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USE OF THE EXPERT ASSESSMENT METHOD IN TECHNOLOGICAL EQUIPMENT OF AUTOMOBILE ENTERPRISES

ИСПОЛЬЗОВАНИЕ МЕТОДА ЭКСПЕРТНОЙ ОЦЕНКИ В ТЕХНОЛОГИЧЕСКОМ ОБОРУДОВАНИИ АВТОМОБИЛЬНЫХ ПРЕДПРИЯТИЙ

AVTOTRANSPORT KORXONALARINI TEXNOLOGIK JIHOZLASHDA EKSPERTLIK BAHOLASH USULINDAN FOYDALANISH

ABSTRACT

As a result of updating the current situation in the transport enterprises with modern cars, the elements of the production technical base do not meet the parameters of the car, or as a result of obsolescence of existing technological equipment and devices. the problem of adaptive rapid reconstruction occurs. Due to the high weight of factors that need to be taken into account in the development of the system of technological equipment of the trucking company in real production situations, there is insufficient information about the consequences of the decision made in these conditions.

The use of the "expert assessment" method is one of the most effective ways to analyze the situation in the field where there is insufficient information about the consequences of the decision and to gather the opinions of qualified experts in making decisions.

This article analyzes the essence of the method of achieving solutions to the problem by summarizing the opinions of leading experts using the "expert evaluation" method in the conditions of uncertainty and lack of information in motor transport enterprises.

АННОТАЦИЯ

В результате обновления сложившейся ситуации на транспортных предприятиях современными автомобилями элементы производственно-технической базы не соответствуют параметрам автомобиля, либо в результате устаревания существующего технологического оборудования и приборов. возникает проблема адаптивной быстрой реконструкции. В связи с большой массой факторов, которые необходимо учитывать при разработке системы технологического оснащения автотранспортного предприятия в реальных производственных ситуациях, недостаточно информации о последствиях принимаемого решения в этих условиях.

Использование метода «экспертной оценки» является одним из наиболее эффективных способов анализа ситуации в сфере, где недостаточно информации о последствиях решения, и сбора мнений квалифицированных экспертов при принятии решений.

В данной статье анализируется сущность метода достижения решения проблемы путем обобщения мнений ведущих специалистов с использованием метода «экспертной оценки» в условиях неопределенности и недостатка информации на автотранспортных предприятиях.

ANNOTATSIYA

Avtotransport korxonalarining harakatdagi tarkibi zamonaviy avtomobillar bilan yangilash natijasida ishlab chiqarish-texnik baza elementlari avtomobil parametrlariga mos kelmasligi, yoki mavjud texnologik asbob-uskunalar va qurilmalarning eskirganligi natijasida texnika bazasini adaptiv tezkor qayta qurish muammosi paydo bo'ladi. Haqiqiy ishlab

chiqarish sharoitida avtotransport korxonasini texnologik jihozlash tizimini ishlab chiqishda hisobga olinishi kerak bo'lgan ko'plab omillar tufayli ushbu sharoitlarda qabul qilingan qarorning oqibatlari haqida yetarli ma'lumotlar bo'lmaydi.

"Ekspert baholash" metodidan foydalanish qarorning oqibatlari to'g'risida yetarli ma'lumotga ega bo'lmagan sohadagi vaziyatni tahlil qilish va qarorlar qabul qilishda malakali mutaxassislarning fikrlarini jamlashning eng samarali usullariidan biri hisoblanadi.

Mazkur maqolada avtotransport korxonalarida qaltis va axborot yetishmasligi sharoitida "ekspert baholash" metodi yordamida yetakchi mutaxassislar fikrini jamlash orqali muammoning yechimlariga erishish usulining mazmun mohiyati tahlil qilingan.

Keywords: *vehicle enterprise, technological equipment; maintenance, repair, manufacturing, technological process, operation, factor, ekspert, concordance coefficient*

Ключевые слова*: автотранспортное предприятие, технологическое оборудование; техническое обслуживание, ремонт, производство, технологический процесс, эксплуатация, фактор, эксперт, коэффициент соответствия*

Kalit so'zlar: *avtotransport korxonasi, texnologik jihozlar; texnik xizmat ko'rsatish, ta'mirlash, ishlab chiqarish, texnologik jarayon, ekspluatatsiya, omil, ekspert, muvofiqlik koeffitsienti*

Introduction. As a result of the operation of modern cars, the elements of the production base do not meet the parameters of cars, or as a result of obsolescence of technological equipment and devices used in existing vehicle enterprises (VE). There is a problem of rapid reconstruction.

