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The Impact of Overhaul on the Efficiency of the Use of Construction Machines

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Abstract: Overhaul (CR) of equipment can be considered from two positions - as an option for updating the fleet of vehicles (extension of service life) and as a method of improving efficiency. Equipment suppliers also use the KR to prepare machines for sale. For many Russian enterprises, at the moment, the KR is the only visible opportunity to somehow maintain their own fleet of vehicles due to the lack of funds to purchase new units.

Keywords: technical operation, aspects, facility, maintenance system, CM.

Introduction

In the pre-perestroika period, the CM was produced at special enterprises, formed, as a rule, at large construction organizations (head offices). To date, there are almost no such enterprises left.

The implementation of the CM was taken over by the mechanization departments and the equipment manufacturing plants. If an organization produces CM on its own and for itself, then a high level of machine recovery is achieved: the readiness factor is 10...20% of the value for a new machine and decreases approximately in the same ratio with each overhaul cycle [3, 5, 7 , 8, 9, 12]. If the CM is performed for the purpose of profitable sale of equipment, the scatter in the values of recovery parameters is very wide and is of a random nature. It should be noted that the quality of imported equipment overhauled at the factories of manufacturing companies is very high, and the price-quality ratio is higher than that of new machines.

The feasibility of conducting a CM depends on many factors: the financial position of the enterprise, the required level of equipment reliability, the possibility of carrying out CM and the number of overhaul cycles, the proposals of the machine market, etc. [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]

In order to assess the feasibility of CM and choose the best option for maintaining the required level of fleet performance, it is necessary to create a model of the change in time of the technical and economic indicators of the machine during operation with and without RC and optimize according to the criteria determined by the strategy and tactics of the ESAP functioning.

Main part

Analysis of trends in the field of improving the efficiency of the technical operation of construction equipment.

The efficiency of the product maintenance and repair system, in accordance with GOST 15.601-98, determines its ability to maintain and restore the specified properties of these products and ensure a given level of their technical readiness at optimal time, labor and cost (efficiency indicators - according to GOST 18322).

An analysis of global trends in the field of increasing the efficiency of MS allows us to identify several main areas:

1. System analysis of MS, modeling of the main production processes.

2. Separation of heat energy into a separate area of activity.

3. Creation of a quality system for technical operation.

4. Formation of the efficiency of fuel cells at all stages of the life cycle of the machine.

5. Improvement of management and functioning of MS elements using information technologies.

6. Improvement of the TS strategy and processes.

System analysis. The perfection of the system is determined by the degree of compliance of its organization with the modern level of development of science and technology. The efficiency of the system, as the degree of realization of resources [ISO 9000:2000, clause 3.2.15], is an integral characteristic, consisting of partial performance indicators of individual processes and structures operating as part of the system.

Therefore, the improvement of technical operation, as a subsystem of ESAP, provides for a systematic analysis of enterprises for the operation of equipment and the substantiation of particular criteria for the effectiveness of their activities.

Accounting and processing of a large amount of data, calculation of indicators, process optimization, process management are impossible without the use of special information technologies.

Thus, the complex of studies to improve the MS of construction and road equipment will include:

- system analysis of the enterprise for the operation of construction machines (ESAP);
- improvement of the organization of production processes;
- development of private criteria for the effectiveness of individual processes and structures of the ESAP.

From the point of view of the organization of production processes, the efficiency of MRO of a product, according to GOST 15.601-98, can be increased by: improving the strategy of MS of a product in accordance with operational data on its reliability; development of operational and repair documentation; improvement of MRO modes.

Improvement of MRO modes. Maintenance and repair modes are understood as the frequency and composition of technical impacts (TV). Significant research has been carried out in the areas of operation of vehicles [2, 3, 4], aircraft [5], construction machines [6, 7, 8, 9] and others [12, 13]. The TV frequency adjustment is based on modeling the dynamics of the reliability and performance indicators of machines under the influence of operating factors (operating modes, climatic conditions, safety requirements, etc.) and the controlling and restoring actions of maintenance and repair. The adjustment is made by applying a system of coefficients, the values of which change as the machine ages.

Conclusion

According to GOST 15.601-98, the quality of the product after maintenance and repair is determined by: the technical condition of the product received for maintenance or repair; quality of spare parts (new and remanufactured) and materials used in maintenance and repair; maintenance and repair quality.

Currently there are two problematic areas of improving the quality of service of construction equipment. The first is the development of a service based on a proprietary life support system (LSS) by organizing a dense dealer network using MRO technologies developed by manufacturers. The second is the improvement of the system of operation of the worn-out fleet of machines of general construction organizations.

The main customers of the proprietary service system are large road construction organizations that own expensive imported equipment.

The predominant part of the park of construction machines is operated by organizations of a general construction profile. As a rule, experienced engineering personnel and skilled workers of these organizations will not experience any special difficulties with the technical side of maintaining the park's performance. However, the problem is to ensure the operability of complex imported equipment equipped with servo drive systems, built-in diagnostics, automated control, especially in the absence of proprietary technical support. The intensity of the appearance of new models of construction machines is constantly increasing. The MS of machines within the framework of the existing organization of the functioning of the ESAP does not have the ability to quickly adapt to the maintenance of new equipment. They cause problems and questions of an organizational, structural, managerial nature, strategies and tactics of the functioning of the company in unusual and difficult market conditions.

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