprise, for the Republic of Uzbekistan P_z=1,08;

[X] – the integer part of number X.

The calculation of maintenance and repair services is given in the table, according to the sequence of maintenance work, it is recommended to perform work during daily maintenance, with maintenance after every 50 and 100 m-hour by the operator.

One of the methods for solving the problem described above is the construction of graphical dependencies and the determination of the optimal parameters of the service organization system using them. In the conditions of the developed road infrastructure of the region, the most suitable method is the one proposed by Professor A.M. Gadzhinsky to determine the parameters of the organization and the value of the material flow moved in the distribution system [13].

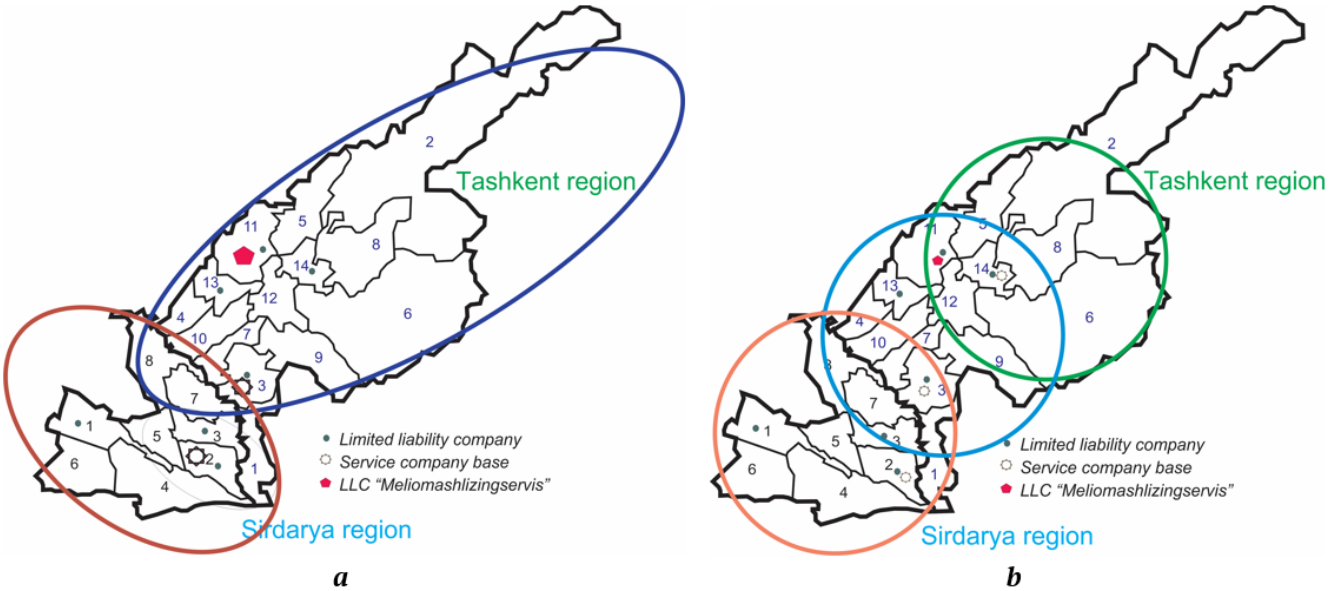
Table 1.

The number of vehicles that the company provided maintenance and repair for 2021 with regional distribution

№	Region names	The results of the maintenance services for excavators in the regions					
			The number of services rendered for the whole of 2021 to excavators	Estimated number of services by frequency in m-hours			
				1000 moto-hours	500 moto-hours	250 moto-hours	seasonal
1	Republic of Karakalpakstan	46	118	82	91	183	92
2	Andijan region	46	55	46	55	110	92
3	Bukhara and Navoi regions	82	76	146	163	325	164
4	Jizzakh region	37	2	66	73	147	74
5	Kashkadarya region	28	4	50	56	111	56
6	Namangan region	40	66	71	79	159	80
7	Samarkand region	53	48	95	105	210	106
8	Surkhandarya region	54	106	96	107	214	108
9	Syrdarya region	19	8	34	38	75	38
10	Tashkent region	58	30	104	115	230	116
11	Fergana region	72	91	129	143	286	144
12	Khorezm region	61	25	109	121	242	122
	Total	596	629	1028	1146	2292	1192

The appearance of additional strong points in the distribution system increases the operating costs for their maintenance, and also leads to an increase in the volume of capital investments for their creation. [9,11-13].

