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Research Article

Peculiarities of Production and Technical Production and Technical Exploitation of the Use of Technology in the Agrotechservice Enterprise

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Abstract

Summary: The purpose of the article is to improve the production and technical exploitation of the machine-tractor fleet and the efficient use of machinery in the service area with the use of application of resuscitation techniques.

The methodology and methods: Used are the theoretical and methodological basis of the research work of our country and foreign scientists on the technical maintenance of agricultural production, the organization and effective functioning of the institutions implementing it. Here a number of methods of analysis of mass service theory and graph theory are used.

The main scientific novelty: The results is the use of integrated indicators to mechanize technological processes in the context of existing structural features of agricultural production, to increase the operating level of the machine-tractor fleet. The production and technical exploitation depends on the level of technical maintenance of the process.

The results: The research are joint review of "production and technical exploitation" and resuscitation techniques in ensuring the mechanization of technological processes in the context of existing structural features of agricultural production; the use of a comprehensive indicator for assessing the operational level of the machine-tractor fleet; development of the model of production and technical exploitation of the fleet based on four groups that characterize the usefulness of organizational, technical and technological measures, as well as methods of increasing the level of technical service of various economic entities to ensure the quality of the machine-tractor fleet operation:

a) Existing forms of technical and technological classification of mechanization of production processes in agriculture and increasing the intensity of use of machines in established engineering service facilities;

b) Improvement of production and technical exploitation of machine-tractor fleet of service enterprises operating in economic climatic conditions and improvement of use of machines with application of resuscitation techniques;

c) Ensure that labor costs and maintenance and repair in the manufacturing process are lower than the cost of 15 manat per conventional ha etalon;

d) Ensure the performance of the whole complex of mechanized work with the effective use of the machine-tractor fleet.

Keywords: Large Company Farms; Agroservice Enterprise; Production–Technical Exploitation; Optimal Method; Means Of Supply; Labor Capacity; Complex Indicators; Generalized Factors; Production Resources; Conventional Ha Etalon

Introduction (Problem Setting)

Production and technical exploitation indicators of the machine-tractor fleet involve the planning of the amount of work done by different economic groups. There is a correlation between the technical exploitation factors of production. Depending between the production exploitation and the technical operation, there is a clear distinction. The level of human impact, the technological basis of the organization of work, and the basics of agro-technical knowledge management are indicated. Demonstrates the continuous and high quality of repair-service activities at the facility.

Due to the lack of financial resources, high cost of spare parts the demand for repairs and maintenance service is growing. Lack of theoretical research and practical recommendations for improving the efficiency of engineering services in the agrotechservice system made the purposeful research work important. A well-known expert appraisal method has been used to develop a comprehensive indicator of production and technical exploitation.

The natural features of the region, the technology of cultivation of agricultural crops, the structure of the cultivated areas, the relief of the soil, the specific soil resistance, the productivity of the plant require the correct selection of the tractor, the agricultural machinery. As a result of carried out theoretical and experimental researches, the number of machine-tractor units and the minimum cost of fuel consumption in agrotechservices were taken. It was found that the existing tractor fleet is more than optimal.

As a result of the experiment it was found out that the level of production –technical exploitation is closely linked to the reliability and operational performance of the machine-tractor unit. In the established operating modes, the statistical characteristics (U_{ITI}) of failure and repair capacity of the units are changing. Reduces the flow of exploitation opportunities, increases the likelihood of complex exploitation, and labor capacity to eliminate them.

Chart of dependence on the level of production and technical exploitation, taking into account all agro-technical services, was presented during the year. He also presented a structural scheme of the complex for maintenance of machinery and tractor fleet.

The purpose of the article

Is to improve the production and technical exploitation of the machine-tractor fleet and the efficient use of machinery in the service area with the use of reservation equipment.

The methodologies and methods

Used as a theoretical and methodological basis of research are the works of our country and foreign scientists on the technical maintenance of agricultural production, the organization and effective functioning of the institutions implementing it. Here a number of methods of analysis of mass service theory and graph theory are used.

