DEVELOPMENT OF THE SCIENTIFIC CONCEPT OF ENERGY EFFICIENCY RCM FROM THE PERSPECTIVE OF A SYSTEMATIC APPROACH

Master's student of TSTrU: ***Aliev Namaz***
PhD., Associate Professor, TSTrU: ***Abdurazzokov Umidulla***

Abstract. On this thesis analyzed systematic approach of energy efficiency of RCM.

Key words. Energy efficiency, RCM, systematic approach

One of the main tasks of the Russian engineering industry at the moment is its modernization. Modernization of mechanical engineering implies the development of Russia on an innovative basis in the conditions of transformation of industrial and economic relations, characterized by high dynamics of all scientific and technological processes. This includes the search for fundamentally new energy-saving technologies and the integration of the best practices of leading world countries into domestic production.

However, the realities of our modernity clearly reflect the unsatisfactoriness of the foundations of the theoretical and methodological framework and the lack of an integrated approach in finding effective tools for influencing the development process. The formation of the theoretical basis of the management tools for the sustainable development of scientific and technological systems in improving the reliability and durability of the SDM hydraulic drive is a significant scientific and practical task. Qualitative modeling of the formula for increasing the energy efficiency of a hydraulic drive is likely with a complex impact on organizational and technological systems, it will allow taking into account operating conditions, interpreting the process of energy efficiency of hydraulic drive of earthmoving machines, mathematical modeling of dynamic processes of hydraulic drive, methodology for substantiating optimal parameters of earthmoving machines, etc. Based on this, it is possible to form adequate effective actions that have an impact on rhythmic development. The conceptual model of the management system methodology for the study of the processes of improving the energy efficiency of the hydraulic drive system is presented in Figure 1.1.Development of the scientific concept of energy efficiency SDM from the perspective of a systematic approach

Figure 1.1 − Conceptual model of dissertation research

The scientific problem is the need for a scientific and methodological basis for improving the existing control systems of a single-bucket excavator to ensure efficient power distribution across its main elements, taking into account system connections, which will minimize time and energy costs, and increase the productivity of the machine.

The structure of the proposed system is as follows. The transformation of problems into goals, due to objectivity and relevance, is currently the input of the management system methodology for the study of processes to improve the energy efficiency of machines. There is no doubt that this field is diverse in many positions (climatic, constructive, operational, technological, the availability of labor resources, as well as the level of development of the scientific sphere, etc.). This means that the more the stage of the controlled subsystem is studied, the deeper the differentiation of the cumulative potential for improving the energy efficiency of the hydraulic drive, and the possibility of its identification is less.

In the aggregate, energy efficiency, patterns of dynamic processes, efficiency, technologies for reducing the energy intensity of the cycles of the excavation cycle − there is a controlled subsystem, the consistency of which will be affected by the hypothesis put forward, the goal set, the formulated research tasks (the control subsystem).

It also describes the basic conditions for the consistency of the managed subsystem and reflects the primary factors of the stable formation of these systems. Analytical research, mathematical modeling of processes and methodology of processes determine the conditions of formation, based on the complex of knowledge of the methodological concept. Only these directions can modify the structure and the principle of decision-making at the first (interpretation of the process of changing the energy intensity of the cycles of the excavation cycle of earthmoving machines), the second (development of a mathematical model of dynamic processes) and the third (methodology for improving energy efficiency) stages of research.

Sustainable development involves the qualitative adaptation of mathematical models to the real processes of operation and the development of a scientifically sound methodology for substantiating the optimal parameters of the effective drive (ES) of earthmoving machines. The adaptation of mathematical models to real processes of operation and the determination of optimal parameters of the EP must be monitored in order to have objective information about the factors affecting them to varying degrees. Therefore, an integrated information array that allows you to develop a set of practical recommendations, implement them and analyze the results obtained is an important element of the system. Based on the results of the analysis of the data obtained, it is possible to estimate the level of energy intensity and durability of the entire hydraulic drive as a system (system output).

The key element of the information array will be the interpretation of the process of changing the energy intensity of the cycles of the excavation cycle of earthmoving machines from the point of view of mathematical models. According to a number of authors, the interpretation of processes should be investigated from the standpoint of adapting mathematical models to real processes of operation and energy efficiency of a hydraulic drive.