The development and progress of the production technical base of road transport enterprises is inextricably linked with capital construction, which is a means of creating fixed assets. Large-scale reconstruction of fixed assets, construction of new enterprises, reconstruction and expansion of existing enterprises and their technical re-equipment.

The investment process, which includes capital construction, planning, design, construction and installation of production and development of the design capacity of the completed facility, is part of a single complex. The specific tasks of industrial construction also apply to the capital construction of road transport. Creating and accelerating the renewal of fixed assets means improving its efficiency by improving the structure of capital expenditures of production construction, reducing the commissioning and construction time of facilities, continuing the industrialization of production construction, reducing the specific cost of construction and significantly improving quality. In each specific case, it is important to choose a reasonable and efficient form of capital expenditure (new construction, reconstruction, expansion or technical re-equipment of existing enterprises) [1].

In essence, all of these forms are interconnected and complementary. With the exception of new construction, other forms do not occur in practice without 'pure'. For example, expansion and reconstruction involve partial construction under certain conditions. Expansion of transport enterprises is practically impossible without the reconstruction of existing buildings and structures, and reconstruction and technical re-equipment is almost always carried out in order to expand production.

Literature review. In the literature of G.M. Napolskiy, A.V. Pugin, M.A. Masuyev, O.D. Markov, M.N. Musajonov, N. Muminjanov, O.H. Hamrakulov, Sh.P. Magdiyev, S.A. Usmanov, E.S. Kuznetsov, P.V. Istomin and Q.M. Siddiknazarov conducted research to improve decision-making methods in the management of technical systems.

Despite the fact that enough extensive research has been conducted by scientists and scholars on this topic, it does not lose its relevance at any time, because the formation of non-

standard decision-making skills in the management of production processes does not lose its importance.

Research methodology. Compared to the cost of new construction, the specific costs per unit of capacity are 71 ... 75% for expansion, 41 ... 43% for reconstruction, and 20 ... 21% for technical re-equipment. The undoubted advantage of technical re-equipment of the existing production base over new construction has been identified, which is associated with the advantages of a certain sequence [2].

The first advantage - due to the volume and nature of construction and installation work, more economical use of material, financial, labor and other resources per unit of production capacity being implemented or expanded.

This advantage over road transport is reflected in the value of the enlarged specific regulatory capital for various forms of fixed capital recovery..

The second advantage - significantly reduces the time required to master capital expenditures. Experience has shown that the construction of a new medium-capacity VE takes 3 ... 4 years, and sometimes 5 ... 6 years and more. Expansion and reconstruction of the existing enterprise will allow to start the main fund 2.5 ... 3 times faster. The shortening of production time will prevent the freezing of building materials, equipment, materials and team work that have been produced and paid for, but have no practical benefit, known as ‘unfinished construction’, for several years.

In addition, long-term construction projects and technical solutions included in their design, technology, building structures, etc. will inevitably lead to spiritual obsolescence.

The third advantage - due to the fact that the engineering and construction works will be carried out in the developed areas, which are provided with access roads, power lines, water pipes, sewerage, heat supply and communication. In this case, there is no need to carry out large-scale earthworks related to landscaping and vertical planning of the land plot.

The fourth advantage - to prevent the spread of material and labor resources, which is typical of many new constructions and is common. Finally, one of the advantages of the restructuring is the presence of such an important social factor as the existing VE, which has an influential, self-motivated force that controls the timing and quality of work [1].

However, the reconstruction, expansion and technical re-equipment of the existing VE should not be considered as the only advantage. There are also certain challenges during the development of reconstruction, expansion or technical re-equipment projects. These are related to the need to place new planning and technological solutions in the existing area dimensions, the size of production facilities, the development of the project without minimal reconstruction and modification, and at the same time to achieve significant results [3].