Decrease in equipment supply by agricultural products manufacturers of agricultural machinery, use of outdated technology and techniques lead to a reduction in cultivated areas and a decrease in the productivity of the major agricultural crops, which will reduce the efficiency of landowners' activities and become an obstacle to the application of reservation technologies, modernization and intensification of production. In agricultural production, reservation methods are inseparably linked with the application of minimum tillage technologies, combined machines, rational machine-tractor aggregates, and machine fleet, which ensure the performance of several technological operations and increase soil fertility [1]. The disparity between technical exploitation and production exploitation in machinery can lead to a decrease in many consumer performance indicators of the machines, making the manufacturing sector less efficient.

In recent years, there has been a decline in the number of machine-tractor fleets created in our republic and in the Russian Federation in publications published on the topic. In this regard, a great deal of research has been done by many scholars. From this point of view, solutions are recommended in the research works "Organization of maintenance of machine and tractor units in the MTS" by K. Aliev and "Machine-technological stations and agricultural agricultural technology parks as a tool for creating innovation and increasing the material and technical base of an enterprise" by Boldaruk D.Yu., Boldaruk II [2,3]. An optimal number of machines is needed to obtain technical and economic indicators and to increase investment. Theoretical and practical issues were mentioned in the research works "Recommendations on incriminating MTS production and technological activities" by L. Orsik Mikhlin V.M., Kushnarev L.I., Khmeleva N.M. and On the issue of improving the methodology for calculating the optimal composition of the ICC "by Pasin AV, Pototsky AA [4,5]. The articles "Evaluation of the efficiency of the use of machines in agricultural production" by Kazakov A.V., Koshelev R.V., Tulnev A.V., "General principles for the effective use of the means of technical operation of MTP in the conditions of STS" by Zangiev A.A. Dudmanidze O.N., Mityagin G.E., "Optimization of maintenance and spare provisioning policy using simulation" by Ruhul S. and Amanul H. deal with the issues of developing the material and technical basis of agricultural production in modern conditions [6-8].

The articles "Problems of assessing the effectiveness of the use of agricultural machinery" by N. Shetnin and "Certification of technical service enterprises in a market economy" by M. Halfin show that there is greater efficiency in agricultural production compared to other options in the formation of Machine Technology Stations [9,10]. The experience of the Russian Federation, Belarus and several Western countries shows that it is possible to improve the use of the machine-tractor fleet and achieve high technical and economic performance. For this purpose, it is possible to arrange agricultural activities by choosing the most suitable options. It is recommended that Agrotechservices use the power to obtain the missing equipment if necessary. In the scientific work "Calculation of the needs of a rural enterprise in the means of technical maintenance and repair of machines" involved in this work by Yudin MI, Meikolo LF, Zakharchenko AP, Tomyakov AI, the relationship between technical operation and production has been suggested as a research work [11].

The main scientific novelty

The results is the use of integrated indicators to mechanize technological processes in the context of existing structural features

of agricultural production, to increase the operating level of the machine-tractor fleet. The production and technical operation depends on the level of technical maintenance of the process.

The presentation of the main material

Consists of analysis of information related to the operation of machine in the regions, integrated approaches to the production and technical exploitation of the machine-tractor fleet to increase the efficiency of the use of machines. The need for such an approach stems from the fact that the production and maintenance processes of machines are inextricably interconnected and have a profound effect on each other.

Improvement of production and technical exploitation of machine-tractor fleet in agrotechservice and improvement of use of machines with the use of resuscitation techniques is very important [2].

Using various techniques and technical equipment

puts serious tasks before agriculture in terms of population's food supply, both now and in the future. The problem of increasing the intensity of agriculture is one of the urgent issues of the day. Unless there is a clear tendency for this increase in agricultural groups, in the agrotechservice group, the daily productivity of the units increased from 8.29 to 8.87 conventional hectares at a 30% increase in production. This indicates that the analyzed features are closely related to the continuity and quality of maintenance activities. Minimum costs are possible when there is less demand for repairs due to lack of financial resources to purchase spare parts (Figure 1).

