

Management of material stocks at the motor transport enterprise

The purpose of the research work is to identify the prerequisites, theoretical and practical justification for improving the organization and methods of reserves planning on the example of the ATP on the basis of current legislation and guidance materials, literature sources. The subject of the study is the relationships that develop in the process of formation and use of reserves. The object of the study in the work is the ATP material stocks. Proceeding from the set goal, the following tasks are distinguished: To study the main directions of improving the efficiency of the enterprise. To analyze the performance of the enterprise. To develop measures to improve efficiency.



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List of basic terms (notions) used in the work

Inventories (from the economic point of view) - part of working capital, property, working for business. Inventories are constantly changing and circulating - circulate as part of the money turnover.

Material stocks are spare parts, units, tires, fuel and lubricants, materials for car maintenance and repair. A special type of material resources is packaging and packing.

Independent demand - demand that consists of individual components of the demand of a large number of consumers, each of whom feels the need independently of the others.

Dependent demand occurs when a manufacturer uses a number of components to provide road transport services, the demand for each component is linked to each other and depends on the production plan of the service.

Discrete demand - demand from time to time, that is, does not have a constant character.

Prediction is the process of the sphere of prediction, as it is about predicting information about future indicators. In addition to the formal, scientific-based forecasting methods, it also includes anticipation and foresight.

Forecast - the result of the forecast, the data of which are of great value to the head of the ATP. Usually they are presented as a document with the given numerical values and graphical.

Suppliers are enterprises that provide ATP with necessary material resources. Suppliers influence the stability and rhythm of the ATP.

Contact audiences - any group with a real or potential interest.

The Board of Directors is the Board of Shareholders during breaks between general meetings; its main function is to control and regulate the activity of the Management Board.

The Management Board is the executive body that manages the current JSC activities.

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Abstract

Work 45 p., 5 fig., 4 tables, 20 sources.

The *purpose of the research work* is to identify the prerequisites, theoretical and practical justification for improving the organization and methods of reserves planning on the example of the ATP on the basis of developed legislation and guidance materials, literature sources.

The *subject of the study* is the relations formed in the process of formation and use of reserves.

The *object of research* in the work is the material stocks of ATP

The following *tasks are* singled out based on the set goal:

1. Give the essence of the enterprise efficiency.
2. Analyze the performance of the company.
3. Develop measures to improve efficiency.

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Contents

<i>Introduction</i>	6
<i>1. Definition of inventories</i>	8
<i>2. Functions and types of inventory</i>	11
<i>3. Development of a general methodology for effective management of ATP material inventories</i>	14
<i>4. Analysis of historical inventory usage by the example of ATP</i>	18
<i>5. Identification and classification of indicators that affect the formation of warehouse stocks</i>	23
<i>6. Prognostication methods used in ATP material stock management</i>	26
<i>7. Factors affecting stock formation and their expert assessment</i>	30
<i>8. The process of expert assessment of factors affecting the formation of ATP warehouse stocks</i>	34
<i>Conclusions and proposals</i>	37
<i>List of literary sources</i>	39
<i>List of Internet Resources</i>	41

Introduction

The study of inventory management can be ranked among the youngest areas of research, although some results have been obtained quite long ago. For the first time such a task was mathematically formulated by Edgeworth F. in 1888 as applied to determination of reserve money funds. In the beginning of XX century there appeared a number of articles to determine the most economical volume of material resource supply to the enterprise.

Modern aspects of inventory management - problem setting, analysis of factors influencing the solution, and a way to take into account the uncertainty in demand - were formulated in the works of Arrow C., Garris V., Marshak S. and Dvoretzky A. The development of these ideas was later picked up in a number of articles.

In recent years, the issues of analysis and inventory management of the enterprise have been attracting increasing attention of business representatives. This is due to the importance of reserves in the business mechanism of the enterprise. Rational organization of sources and structure of reserves affects the speed of their turnover and efficiency of use. In addition, the financial condition of the organization is directly dependent on how well the financial policy regarding the sources of reserves is implemented. Thus, surplus of reserves means that a part of the capital of the enterprise is idle and does not bring income. At the same time, the lack of reserves will slow down the production process, slowing down the speed of turnover of the enterprise's economic assets.

