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«ҒЫЛЫМ ЖӘНЕ БІЛІМ - 2018»
XIII Халықаралық ғылыми конференциясы

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The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов и молодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

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The method of selecting rational parameters of the maintenance and repair system for improving the working capacity of career vehicles has been developed, the application of which will allow the maintenance of maintenance and repair records to be recorded, analyze them and, on the basis of this, take technical, technological and organizational decisions, Regulations for maintenance and repair of dump trucks, as well as, if necessary, develop recommendations for manufacturers to improve the reliability engineering.

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DEVELOPMENT OF A COMPREHENSIVE INDEX OF THE EFFICIENCY OF ROLLING STOCK OPERATION

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The widespread use of road transport, its technological and organizational advantages, requires the identification of existing reserves to increase the efficiency of vehicle operation, technical and technological levels of vehicles and equipment; development of modern mechanisms for renewal of rolling stock; improving the structure of the rolling-stock of rolling stock of road transport enterprises (MTE), taking into account modern principles of management and organization of activities in a market economy.

In their activities, business entities often face the problem of choosing the best solution from alternative options. An auto transport company when purchasing vehicles should solve the problem of choosing the most efficient rolling stock, and consumers of transport services choose the carrier whose quality / price service is better than that of competitors.

For the company's managers, the issue of making an effective decision regarding the use of rolling stock (selling, replacing, increasing the efficiency of use) often arises. For this, it is necessary to develop a strategy. Many foreign authors consider strategic planning in detail, in which it is necessary to assess the available opportunities, and be prepared for competition based on market research.

The complex of parameters characterizing the competitiveness of the MTE includes technical, economic and socio-organizational groups of parameters. Technical parameters are the most stringent and to a large extent characterize the quality of the transport-technological process. They are determined by the current standards, norms, rules, technical regulations, recommendations, legislative acts, compliance with international norms and characterize the boundaries of changes in technical parameters.

It is also necessary to remember the safety of the rolling stock and its compliance with international quality standards.

Economic parameters are characterized by a one-off cost for the acquisition of vehicles (the paid cost of the goods, transportation costs, pre-sale services, taxes, customs duties) and the costs of operation (maintenance, services, repairs, spare parts, fuel, depreciation).

Social parameters are characterized by taking into account the social structure of consumers, fashion, shifts in the structure of consumption, national characteristics in the organization of production, advertising, marketing, service. Tendencies of changing external factors can be taken into account: the economy, market conditions, scientific and technological progress, the sudden emergence or withdrawal of competitors from the market.

Organizational parameters are characterized by the volume and terms of delivery; forms of payment and payment terms; completeness of delivery; conditions of guarantee, responsibility of the parties for fulfillment of the supply contract; system of discounts and cargo insurance.

Solving multivariant problems is greatly simplified if the manager has at his disposal reliable quantitative results of the evaluation of alternative options. Then the options can be ranked, and the choice of the best of them is not difficult. Naturally, the results of the evaluation should be objective, otherwise the practical application of them instead of good can harm.

At present, the manager or the person making the decision faces the problem of selecting the necessary information from a huge number of statistical data. Selection and validation of information takes a large amount of time.

Therefore, the leader, in order to avoid mistakes, must also rely on the scientific approach when choosing the criteria for decision-making, since the price of the error is very high.

When making an optimal decision in a market economy, the manager must take into account also the issue of competitive relations in the field of road transport, and the MTE should use its competitive capabilities, namely: reputation, high quality, legitimacy and dumping.

Any manager or person making a decision is interested in high efficiency of the enterprise. To make effective decisions, it is necessary to have initial data that characterize the company's work, exposing its shortcomings and seeking out potential opportunities. Thus, to justify economic decisions, it is necessary to conduct an analysis. It is implemented through a series of techniques. Some of them were developed on the theory of analysis proper, others were borrowed from other sciences: mathematics, statistics, psychology, management, accounting. The head, in our opinion, should be guided in all variety of receptions and spheres of their most rational use. All methods of analysis (the total number of them is about a hundred) can be divided into three large groups: logical, mathematical and heuristic.

