Assessment of the technical and technological condition of the transport complex

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Abstract. The presented study is devoted to the assessment of the technical and technological state of the transport complex. The work analyzed indicators reflecting the share of fixed assets of the transport complex as part of national fixed assets and the degree of depreciation of production capacities of the transport industry. The analyzed indicators reflect that about a quarter of all fixed assets are related to the transport complex, and the volume of depreciated fixed assets exceeds 50%, while production capacities are updated to increase fixed assets, and not to ensure a qualitative or quantitative upgrade. The study proposed a model for ensuring the qualitative development of the transport complex, which contains measures to update existing fixed assets and new principles for the management and development of the transport complex.

1. Introduction

The development of various fields of activity in Russia was carried out as part of the Soviet Union, when the main types of activity were formed, new types of production were created, large industrial complexes were built and the existing production potential was formed. In the same period, a transport complex was formed, which included not only road, rail and city transport, but also pipelines were built, sea and air transport and other types of transport were created. The indicated types of transport until today carry out interstate transportation, the potential of which is today used almost unchanged [1].

The creation of new modes of transport was caused by the need to transport people over long distances, moving products and services within the framework of a nation state, in order to provide the necessary resources to all consumers. In the same period, the main transport corridors were created, which were based on the assessment of congestion, demand, deficit and excess of goods and services, as well as the construction of storage facilities and transport and logistics centers were carried out [2-3]. At the same time, the use of equipment, devices, buildings and structures from the Soviet period reduces the quality of the production process and negatively affects the environment [4].

In this regard, we consider it relevant to conduct a study in which the technical and technological condition of the transport complex will be assessed, namely, the operating periods of buildings, structures, machinery and equipment, vehicles are determined, and the volumes of renewal, retirement and depreciation of production capacities in transport complex.
2. Materials and methods
The purpose of this study is to assess the technical and technological state of the transport complex and formulate recommendations on the development of the transport complex of Russia. The following tasks were set in the work:

- Assess the technical and technological condition of the transport complex;
- To propose measures for the development of the transport complex.

The study was based on data that was published in open sources, and statistical, logical, and analytical methods were used as methods and approaches, which made it possible to reveal the goal of the study.

3. Results
The modern industrial structure on a global and national scale has different scales and affects different areas of activity. Not only has the development of various types of activity, but also the stability of the state and population depended on the functioning of the industrial complex [5]. One of the industries that affect the stability of the state and the world community is the transport complex, which provides export and import of various goods, increases the volume of trade between states, carries out the movement of passengers and, in general, ensures the stable functioning of the global industrial complex [6].

To conduct an objective study, it is necessary to consider the composition of fixed assets by type of activity in order to determine the share of the transport complex in fixed assets (figure 1) [7].

![Figure 1. The composition of fixed assets by fields of activity, as a percentage.](image)

From the presented figure, it is clear that 22.4% of fixed assets account for transport and storage, and this indicates that the capital industry in the transportation industry is a leader among other areas of activity.

Further, it is advisable to analyze indicators reflecting the state of fixed assets of the transport complex. Assessment of the technical and technological state of production assets in the modern scientific literature is carried out using various indicators and coefficients. In our opinion, it is advisable to base the assessment of the technical and technological state on the analysis of worn-out capacities, input and output of fixed assets (figure 2) [7].
The figure indicates that the volume of worn-out capacities is more than 50%, but at the same time, a slight decrease in this coefficient is observed. The coefficient of renewal of fixed assets does not exceed 4%, but in the period under review, this coefficient has variable indicators. The fixed asset retirement rate does not exceed 0.4%, and if we consider this ratio together with the renewal rate, we can conclude that it is not the main production assets of the transport complex that are updated, but their volumes increase.

Consider the volume of completely worn out basic production assets (figure 3) [7].

From the presented figure, it can be seen that in the transport complex, “machinery and equipment” and “vehicles” are considered the most worn out. It is worth noting that during the period under review there is no qualitative change in fixed assets, moreover, in terms of “building”, “construction” and “machinery and equipment” these indicators increase.

Thus, the analysis showed that the technical and technological condition of fixed assets of the transport complex is deteriorating every year and today it is necessary to carry out activities aimed at the qualitative and quantitative updating of fixed assets [8].
4. Discussion

Ensuring the development and transition to new technologies, including innovative and digital, requires the transport sector to completely restructure and create certain conditions for this area of activity. Undoubtedly, the transition to innovative technologies that provide an increase in the efficiency of the field of activity will reduce production-operating costs, reduce the consumption of fuel and energy resources and increase the quality characteristics of production [9-12].

In our opinion, the model for ensuring technical and technological development can be represented in the form of the following scheme (figure 4) [13-17].

![Figure 4. Model for the technical and technological development of the transport complex.](image-url)

Thus, the presented model will ensure the transition of the transport complex to a qualitatively new path of development; the implementation of the model will allow the introduction of new and updated production capacities and will ensure the transition to innovative and digital (intelligent) transport management systems.

5. Conclusion

The study revealed the problems and prospects for the development of the transport complex. The work analyzed technical and technological indicators that reflect the share of worn-out capacities. The presented analysis showed that the transport complex has a high proportion of worn-out capacities, and at the same time, the capacity is being updated to increase fixed assets, rather than eliminating worn-out facilities. In the work, a model was proposed for ensuring the technical and technological development of the transport complex, which contains mechanisms for updating production capacities, as well as for switching to a qualitatively new path of development and management of the transport complex.

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