Also, it should be noted that the efficiency of any enterprise provides, first of all, a responsible attitude of employees to their duties and correct attitude of departments to each other. That is why today we can see a great competitiveness of foreign companies in our country. And it is said a lot about the fact that domestic motor transport enterprises are in decline and most of them have already ceased their activity. This is due not to the ability but, first of all, to the unwillingness of the managers of these companies to adapt to the market conditions, are changing rapidly. Therefore, it

is necessary to move completely to market conditions of management and find more ways to "create" rather than more reasons "why we can't do".

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1. Definition of inventories

Each motor transport enterprise shall have the necessary inventory to carry out its activities. The company's expenses for storage, order and transportation depend on the number of inventories, as well as expenses related to the shortage of inventories (deficit), and these expenses are much more difficult to estimate. All these costs determine the profit and profitability of the enterprise, so it is very important to be able to determine the optimal size of stocks and make an order in time. It is also important to take into account the actual stock availability and its dynamics.

Inventories (from the economic point of view) - part of working capital, property, working for business. Inventories are constantly changing and rotating - circulate as part of the money turnover.

Inventories (from the production point of view) - a material stock is a stock of a resource or items used in an organization.

The general term "reserve" includes three types of reserves:

- Raw materials and materials in stock;
- semi-finished products;
- Finished product.

Work-in-progress - production not completed within the limits of this enterprise.

Finished products - products that have fully passed the production cycle at this enterprise.

Given the specifics of our production, "reserves" accept this interpretation.

Material stocks are spare parts, units, tires, fuel and lubricants, materials for car maintenance and repair. A special kind of material resources is packaging and packing.

Inventories are among the most expensive assets of most companies and account for up to 40% of total capital. The availability and volume of reserves affect the economic performance of an organization.

The main problem in stock creation is to ensure maximum sales at minimum costs. As these factors confront each other, some optimal solution must be found. This is the main problem of stock creation - to determine the required volume.

The stock optimization approach highlights storage problems that are either too small or too large. If the stock is too small, customer requirements are not met and present and future implementation can be lost. You may lose a discount on the amount of goods you buy, and you may need to order goods frequently, which will incur costs both in management and accounting.

Usually, large volume reserves are stored for the following reasons:

- Insurance in case of higher demand than usual.
- Insurance against long delivery time, than usual.
- Taking advantage of a discount to a wholesale buyer. It may make sense to buy more inventory than is required now, if the growing cost of storage is counteracted by a reduction in the full unit cost.
- Take advantage of seasonal or other price fluctuations. For example, a consumer who buys coal in summer (when it's cheaper) believes that it will save him more money than he will spend on storage of stocks.
- In the production of raw materials storage ensures that all necessary components for the final assembly are always available.

Advantages of low stock levels:

There are two main advantages to maintaining low stock levels.

First, less money is spent on inventories. In a new case, when the amount of money is limited, the money that is spent to buy additional stocks cannot be used for other purposes. Storing less inventory frees up money for other purposes. Because limited money is the most common and serious problem in small businesses, a disciplined approach to inventory creation can be key to the success of your business.

Secondly, the following conditions mainly increase profitability:

- low storage costs resulting from savings in other costs, such as heating, electricity, storage space, equipment and staff costs;

- rapid capital turnover. Profit comes only after the sale of the stock, so the smaller the stock, the more frequent its turnover is and the faster you can make a profit;
- less inventory is dirty and stolen. A small inventory level makes it less likely that it will be contaminated or spoiled during storage or loading. Thefts are also reduced by the fact that with smaller stocks, losses are more visible and theft is faster;
- less risk of product aging and slow stock turnover. With accelerated sales, the risk of staying with unsold goods decreases. This fact is partly decisive in production with frequent changes in technology;
- lower financial costs. Less capital is involved in the case, so in the case of a loan reduced interest payments and the bank.