Logical analysis methods are relatively simple and do not involve the use of complex apparatus. Central to this group is a comparison - the most common technique, the essence of which is the evaluation and analysis of the object under study (process, phenomenon) through other similar objects. When using the comparison, it is necessary to remember two sayings: "everything is known in comparison" and "any comparison is lame". The task of the manager and analyst is to reduce the error of reception to a minimum.

When performing the analysis using this technique, it is necessary to choose a comparison base and to ensure comparability of the compared objects and the indicators reflecting them. The basis for comparison is:

1) Planned indicators, which, in the conditions of transition to a market economy, are compiled by the enterprise itself based on government contracts and the existing conjuncture, contracts and contracts concluded on the market.

2) Indicators of previous periods, through which the dynamics of development of individual aspects of production are visible.

3) Indicators to be achieved by the enterprise according to the project.

Also, during the analysis various methods are used:

- reception of allocation of "narrow" places and leading links;
- detailing;

- grouping;
- balance sheet;
- chain substitutions;
- expert method;
- index method.

The complication of production, the increased influence of market factors, the increase in the price of the error of the "unsuccessful solution" require the leader to use in his analysis more subtle methods and techniques, a modern mathematical apparatus.

For their qualified use, a systematic understanding of the economic activity of the facility, mathematical methods for describing the phenomena under investigation, and imitating their behavior in the situations that are used are necessary.

When using mathematical models in analysis, the following sequence should be adhered to:

1) Define the task in the content plan in accordance with the goal.

2) Clearly formalize the task.

3) Formulate a mathematical model, that is, present an analytic problem in the form of a system of equations and inequalities.

4) Prepare information for solving the problems of the model.

5) Develop (or use the existing) algorithm for solving the problem on the computer.

6) Solve the problem.

7) Interpret the results.

8) Accept, based on the interpretation of the results (or taking into account it) the relevant decision (or return the materials for revision, including changes in the volume of the source information, objective function, constraints).

The characteristics of methods and methods of analysis are given in the scientific and educational literature.

The most widespread on foreign firms have received mathematical-statistical models. They are based on the presence of an incomplete probabilistic (stochastic) connection between the studied indicators.

This method, using a mathematical model, can be actively used in analyzing the economic efficiency of introducing innovations, especially where results are not amenable to a strict quantitative measurement (introduction of a new system of organizing or preparing production, organizing labor, restructuring management, introducing new forms of management, improving qualifications of employees).

Currently, heuristic methods are also used:

1) The adoption of the analogy involves the use of such a known solution.)

2) The reception of the inversion consists in applying the system "on the contrary" (turn the object "upside down"), turn it inside out, swap it.

3) The brainstorming session is a method of intensive generation of new ideas through the creative collaboration of a group of specialists.

4) The reception of the synectics is based on the discussion of dissimilar elements. With the use of synectics, a group of specialists of different professions is looking for a solution to the problem.

5) Reception of control questions. With the help of leading questions, solve the problem.

6) The reception of a collective notebook allows you to combine an independent nomination of ideas by each member of the working group with their collective assessment and decision-making process.

7) Morphological analysis is based on combinatorics - a systematic study of all theoretically possible variants that follow from the patterns of the structure (morphology) of the analyzed object.

When choosing the optimal rolling stock, it is necessary to take into account the main tasks of logistics:

- selection of the type of vehicles;
- justification of leasing or attraction of vehicles from specialized organizations;
- rent of vehicles;

- selection of the optimal complex, combination of vehicles;
- determination of optimal transport routes;
- development of plans for the use and loading of vehicles.

In this regard, for the effective operation of the MTE it is necessary that the car is operated at the maximum, that is, the period of working time during which the car is in good condition and operated, approached the number of hours of the working shift.

The solution of the tasks set in the present work was carried out in relation to a trucking enterprise engaged in freight transport, the structure of which includes a universal rolling stock, a different service life, as the simplest type of MTE. Subsequently, it is possible to proceed with the development of a rational structure for motor transport enterprises of other types.

Each vehicle in the coordinate space "output per line - technical availability ratio" may occupy a certain place, which, nevertheless, does not provide an opportunity for unambiguous judgment on the effectiveness of its operation. To increase the accuracy of this assessment, we propose a comprehensive indicator of the efficiency of rolling stock operation k_i, defined by (1):

$$k_i = \frac{a_{Bi}}{a_{Ti}}$$

wherea_{Bi}- production ratio per line;

a_{Ti}- coefficient of technical readiness.