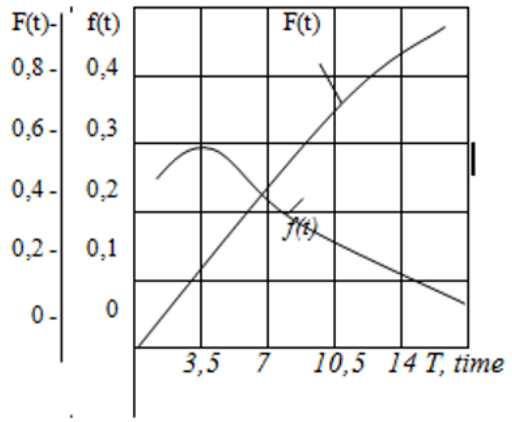

Figure 1: Distribution of probability of rejection of work volume f(t) and MT3-1221+3C3-3, 6 denial of sowing aggregate. T=6,9 hours; σ=4,3 hours.

As a result of the experiment it was found out that the level of production and maintenance is closely linked to the reliability and technical exploitation performance of the machine-tractor unit. Statistical characteristics of the unit's not refusing and repair capacity (Figure 2) in the established operating modes change as UİTİ increases. The flow of exploitation opportunities is reduced (Figure 3), the possibility of complex exploitation and the labor capacity to eliminate them are increased (Figure 4).

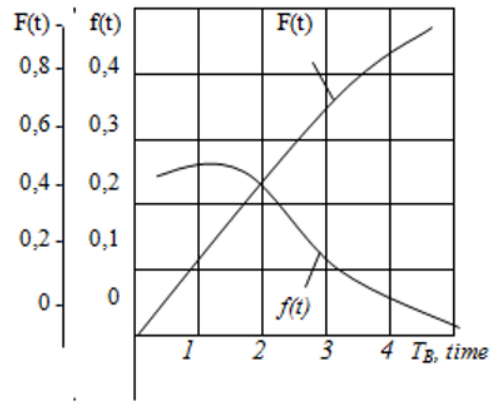

Figure 2: MT3-1221+3C3-3,6 distribution of restoration of working capacity of the sowing unit T= 2,4 hours; σ =1,7 hours.

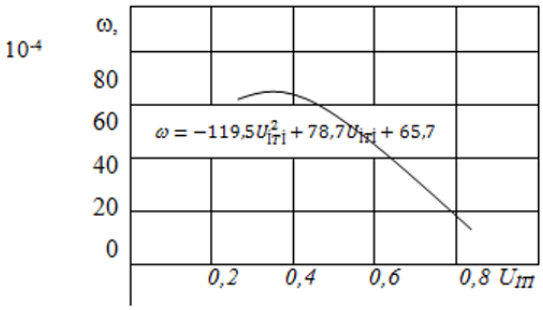

Figure 3: Dependence of the denial flow parameter (ω) on the level of production and technical exploitation (UİTİ). UİTİ- production and technical exploitation.

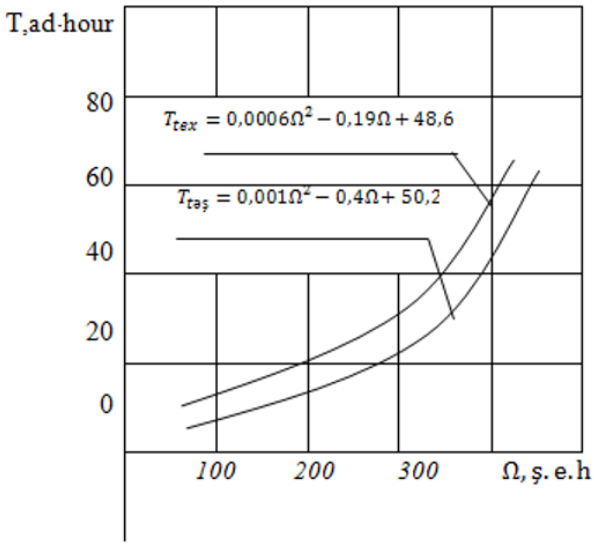

Figure 4: Changes in working conditions to avoid idle parking of machine-tractor units for technical (T_{tech}) and organizational (T_{org}) reasons with increasing annual load.