There are four types of costs associated with inventory in the organization:

1. Expenses for resource acquisition. Determined by its price and purchase volume. In some cases, discounts (discounts) are taken into account here.
2. Costs to order. As well as the cost of purchase, they are one-off costs, which include costs of negotiating with the supplier, preparing and concluding the delivery contract, transportation costs, etc. Unlike purchase costs, they do not depend on the volume of the order or are little dependent on it.
3. Production costs. There are alternatives to the cost of resource and order costs and arise when the order for replenishment is placed internally. These costs include the cost of producing the quantity ordered, as well as the costs of preparing production for the order, usually for equipment reorder (a component independent of the order volume);
4. Costs of stock keeping. They are difficult to determine for a company, so they are usually severely underestimated.

Proceeding from the considered questions, it is possible to draw a conclusion that creation of necessary stocks is of great importance for production activity of the enterprise. In addition, stocks perform critical functions, increasing flexibility and reliability of production management.

2. Functions and types of inventory

When considering the concept of reserves, it is very important to study the application of reserve functions.

Inventories perform three essential functions:

- o accumulation function;
- o price and inflation protection function;
- o cost management function.

The first and main function of reserves is accumulation of resources and their distribution to improve reliability and synchronization of movement and transformation of material flows at the enterprise.

The most important principle when organizing the movement of material flows in production is to ensure their continuity. However, it is practically impossible to organize a fully continuous production cycle at the enterprise and synchronize external supplies with the production process. Thus, the stocks arise in different areas of movement as a consequence of violations of continuity of material flows.

The accumulation function allows

- increase the stability of the company's operation due to complete or partial elimination of the negative impact of adverse external and internal factors: demand fluctuations, unfair suppliers, internal system failures, transport delays, strikes, etc. ...;
- to increase the level of consumer service at the expense of stocks of finished products. Requirements of clients of the enterprise in real conditions seldom can be satisfied, if there is no necessary stock of production. For example, if the demand for production products is high only in summer, a company can create a stock sufficient to meet the high summer demand during the winter period of low demand. Or, if the demand undergoes significant fluctuations, it is easier to smooth their negative impact on the organization of supply of products to customers by creating a stock.
- to avoid downtime due to stock of raw materials, i.e. inefficient use of equipment and live labor, as well as losses caused by subsequent underproduction of

goods. Usually, if suppliers of the firm organize deliveries irregularly, it is reasonable, until the relationship with them is settled, to accumulate stocks of raw materials in order to protect themselves from the irregular work of suppliers, transport, etc.

The second function (protection against price changes and inflation) of the inventory is to preserve the monetary resources of the enterprise. By placing free cash in a bank, the enterprise can save it and get a big income. On the other hand, the value of the stock can grow faster than the money placed in the bank. Thus, stocks can be considered as investments for future use or resale (speculative stocks). When deciding to create such stocks, the costs and risks of storage must be carefully assessed.

The cost management function is closely related to the size of batches ordered for replenishment, as it has a direct impact on cost levels. The point is that in the process of inventory management two main issues are solved: what should be the size of the delivery lot and when to place the order. Most suppliers offer discounts on large batches ordered at certain periods of time and sell out. Transportation companies also offer discounts for large volume shipments. Thus, a single purchase of large quantities at a certain time can, in fact, reduce costs.

According to the functions performed, the stocks are in storage and can be divided into the following groups:

1. Insurance stocks. Called to provide the company from the impact of various adverse factors, such as increased prices for resources, supply disruptions, etc.. Usually, they are created at the entrance to the system:

2. Reserve stocks. They are created in case of sharp deviations in the intensity of entry or consumption of the resource during the production process or at the exit from the system.

3. Seasonal stocks. These are created when there are seasonal fluctuations in the entry of resources or demand for finished products.