On the basis of the average annual volume of labor and the distance between the objects and the support center, transport costs are determined for various numbers of support points. For this, the number of services of only a



a *b*

Fig.3. Recommended location of strong points
A - with the existing organizational system; B - recommended organizational system

periodic nature was determined and the calculation data are given in the table. Only taking into account transport costs to enterprises, transport costs were calculated [9].

Calculations showed that with the introduction of two strong points for the Tashkent region, it reduces current costs by 25%.

Conclusions. Analysis of the activity of DP "Meliomashleasingservice" and the production process for the provision of services, the following recommendations were developed, taking into account the organization of reference points:

• reorganize the regional strongholds, taking into account the logistics directions, based on the location, transport and other costs in the provision of services.

• when organizing a strong point, it is necessary to take into account the location of the point, taking into account the provision of the smallest radius of services and the loading of technological capacities.

• The recommended block diagram of the organization of a strong point on the example of the Tashkent region, covering the entire territory of the region, reduces current transport costs by 25%.

These conclusions will make it possible to firmly integrate in the market and save material costs and costs of construction and reclamation machines during downtime due to loss of efficiency.

References:

1. Указ президента Республики Узбекистан об утверждении концепции развития водного хозяйства республики узбекистан на 2020 — 2030 годы. Ташкент, 10 июля 2020 г., № УП-6024.

2. http://www.uzmml.uz – официальный сайт ГУП «Узмелиомашлизинг».

3. https://water.gov.uz/ru - официальный сайт Министерства водного хозяйства Республики Узбекистан.

4. З.Ш.Шарипов, Д.Д.Баратов, Б.Х.Норов, – Минтақавий таъмирлаш марказларини ташкил этиш. III Международная научно – практическая конференция: “Современные материалы, техника и техналогии в машиностроении” (посвященная 20 летию АО “Узавтосаноат” и 5 летию Андижанского машинастроительного института) II секция. Андижон, 2016 й., 238 – 243 бетлар.

5. Технический сервис машин сельскохозяйственного назначения. /В.В. Варнаков, В.В. Стрельцов, В.Н. Попов, В.Ф. Карпенков. —М.: Колос, 2003. -253 с.

6. Справочник инженера по техническому сервису машин и оборудования в АПК. – М.: ФГНУ Росинформагротех, 2003. – 604 с.

7. Абдразаков Э.Ф. Совершенствование организации технического сервиса машинно-тракторного парка: на примере Саратовской области: дисс. Канд.техн наук: 05.20.03. – Саратов, 2012 г.

8. Надежность и ремонт машин/ Под ред. проф.В.В.Курчаткина. – М.: Колос, 2000. – 776 с.

9. Б.Норов и другие. Методические указания для выполнения курсового проекта по дисциплине «Эксплуатация и ремонт мелиоративных и строительных машин». – Ташкент, ТИИМ, 2008 г. – 64 с.

10. R. Steinhilper and F. Weiland, “Exploring new horizons for remanufacturing an up-to-date overview of industries, products and technologies,” in Procedia CIRP, 2015, vol. 29, pp. 769–773, doi: 10.1016/j.procir.2015.02.041

11. Ilaria Mariotti. Transport and Logistics in a Globalizing World. - Springer International Publishing, 2015 – 92 p.

12. Alan Rushton, Phil Croucher, Peter Baker. The handbook of logistics and distribution management. - Kogan Page; 5 edition, 2014, - 720 p.

13. Гаджинский А. М. Логистика: Учебник — 21-е изд. — М.: Издательско-торговая корпорация «Дашков и К», 2013. — 420 с.