In fact, the value of the proposed indicator determines how much time a technically sound vehicle was used for its intended purpose.

Fig. 1 illustrates the performance characteristic of the rolling stock taking into account the known(a_{Ti}anda_{Bi}) and introduced k_i indicators.

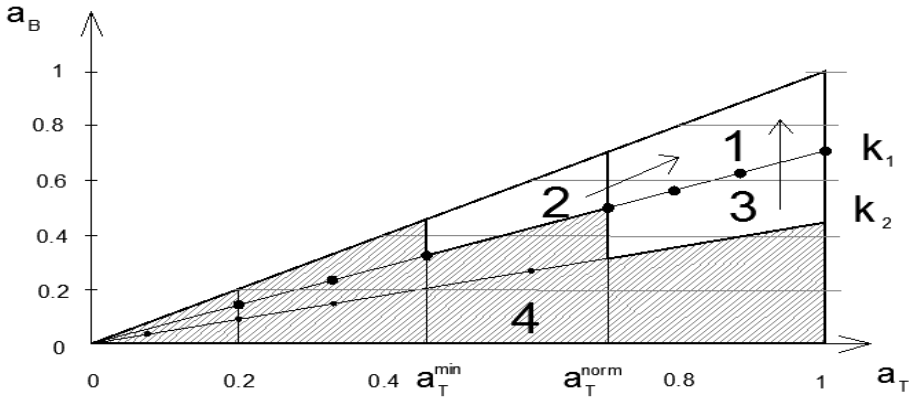

Figure1 - Areas of values of technical and operational performance indicators

rolling stock of a trucking enterprise (a_T^{min}anda_T^{norm}- minimum and normative values of the coefficient of technical readiness, respectively; $k_i$andk_i- boundary values of the complex index; 1, 2, 3 and4 - the evaluation of the efficiency of rolling stock operation).Normative value$a_T$coefficient of technical readiness a_T^{norm}determines the state of the vehicle, at which it is considered reliable when carrying out transport work, and the minimum coefficient valuea_T^{min}- the state when the reliability of the vehicle does not correspond to the conditions for carrying out the transport work.

The space of values $a_B$anda_T (Fig. 2.8.) can be divided into additional segments by two values$k_1$and$k_2$complex indicator k of the operational efficiency of the rolling stock:

k_1–the value of the integrated indicator of the efficiency of rolling stock operation, if equal to (or exceeding) the actual value of the indicator $k_{\phi i}$, the use of the rolling stock for its intended purpose is effective;

k_2–minimum value of the complex indicator of the efficiency of rolling stock operation, and, if the actual value of$k_{\phi i}$ is less thank_2, then the rolling stock is used for its intended purpose not efficiently.

Areas of the values a_B- a_T, concluded between the boundary values of the indicators k_1 and k_2, in order to improve the efficiency of rolling stock use as intended, and four areas are distinguished: 1 - the rolling stock is reliable and efficiently operated; 2 - the rolling stock is satisfactory in terms of technical condition and is effectively operated; 3 - rolling stock is reliable and has the potential to improve operational efficiency; 4-area of low efficiency of rolling stock operation.

The above-mentioned areas of values of performance indicators of rolling stock are used to assess the efficiency of operation of the rolling stock fleet of the MTE and the formation of a system of requirements for the rational structure of the fleet.

Target function of operation of MTEpark:

$$\begin{cases} \frac{a_{Ti} \to 1}{a_{Bi} \to 1} \end{cases}$$

Areas of finding the values of indicators of operation of the rolling stock of MTE are characterized by the following limitations:

1) the fleet of rolling stock is effective, which corresponds to the conditions (area 1):

$$\begin{cases} \frac{a_{Ti} \geq a_T^{norm}}{k_ф \leq k_1} \end{cases}$$

2) improvement of the MTE technical service, renewal of the fleet should be carried out under the following conditions (area 2):

$$\begin{cases} \frac{a_{Ti} \to 1}{a_{Bi} \to 1} \end{cases}$$

3) improvement of the MTE operation servicebe carried out under the following conditions (area 3):

$$\begin{cases} \frac{a_{Ti} \to 1}{a_{Bi} \to 1} \end{cases}$$

4) in other cases MTE vehicles are to be recycled, sold or replaced with other vehicles (area4).

