

OPTIMIZATION OF THE PROCESS OF CARGO TRANSPORTATION BY ROAD

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The existing system of organization of road transport in Ukraine almost does not allow the introduction of modern logistics methods of cargo delivery and reduce transportation costs. It is necessary to find alternative schemes of traffic organization, which will allow to increase the competitiveness of road transport, and reduce the cost of transportation. Observation and research of the issues of ensuring the efficient operation of motor transport enterprises, classification and description of the components of improving the management and optimization of freight transport, which will enable motor transport enterprises to influence the design of rational transportation process, reduce transport costs and production in general. Correlation-regression analysis of the efficiency of determining the rational route of movement of vehicles allows to improve the technical and operational indicators of rolling stock and increase the productivity of vehicles and reduce the cost of transported goods.

The organization of external transportation concerns two phases of the production enterprise: supply and sale. Institutionally, external transportation can be implemented both by own vehicles, and then we will talk about our own delivery department (transport unit) and vehicles of third-party organizations (specialized transport organizations, public transport). Obviously, the criterion of rational organization of external transportation is similar to a similar criterion in internal transportation. The analytical approach determines a certain identity of transport costs with the volume of cargo turnover, based on a constant level of tariffs. Mathematically:

$$B_{tc} = S_t \times BO \rightarrow \min; BO \rightarrow \min, \text{ if } S_t - \text{const}, \quad (1)$$

Where B_{tc} - transport costs, UAH;

S_t - transport tariff, UAH / t km;

BO - cargo turnover, t km.

In turn, freight turnover can be submitted:

$$BO = \sum_i P_i \times L_i \quad (2)$$

Where P_i - the weight of the i -th product, t;

L_i - travel distance, km.

Thus, the presented formulas illustrate the existence of three groups of factors for optimizing transport processes, both internal and external:

- factors influencing the level of traffic (P_i);
- factors influencing the distance of transportation (L_i);
- factors influencing the cost of transportation (S_t).

From the point of view of the logistics concept, simultaneous optimization should take place by taking into account all three groups of factors integrated. For example, suboptimal freight turnover can be advantageously compensated by an elastic system of transport tariffs, or conversely, suboptimal transport tariff can be eliminated by a minimum volume or distance of traffic.

The use of optimization methods is often due to the need to meet certain conditions of simplification. This approach to finding optimal solutions suspects that the creation of inadequate, theoretical (in the current, negative sense) knowledge, unsuitable for practical business activities. Simplification will make it possible to use simpler and less labor-intensive methods, which can be justified if the solutions obtained do not actually differ in principle from the best results. Such simplifications are also applied in practice precisely because of the mentioned complexity and time-consuming decision-making. However, without a doubt, the preconditions must be taken into account to a greater or lesser extent, and this requirement is also one of the most well-known transport optimization problems.

The so-called "transport task" or "transport issue" has been described in the literature for many years in areas such as operational research, linear programming, and transport economics and logistics. This method has varieties: closed transport issue, open transport issue, transport and production issue, minimization of empty runs.

Briefly, this problem can be defined as follows: it is necessary to develop an optimal transport plan for a certain number of consumers from a certain number of suppliers (table).

It is believed that these are homogeneous goods, and therefore, consumers are not limited, for example, to one supplier, but can choose from all available. Each connection is subject to a certain specific consumption of transport (values within the table). The problem is quite difficult to solve for at least two reasons:

- there are limitations in the production capacity of suppliers;
- choosing the best combination for this consumer can have reduced consequences effectiveness for others.

Analysis of the "transport problem" allows us to draw the following conclusions:

- the basis of calculations is the cost of transporting a unit of cargo at a distance between them;
- supplier and the given consumer, which is (as laid down) a fixed cost, ie independent from the transport plan;
- the total cost of transportation of the entire parcel is calculated as a multiplication of the specific costs and cargo weight.

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