A well-organized system of monitoring and evaluation of the mathematical apparatus of the study of processes and patterns of dynamic processes of the hydraulic drive will make it possible to more effectively form tasks that require special participation of the researcher at all stages. Based on the data obtained, it will be possible to make effective management decisions, to form a list of measures that will change the conditions (prerequisites) for the functioning of the controlled subsystem (feedback) in the direction of the mathematical model of research. Considering the

above, the described system has such indicators as unity, structurally organized, purposefulness. It should be noted that the theoretical assumption about the use of an integrated approach to the creation of a logical-structural scheme of the study is significant and justified.

The implementation of the model of mathematical description of the priority research process (energy efficiency) is consistent with a holistic variation of the elements of the mathematical apparatus.

The solution of a set of tasks taking into account system connections is possible with a systematic approach of considering the effectiveness of the process. Thus, the excavator is presented as a complex hierarchical system (Fig. 1.2) consisting of the main subsystems (power plant, hydraulic drive, working equipment, working body and environment).

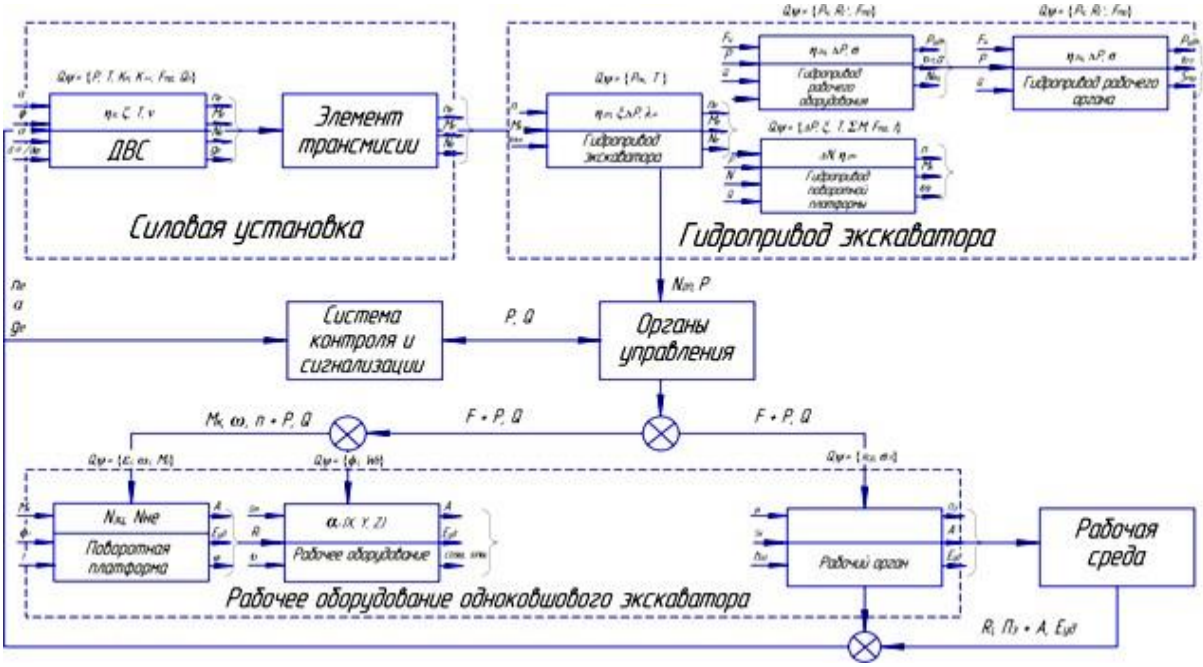

Figure 1.2 - Block diagram of the main excavator systems

An integrated approach as one of the priority conceptual principles of scientific research provided an opportunity to identify and adapt the main subsystems and its components, interaction, goals and functions, to develop a logical and structural block diagram of the control system by studying the processes of changing the energy intensity of the cycles of the excavation cycle of earthmoving machines and increasing their energy efficiency.

Reference

1. Yusupov, Umidbek Boltaevich, Valeriy Anatolevich Topalidi, and E. Uzbekistan. "Development of coefficients for correcting the mileage of tires of

specialized vehicles, taking into account work in career conditions." 湖南大学学报 (自然科学版) 49.02 (2022).