We will determine what decisions the manager can take, using scientific requirements to the rational structure of the rolling stock of the auto transport enterprise (Table 1).

Table 1

Requirements for the rational structure of the rolling stock fleet of a road transport enterprise

AreasofValues	Estimation of the efficiency of vehicle operation	Determining the actions of the MTE services
Areas №1	$a_{Ti} \geq a_T^{norm}$ $k_ф \geq k_1$	Efficientrollingstock
Areas №2	$a_T^{min} \leq a_{Ti} < a_T^{norm}$ $k_ф \geq k_1$	Improvement of the technical service
Areas №3	$a_{Ti} \geq a_T^{norm}$ $k_2 \leq k_{Фi} < k_1$	Improving the activities of the service department
Areas №4	$a_{Ti} < a_T^{norm}$ $k_ф < k_1$	Inefficientrollingstock
	$a_{Ti} < a_T^{min}$	
	$a_{Ti} \geq a_T^{norm}$ $k_{фi} < k_2$	

Thus, the carried out theoretical research allows us to conclude the following:

Increasing the efficiency of rolling-stock operation can be carried out using scientifically sound requirements to the rational structure of the rolling-stock, which allows to purposefully improve the efficiency of car operation on the basis of improving the performance of individual services.

Justified is the need to introduce an indicator of the efficiency of rolling stock operation, determined by the ratio of production coefficients to the line and technical readiness, which together with these indicators form a system of improved requirements for the rational structure of the MTErolling-stock.

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ДИЗЕЛЬ ГАЗДАРЫ ПАЙДАЛАНЫЛҒАН КАТАЛИТИКАЛЫҚ БЕЙТАРАПТАМАЛАР

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Каталитекалық бейтараптамалар құрастырмаларының ерекшеліктері мен металл тасығыштағы каталитекалық бейтараптамаларды өндіру технологиялары туралы қарастырылды.

Каталитекалық бейтараптамаларда ішкі жанудың ПГ қозғалтқыш құрамындағы отынның толық емес жануындағы уытты өнімдерінің жалынсыз тотығуы болады. Реакция катализатордыңбеткі қабатында жүреді. Мысалы, көміртек оксиді тотығады: $2CO+O_2=2CO_2$.Сол жағдай формальдегидпен де болады: $HCOH+O_2=H_2O+CO_2$

Реакциялар осы процесстер өтіп жатқан бірқатар жағдайларға, температураға және ПГ-ның көлемдік жылдамдығына байланысты.

Ереже бойынша каталитикалық бейтараптама екі негізгі бөліктен тұрады: корпус пен катализатордан. Катализатор бастапқы және қайталамадан тұруы мүмкін тасымалдаушыға енгізіледі.Бұл ретте бастапқы тасымалдаушы механикалық беріктікті қамтамасыз етеді, ал қайталама тасымалдаушы газбен байластың қажетті алаңын қамтамасыз етеді.

Қазіргі уақытта тасымалдашылардың әртүрлі нысандары әзірленген: түйіршіктелген, таблетка, жекелеген түтіктер, пластиналаржәне т.б.түрлерінде. Жекелеген призмалар түрінде орындалған керемикалық ұялы тасымалдаушылар кеңінен таралған. Катализаторды тасымалдаушы ретінде екі кеуекті құрылымға, үлкен механикалық беріктік (74-122кг/см^2 дейін) пен дамыған бетке (66-89м^2/г) иеленген бемитті гидроксидінен алынған Al_2O_3 қолданылады. Тасымалдағыштың беріктігін арттыру үшін Al_2O_3 негізінде жоғарғы температурада өңдеу кезінде тасымалдаушылардың негізгі материалдарымен тиісті алюминаттар құрайтын сілтіленген металдар оксидтерінің қоспалары енгізіледі.

1-суретте катализаторы гранулаларға, ал 2-суретте керамикалық призмаларға енгізілген бейтараптама көрсетілген.

Каталитикалық бейтараптамалар өздігінен жүретін тау-кен жабдық үшін жерасты жағдайлар мен мансаптарда машиналардың қалыпты жұмысын қамтамасыз ететін бірқатар