4. Current (circulating) inventory. They arise as a result of non-synchronous operation of adjacent links in the logistics chain, different types of receipt and consumption of resources (for example, batch receipt and consumption per unit), etc.

5. Speculative stocks. Received for further resale in case of resource price increase and serve for storage and increase of cash of the organization.

6. In addition to the above-stated stocks, which are in storage, we can also call: transport - are the items that are in the process of transportation and therefore not available to work with them and technological (cycle), consisting of items in the process of transformation (processing), and, in fact, is not a stock.

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3. Development of a general methodology for effective management of ATP material inventories

The main purpose of the company, regardless of what it does, is to get the maximum possible profit, and for this purpose it is necessary not only to produce and sell their products, but also to be able to effectively establish the production process. It should be noted that in our case, the product is a service - road transportation and additional accompanying service.

Inventory management at the enterprise can be performed according to one of three approaches: maximization, minimization or optimization [1, p. 48]. However, the most relevant at present is optimization of the enterprise's reserves, aimed at determining the most optimal size and structure of the reserves, reducing costs for their maintenance, reducing dependence between production units of the enterprise, creating a system of effective control over their movement. Improving the efficiency of inventory management should be implemented in several stages, which have certain specific features. To make the picture clearer, let's build a scheme of the sequence of proposed activities at motor transport enterprises (fig. 1).

It should be noted that whatever management method is used, there are minimum requirements for the system to be manageable and to be able to implement different stock planning methods. If effective inventory management methods are used, this will have an immediate impact on the reduction of delivery and storage costs.