Mechanization of Vehicle maintenance and Current Repair Technological Processes in VE is one of the main ways to reduce costs in ensuring the performance of vehicles and the high quality of work performed. Vehicle maintenance and Current Repair workload reduction is achieved through the use of mechanization tools to reduce the time spent on certain technological operations. Mechanization of the technological process both improves the quality of Vehicle maintenance and Current Repair, and improves the working conditions of workers [4].

Explains the decision-making process as follows: The decision-making process is the selection of options that solve the problem within several options.

Laws, standards, regulations, norms and other applicable documents are usually followed in decision-making, using the experience of other experts and organizations in making them [5].

The share of 60-65% of all decisions in the engineering and technical service of the trucking company (80-83% in the VE engineer, 45-55% in the chief engineer) corresponds to similar recurring production situations [4].

There are also issues that need to be addressed at the level of the transport enterprise, which affect the effective operation of the transport enterprise, but are not clearly defined in the current laws, standards, regulations and other documents. due to the high number of factors, there will not be enough information about the consequences of the decision made in these circumstances. Example: equipping the production base with technological equipment [5].

Effective operation of road transport enterprises in the competitive environment of the transport services market through their services, efficient and reliable use of rolling stock, in many respects, compliance with the state of production equipment, level of mechanization, parameters of operating vehicles depending on the conditions. This is due to the fact that increasing the efficiency of maintenance and repair of vehicles, regularly equipping the production base with modern equipment, and the implementing new advanced production processes is a crucial factor in labor productivity and quality of work, their cost. 'shows the mystery.

The problem of developing a system of technological equipment for the transport enterprise is a problem at the enterprise level, and due to the high number of factors that need to be taken into account, there is insufficient information about the consequences of the decision.

In the process of management, a set of tasks to be performed in decision-making in new, unknown conditions is combined with the concept of operations research.

Such operations include specific measures taken to increase the efficiency of the system, as well as complex programs related to achieving the goals of the system. Each operation is evaluated by its efficiency, ie weight. In general, performance or goal function can depend on three groups of factors.

The first group of factors pre-existing, describes the conditions under which the operations are performed, and they do not change during the course of the operation.

For a particular VE, this is the economic strength of the VE; VE specialization (light, freight, bus); the enterprise is provided with production technical base.

The second group of factors is also called decision elements and can change during management by affecting the objective function. These can be the quality of maintenance and current repairs, the system of organization of maintenance and repair work, staff qualifications, level of mechanization, etc..

The third group of factors are conditions that are not known in advance, and their effects on performance are unknown or insufficiently studied. For example, the technical safety of the equipment; technical characteristics of the equipment; quantity (power) of the device; equipment performance indicator.

When the factors of this group work together, the problem of decision selection is expressed as follows: it is necessary to find the elements of the decision, taking into account the influence of unknown factors under certain conditions; these elements should be provided to obtain the extreme value of the target whenever possible. It should be noted that complete information can be obtained only after the occurrence of this or that event and the need to make the necessary decision, and after the system goes into reactive control mode (for example, maintenance and repair when the quality and efficiency of their work decreases).

That's why it's important to know how to fill or compensate for a lack of information in management.

Such methods include:

1. Collect and analyze additional information. Obviously, this is possible if the system has a set amount of time and resources.

2. Use the experience of similar companies and decisions. You will need to have access to a decision bank. Also, the experience of others cannot be used directly (without adapting to the situation).

3. Use the opinions or expertise of a team of experts.

4. Interviews and Inquiries.

5. Special methods and criteria based on game theory.

6. Use simulation modeling and other methods that reflect real-world production situations.

In real production situations, for example, the problem of developing a system for equipping a trucking company is a production situation with insufficient information.

Analysis and results. Interviews and questionnaires in the form of open interviews or question-and-answer sessions are used to take expert opinions, in which each expert makes a quantitative assessment of the factors or alternatives being compared, that is, classifies them. The expert groups will then summarize the participants' individual assessments according to established rules.

The simplest of the methods based on expert evaluation is logical stratification, which is based on the analysis of data in the literature, generalization of experiences, and a survey of experts to determine the initial list of factors that need to be stratified (Table 1) [6].