This is due to the fact that as the complex denials of older techniques increases, the removal of them requires more time and costly repair and maintenance effects. This situation creates a desperate situation for all areas of the zone, as the maintenance infrastructure is poorly developed. To get rid of this, car owners either choose their own service path or stop using the car. The increase in the use of tractors in the peasant-farming group, with an average annual operating capacity of 130 conventional hectares, was accompanied by increased maintenance and repair costs by 15 man. / conventional hectare. In this group, mainly obsolete machines are used, which can lead to undesirable results.

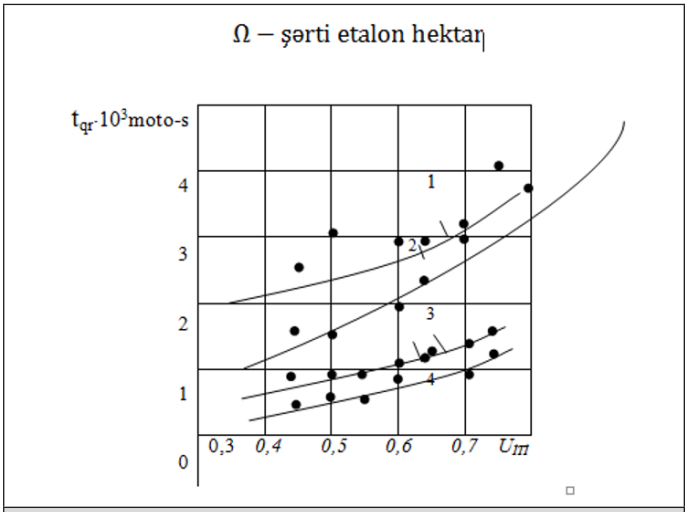

Figure 5: Dependence of residual resource (TR) (t_{qr}) of MT3-1221 tractor power disconnect shaft and transmissions on the level of production and technical exploitation (U_{ITI}).

1- Wheel of the 1st stage of GAV transmission; 2- Wheel of the 2nd stage of GAV transmission; 3-gear wheel of the 2nd transmission; 4- gear wheel of the 3rd transmission;

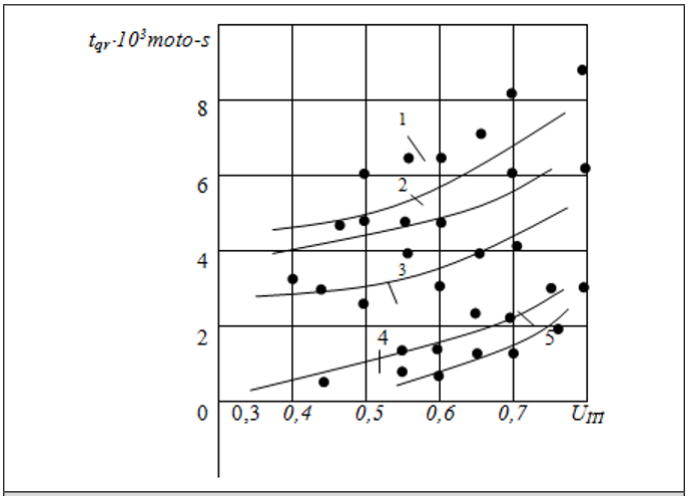

Figure 6: dependence of the residual resources (t_{rr}) of the MT3-1221 tractor transmission and attachment coupling on the level of production and technical exploitation(U_{ITI}).

1– main gear wheel; 2– transmission gear wheel; 3– sun gear wheel;
4– compression handle of attachment coupling; 5– drive coupling disk.

The level of production and technical exploitation of machine resources under the influence of factors is determined by taking into account the average rate of change in the parameters of the details. Assessment of the impact of the level of production and technical exploitation of the machine-tractor fleet has shown that various parts and components have a long-term tendency to improve the quality of service (Figure 5 & 6).

At the same time, the dynamics of consuming the details noted as a result of the instability of the production and technical exploitation process depend on the complete maintenance of technical services and the professional training of the staff. With an average annual load of 1220 acres, repair costs were reduced by 0.6 manat per unit of work thanks to using technologies in high level, increasing the level of exploitation, reducing emptiness of machine-tractor unit due to technical issues.