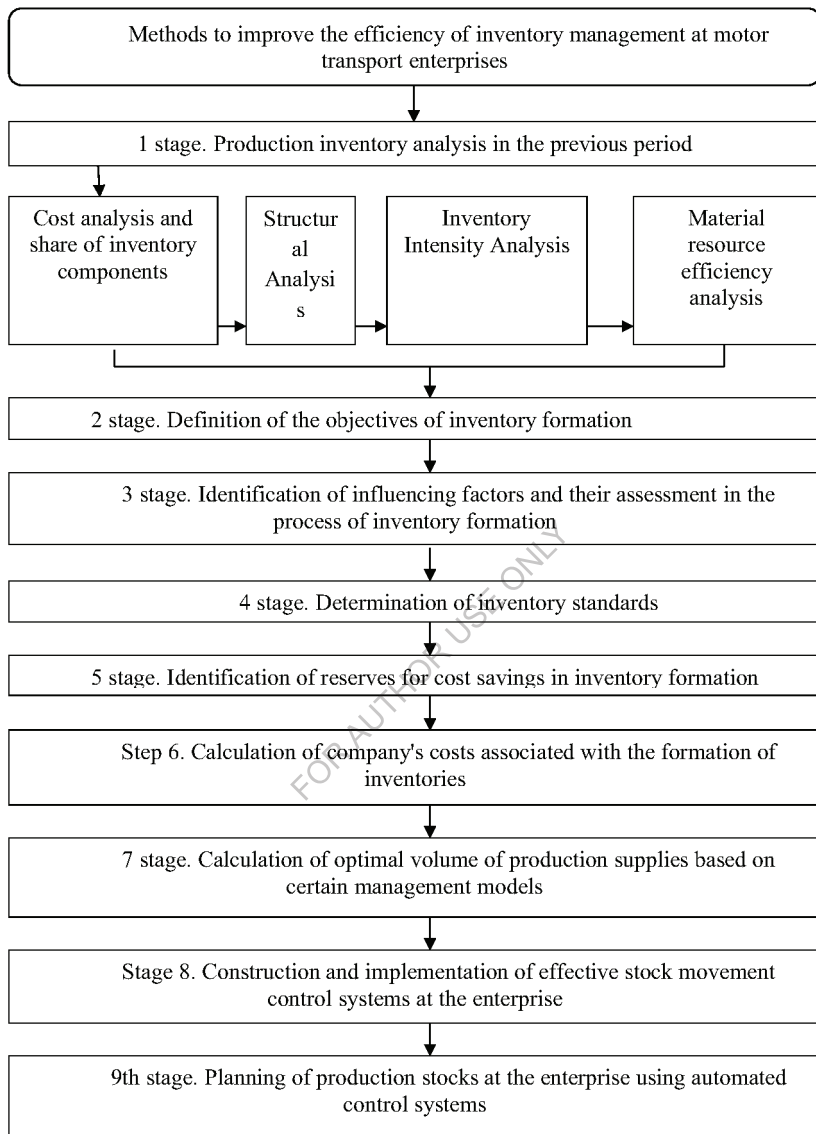


Figure 1 - Stages of ensuring effective process of forming ATP inventory

However, these requirements require consistent execution of logistics operations and ensuring the introduction of effective management accounting. For this purpose, it is necessary to solve specific tasks [2, p. 91] listed in Fig. 2.

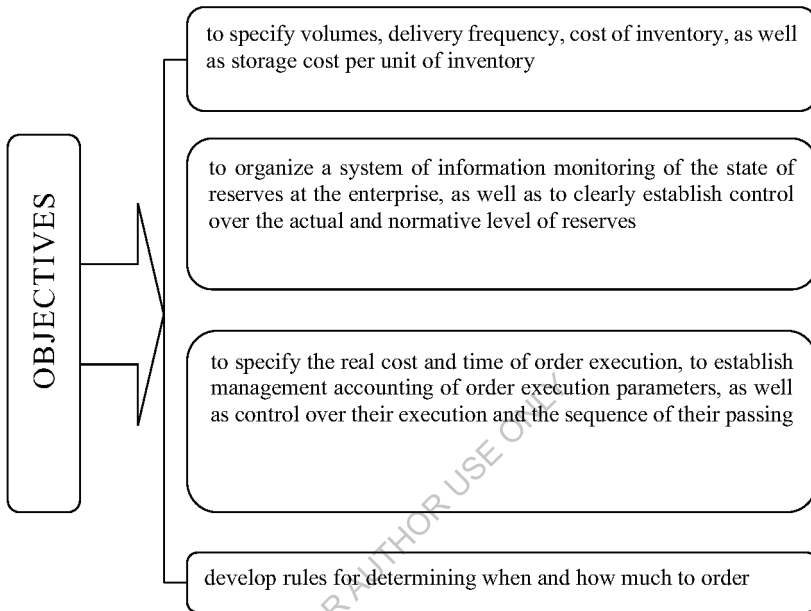


Figure 2 - Tasks to be solved by the enterprise to implement the inventory management system

A well-functioning inventory management system should ensure continuous comparison of normative and actual indicators, i.e. it should monitor deviations between these indicators and identify the cause of their occurrence. The ability to identify the volume, time and frequency of stock replenishment contributes to the process of their optimization at the enterprise, and as a result, minimizing costs associated with the formation of reserves at the enterprise. Calculation of stock ratios (in physical terms) will simplify the procedure of purchasing and storage budgets, and help optimize costs. Inventories (from an economic point of view) - a part of working capital, property, working for business. Inventories are constantly changing and

circulating - they circulate as part of the money turnover. Considering the specifics of our production, "reserves" adopt this interpretation. Inventories are spare parts, units, tires, fuel and lubricants, materials for car maintenance and repair. A special type of material resources is packaging and packaging.

To simplify the procedure of regulation of order parameters it is necessary to develop and implement the rules of period and volume of the order at the enterprise. The current inventory management system at the enterprise should be accompanied by a constant monitoring of the progress of the order, provide feedback for the staff to make effective decisions on the purchase of inventory. The transport enterprises should use material and energy resources efficiently and contribute to their economy. The basis for such savings is the focus on technological development of the enterprise, which should include the following tasks (Fig. 3)