Table-1

The table of identification of the main factors influencing the development of the system of technological equipment of vehicle enterprises

Sign of factors	*Name of factors*	Serial Number (Color)
1st-factor	The economic power of AE	
2nd-factor	AE specialization (light, freight, bus)	
3rd-factor	Equipment safety	
4th-factor	Technical characteristics of the device (convenience, price)	
5th-factor	Maintenance and repairing work organization system	
6th-factor	Quantity (capacity) of the device	
7th-factor	Equipment performance indicator	

When working with experts individually, each expert makes a quantitative assessment of the factors or alternatives being compared, that is, classifies them. The examination is conducted by experts, not managers, and takes the form of recommendations.

The group of experts will be informed in advance of the main factors identified on the basis of the research and the essence of the evaluation method. When forming an expert group, it is important that they are experts but not personally interested in the outcome [7].

The experts individually assess the factors presented in the form shown in Table 1, in the process of determining the factors in descending order of impact on the research object [8].

The following group of experts, consisting of qualified specialists and leading scientists in the field, has been selected to identify the main factors influencing the technological re-equipment of the transport enterprise:

1st-ekspert – c.o.t.s. docent, pedagogical experience 29 years.

2nd-ekspert –c.o,p,s. professor, pedagogical experience 32 years.

3rd-ekspert – c.o.t.s. docent, pedagogical experience 12 years.

4th-ekspert – c.o.t.s. docent, pedagogical experience 41 years.

5th-ekspert – the head of the vehicle enterprise, working experience 17 years.

6th-ekspert – the head of the vehicle enterprise, working experience 29 years.

7th-ekspert –the head of regional transportation department, working experience 35 years.

8th-ekspert – the head of vehicle enterprise, c.o.t.s docent, working experience 34 years.

9th-ekspert –senior teacher, pedagogical experience 11 years, (working experience 26 years).

Analysis of results. The group of experts was informed about the main factors influencing the technological re-equipment of transport enterprises and the essence of the assessment method.

Each expert was instructed to quantify the factors being compared, that is, to classify them. The results of the individual evaluations of the participants by the expert groups were then summarized in Table 2.

Table 2

"The results of a priori painting of the main factors influencing the technological equipment of vehicle enterprises

Factors	Eksperts (conditional serial number)									**The sum of the colors by factor,** N	Color Summary Error,Δ_i	The square of the errors, Δ^2
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**			
1st-factor	1	2	1	3	1	2	1	2	1	14	22	484
2nd-factor	2	5	4	2	3	3	2	3	4	28	8	64
3rd-factor	4	3	3	4	5	4	4	4	3	34	2	4
4th-factor	5	6	6	5	7	5	7	7	5	53	-17	289
5th-factor	7	7	5	7	6	7	6	5	7	57	-21	441
6th-factor	6	4	7	6	4	6	5	6	6	50	-14	196
7th-factor	3	1	2	1	2	1	3	1	2	16	20	400
										252		1878

The error of the sum of each factor from the average of the sum of all the colors was determined by the following expression:

$$\Delta = N - \frac{\sum N}{R} \qquad (1)$$

here: ***R*** *– number of factors.*

Color sum error, Δ_i**:**

$$\Delta_1 = N_1 - \frac{\sum N}{R} = 14 - \frac{252}{7} = -22$$

$$\Delta_2 = N_2 - \frac{\sum N}{R} = 28 - \frac{252}{7} = -8$$

$$\Delta_3 = N_3 - \frac{\sum N}{R} = 34 - \frac{252}{7} = -2$$

$$\Delta_4 = N_4 - \frac{\sum N}{R} = 53 - \frac{252}{7} = 17$$

$$\Delta_5 = N_5 - \frac{\sum N}{R} = 57 - \frac{252}{7} = 21$$

$$\Delta_6 = N_6 - \frac{\sum N}{R} = 50 - \frac{252}{7} = 14$$

$$\Delta_7 = N_7 - \frac{\sum N}{R} = 16 - \frac{252}{7} = -20$$

The concordance coefficient is used to assess the degree of coherence of export views. The concordance coefficient varies from 0 to 1. If it differs significantly from 0, then there is some agreement between the opinions of experts.