Impact of production and technical exploitation on repair costs shows that the efficiency of using technology is not the same (Figure 7) [12,13].

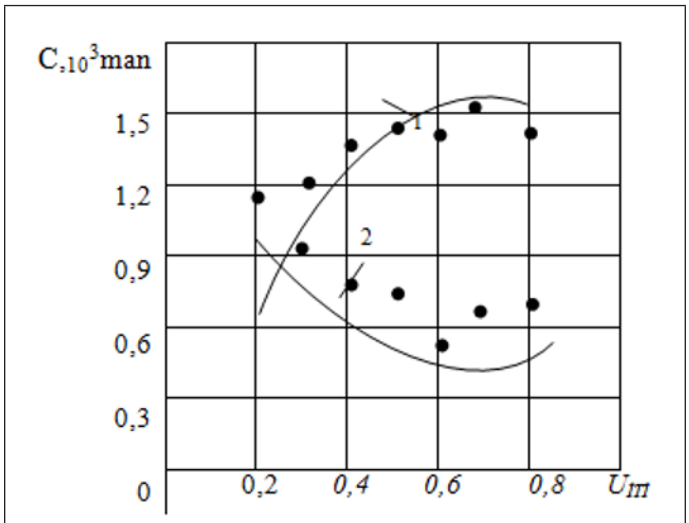

Figure 7: During the operation of a machine-tractor unit dependence of income (1) and expenses (2) on the level of production and technical exploitation during the season.

The costs associated with maintaining and operating the machinery are even greater when the total costs of production and technical exploitation are U_{ITI}>0,7. This is due to the fact that the park has a lot of old equipment, its over-amortization period, their ability to work and increase unreasonable costs. Thus, the production and technical exploitation level in the farming groups with an average index of 0.50 was 221 conventional hectares with an increase of 12 AZN per unit of repair and maintenance costs.

When U_{ITI}<0,5, the damage caused by the non-use of machines is sharply increased. This is mainly due to the extension of agricultural crops for sowing and harvesting. The level of operational and technical operation leads to increased technical and technological risk and a decrease in profitability.

The process of using a relatively stable machine is observed when $0,5<U_{İTİ}<0,7$. The dispersion analysis of costs associated with operational and maintenance costs shows that more than half of this is due to the difference between the level of technology utilization and its ability to maintain. The dispersion analysis of costs associated with production and technical exploitation shows that more than half of this is due to the difference between the level of technology utilization and its ability to support it.

The use of innovative techniques during production and technical exploitation has shown that the level of production and maintenance of the machine-tractor fleet increases with the combined efforts of agrotechnical enterprises in our research farms. The main goal in this approach is to improve the use of the machine. At the same time, economic interests are determined by the increase in revenues of commodity producers from the main production. At the same time, the main advantage is the reduction of the demand for machines and mechanisms, respectively, the costs of their acquisition and operation, and the timeframe for their work.

A joint determination of the machine utilization strategy shows that the use of machine-tractor units over a day is achieved by increasing the productivity of the units. Performance of hourly production tasks increases the efficiency of aggregates by 30-35% compared to the level of self-sufficiency of the farm. Productivity is particularly high in cultivation (1.0 ha / h). Costs for maintenance of cars are significantly reduced. This is mainly due to the use of mobile and semiconductor tools, which in practice prevent the machinery from being unused for technical reasons. All of this ultimately affects the level of production and technical exploitation. Figure 8 shows the variation in production and technical exploitation, depending on the productivity of the sowing unit MT3-1221 + C3-36 in different use methods (Figure 8).