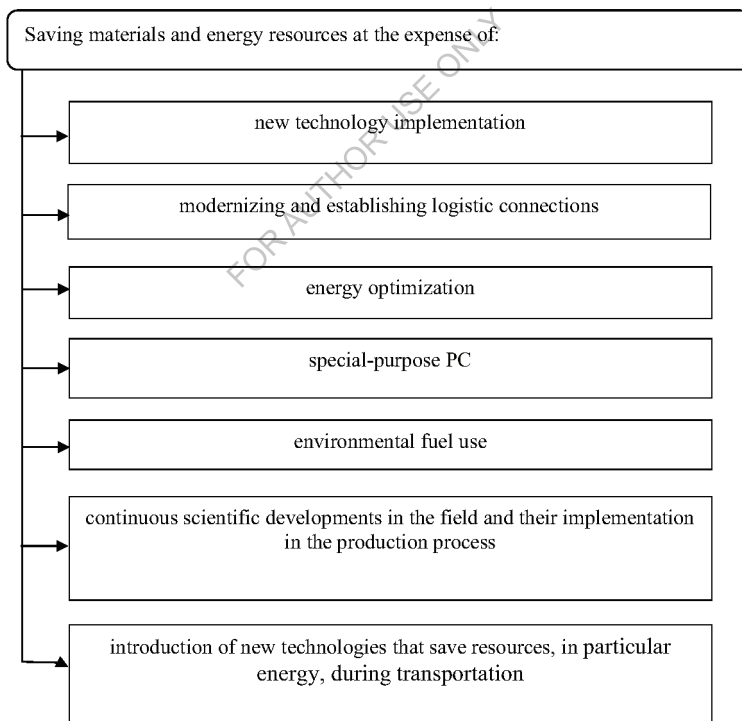


Figure 3 - Efficient use of ATP resources

4. Analysis of historical inventory usage by the example of ATP

Until recently, it was believed that the more stocks a company has, the better. This is true when a company has problems with material and technical supply, in conditions when it is necessary to create significant insurance reserves. However, in today's conditions, the problem of shortage is much less acute; enterprises can make a variety of investments. The owner of the enterprise has to create reserves, because otherwise the costs will increase or the profit will decrease. Inventories and financial resources can also be seen as interchangeable factors. It follows that inventories are created when they provide a higher return on investment than when capital is used in an alternative way. Therefore, before investing money in inventories, management must take into account that the company refuses alternative investment options.

So, when making a decision about material resources, the management is faced with the task of choosing whether to purchase the stocks from suppliers as they are consumed or still form the stocks.

It is necessary to notice that at work of the motor transport enterprise material resources become more than 60 % from a total sum of the turned means. Their availability at the right time and in the right amount is the most important aspect of all activities of the enterprise of this industry. Therefore, there is practically no question that managers form warehouse stocks, but still let us give examples of drawbacks and advantages when purchasing resources from suppliers as their need arises and when warehouse stocks are formed (Table 1).

Table 1 - Shortcomings and Benefits in Purchasing Material Resources and Building Warehouse Stocks

Purchase of material resources as and when required	NOTES	Formation of warehouse stocks	NOTES
	<ul style="list-style-type: none"> ✓ inflation growth rate; ✓ stock shortage; ✓ insufficient quality level; ✓ force majeure circumstances; ✓ risks. 		<ul style="list-style-type: none"> ✓ maintenance costs of warehouses; ✓ WP of warehouse workers; ✓ obsolescence; ✓ insurance expenses
	APPLICATIONS		APPLICATIONS
	<ul style="list-style-type: none"> ✓ discounts for regular customers; ✓ innovation consumption; ✓ participation in current promotions. 		<ul style="list-style-type: none"> ✓ no downtime due to lack of resources; ✓ satisfactory quality level; ✓ discount on wholesale purchases.

Thus, this table shows us that stock formation is more expedient. At the same time, we see that the main disadvantages in this case are different costs. Let us further consider the main costs of formation of motor transport company's warehouse stocks. They include costs associated with ordering goods, costs of maintaining and storing the required level of inventory, and deficit costs.