$$W = \frac{12 \cdot S}{m^2(R^3 - R)} = \frac{12 \cdot 1878}{9^2(7^3 - 7)} = \frac{22536}{27216} = 0.828 \qquad (2)$$

here: ***S*** *- sum of error squares.*

$$S = \sum_{i=1}^{k} \Delta_i^2 = 484 + 64 + 4 + 286 + 441 + 196 + 400 = 1878 \qquad (3)$$

here: ***m*** *- number of experts.*

If $W \prec= 0.5$ is small, the result will be negative, which may be due to the fact that the instructions to the experts are vague, the factors were chosen incorrectly, or the experts do not have in-depth knowledge.

Conclusions. Based on the results, an a priori color diagram showing the distribution of factors in descending order of the sum of colors is constructed (Figure 1).

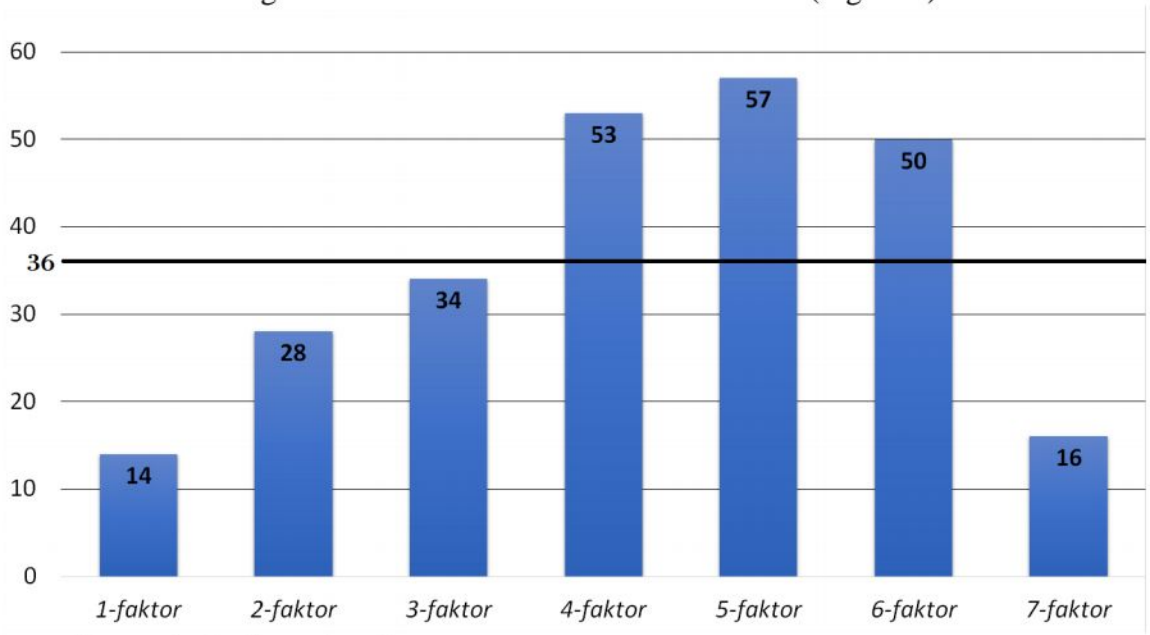

Figure-1. Aprior color diagramm.

The colors of each factor are compared to their mean values for all factors, and the underlying factors are determined.

Their mean for all factors:

$$N_{mid} = \frac{\sum N}{R} = \frac{252}{7} = 36 \qquad (4)$$

The analysis of the Aprior color diagram shows that when compared with their average value for all factors ($\mathbf{N_{midt}=36}$), the main factor is **factor 1** (N_1 = 14; economic strength of VE) and **factor 7** (N_7 = 16; is an indicator of the quality of the equipment), which is followed by the following important factors and **factor 2** (N_2 = 28; specialization of VE).

In conclusion, it can be said that in the management process and in real production situations, when making decisions in new conditions that are not known in advance, the analysis of the state of the system and decision-making in case of insufficient information production situations and several options as a solution to the problem Integrating the opinions of qualified professionals in the adoption - the use of the method of expert evaluation is an effective, fast and relatively simple method of organization.

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