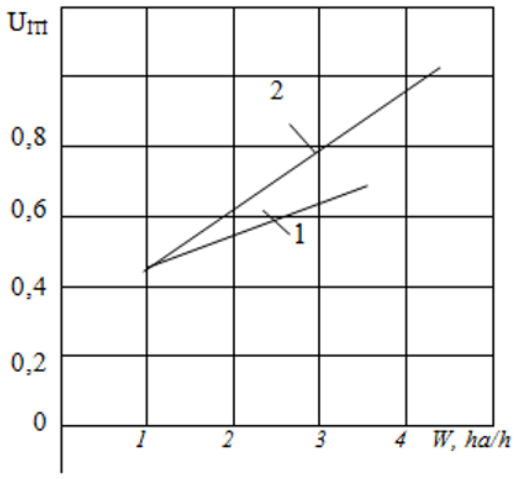

Figure 8: Changes in production and technical exploitation levels (UİTİ) depending on productivity (W) of the sowing unit (1) when the farm uses its own technology (2) to integrate technology with the agrotechnical enterprise.

The positive effects of integration were evident during the first months of collaboration. At the same time, the integration of farm activities with the agrotechservice enterprise requires extensive organizational training. Each machine-tractor unit has its own productivity and adaptation for movement in space, Annually, prices for agricultural products, machinery, fuel and lubricants, seeds and fertilizers change, productivity is changing, and hence the use of technology according to integration principles cannot be considered a one-time solution. Specific cost of the unit can be achieved both by increasing the level of production and technical exploitation and by increasing the efficiency of the machine-tractor unit (Figure 9).

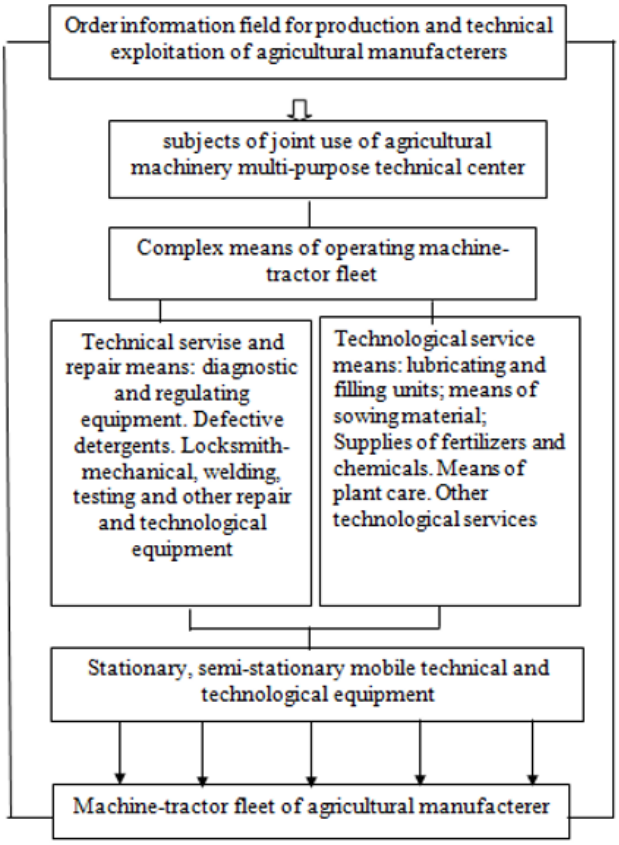

Figure 9: Structural scheme of the complex of production-technical exploitation of machinery-tractor fleet.

When the same amount of mechanical work was done, the advantage was given to the MT3-1221 tractor unit. This is not only due to its high productivity, but also due to its relatively low demand for production and technical exploitation. Determining the optimal location of equipment (machinery, machine-tractor unit, machine fleet) required by the service and agrotechservices, it is considered that the agrotechservice facility will be able to maintain the technology at one point. The machine-tractor unit must be serviced at the starting point after servicing [14,15].

Research has shown that the most viable option is to combine agrotechservice object and means (e.g. machine-tractor units

and workshops) in two ways: let each machine be parked in the work shop return to the starting place (work) after service. As we have seen, this shift of machinery should not exceed 53 km for agrotechservice and 15-16 km for peasant farms. It also provides the option of moving the service vehicle to the point where it is a machine and then returning to its original location. The distance of such mobile workshops should not exceed 37 km for agrotechnical enterprises, 17 km for large farms and 4-5 km for peasant farms [16,17]. Interrelationships and models of production-technical exploitation of the machinery and tractor fleet show that their implementation is more realistic for small-scale joint ventures at the district and inter-farm levels.

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