2. Anvarjonov, A. A. "Rating of the operational massage of the tires of large-loaded mining dump trucks operating at the objects of the almalyk mining and metallurgical combine." Galaxy International Interdisciplinary Research Journal 10.1 (2022): 36-40.

3. Обитов, Н. М., У. А. Абдураззоков, and А. А. Анваржонов. "Анализ крите-риев оценки энергетической эффективности грузовых автомобилей в условиях эксплуатации." Горный вестник (2022): 99-103.

4. Yusupov, Umidbek, Omil Kasimov, and Akhmadjon Anvarjonov. "Research of the resource of tires of rotary buses in career conditions." AIP Conference Proceedings. Vol. 2432. No. 1. AIP Publishing LLC, 2022.

5. Ziyayev, K. Z., U. A. Abdurazzokov, and B. Ismailova Sh. "Zamonaviy shaharlarning transport muammolari va ularni hal etish usullari." Uzbek Scholar Journal 9 (2022).

6. Ziyayev, K. Z., U. A. Abdurazzokov, and B. Ismailova Sh. "Transport samaradorligi va harakat xavfsizligini oshirishning zamonaviy yo ‘li." Uzbek Scholar Journal 9 (2022).

7. Ziyayev, K. Z., U. A. Abdurazzokov, and B. Ismailova Sh. "Transportation problems of modern cities and ways to solve them." Uzbek Scholar Journal 9 (2022).

8. Abdurazzoqovich, Abdurazzoqov Umidulla, and O‘taganov Sarvar Qahramon o‘g. "DEVELOPMENT TENDENCY OF NOISE AND EXHAUST GASES-FREE ELECTRIC BUSES IN CITY PUBLIC TRANSPORT." Galaxy International Interdisciplinary Research Journal 11.1 (2023): 76-80.

9. Зияев, Камоллиддин Зухриддинович, and Умидулла Абдураззокович Абдураззоков. "ЗАМОНАВИЙ ШАҲАРЛАРНИНГ ТРАНСПОРТ МУАММОЛАРИ ВА УЛАРНИ ҲАЛ ЭТИШ УСУЛЛАРИ." Uzbek Scholar Journal 9 (2022): 253-255.

10. Ziyaev, Kamoliddin Zuxritdinovich, and Shoxsanam Bekjon qizi Ismailova. "Method of determination of transport intensity in urban conditions." European multidisciplinary journal of modern science 5 (2022): 111-114.

11. Anvarovich, Mukhitdinov Akmal, and Ziyaev Kamoliddin Zukhritdinovich. "Method for evaluating the energy efficiency of regulated driving cycles." European science review 9-10 (2016): 234-236.

12. Ziyaev, K. "Development of a test complex for determining the modes of movement of vehicles." Scientific-technical journal of FerPI (2021).

13. Mukhitdinov, Akmal, et al. "Methodology of constructing driving cycles by the synthesis." E3S Web of Conferences. Vol. 264. EDP Sciences, 2021.

14. Khudayberganovich, Khakimov Shaukat, Mukhitdinov Abbos Akmalovich, and Abdurazzoqov Umidulla Abdurazzoqovich. "Estimation of efficiency of the road train used in mountain conditions." European science review 7-8 (2016): 233-235.

15. Abdurazzoqov, U. A., and A. M. Ochilov. "Navoiy shahar jamoat transport tizimi takomillashtirish." International scientific online conference. 2022.

16. Зияев Камоллиддин Зухриддинович, Абдураззоков Умидулла Абдураззокович, and Исмаилова Шохсанам Бекжон қизи. "ТРАНСПОРТ САМАРАДОРЛИГИ ВА ҲАРАКАТ ХАВФСИЗЛИГИНИ ОШИРИШНИНГ ЗАМОНАВИЙ ЙЎЛИ". Uzbek Scholar Journal, vol. 9, Oct. 2022, pp. 244-6, https://www.uzbekscholar.com/index.php/uzs/article/view/313.

17. Topalidi, V. A., and U. B. Yusupov. "Wear resistance of tires of specialized vehicles depending on the category of strength of quarry roads." Automotive industry 12 (2020): 20-22.

18. Topalidi, Valeriy, Umidbek Yusupov, and Samad Allaberganov. "Improving the efficiency of transport logistics support." AIP Conference Proceedings. Vol. 2432. No. 1. AIP Publishing LLC, 2022.