Order costs are related to the placement of orders and directly depend on the frequency with which they are placed. These costs include the cost of keeping records, preparing and concluding operations, and transportation costs of moving goods between companies and warehouses. The most convenient, though not the most accurate method of determining the costs of preparing, processing and filing each order is to divide the total annual costs of the purchasing department (department staff salaries, material and overhead costs) by the number of orders filed in a year.

The literature offers another way to determine the costs of an order, namely, accurate timekeeping and sample survey in order to determine the average time spent on preparation and submission of orders.

Storage costs, which include the cost of capital measured in inventories, costs of keeping goods in stock and other costs associated with the physical presence of goods. By investing in inventories, the firm thereby declines to use these funds for other purposes (e.g., to acquire new equipment, develop new products, place funds in short-term securities, etc.). Consequently, the cost of capital should be taken into account when investing in inventories. The calculated value can be calculated on the basis of the cost of obtaining a bank loan to invest in reserves, interest on short-term securities, which the enterprise can count on when refusing to invest in reserves, or the level of profitability of the project of capital investments, which can not be carried out when investing in reserves, or the norm of profitability of investments in reserves. Once the value of capital is determined, some other expenses, depending on the size of reserves, should be added. These usually include property tax and inventory insurance costs, costs due to shortage or limited shelf life, operating costs associated with the storage of inventory (e.g. rental of occupied premises, use of heating, electricity, etc.).

Let's calculate the level of average cost of inventory storage on the example of ATP for the last three years (Table 2).

Table 2 Example of determination of storage cost level using the average cost method

Indicators	Value by year, UAH			The result for three years, UAH
	2016	2017	2018	
Average stock balance	103000	128000	115000	346000
Insurance	2300	2680	2300	7280
Outdated	3200	3000	2800	9000
Markdown	1200	800	1000	3000
Taxes	6200	7680	6900	20780
Total cost	12900	14160	13000	40060

According to the table, the cost of inventory maintenance is calculated as a ratio of total cost to cost:

$$K_{cr} = \frac{40060}{346000} = 0,11578$$

That is, the cost of stock maintenance for each hundred hryvnia of stock amounted to 11.578 UAH per year.

The third and last type of costs are deficit costs arising when demand for a product exceeds its availability in stock. There are difficulties in calculating this type of costs. Taking into account the specifics of the motor transport industry, the shortage of inventory is reflected in all activities of the enterprise. They are equated with the lost profit. Moreover, these costs may be even more significant when a significant part of a company's good name is lost. One of the frequently used indicators to control deficit costs is service level.

The traditional optimization criterion in the tasks of inventory management is minimization of the costs considered above.

The implementation of the task is possible using economic and mathematical calculations and knowledge in the field of inventory management theory, which was suggested above. Thus, the task of selection of necessary stocks of material resources has an alternative character and should be solved by optimization methods.

ATP operates in the city of Kharkov (Ukraine) since 1996, at this time Ukraine was just beginning to enter the process of market relations, and therefore the original work of the company was based on other methods. But even today the company has not implemented the process of organizing operational control and management of inventories of material resources. In other words, this is the introduction of automated enterprise management systems that allow for accounting of the movement of material resources (inflow, consumption, daily balances). As a result of such operational control comes daily (weekly, ten-day, monthly or other frequency) information about the actual presence of stocks in the company's warehouses and the degree of their compliance with established standards. This will allow for continuous control over their size, timely and promptly identify the formation of excess balances or shortages in certain items, which may disrupt the organization of continuity of customer operation.

The system of operational control and management is an organization of continuous activity of the logistics department employees aimed at forming production stocks in economically justified sizes and ensuring a stable volume and range of materials throughout the planned period to ensure uninterrupted operation of the enterprise.

Available information about the movement, cost, formed regulatory framework for inventories and working capital, etc. for any of the materials used will allow the manager to promptly manage material and financial flows at the company during the year. This information will enable the manager to solve the following set of tasks:

- ✓ identify material resource gaps;
- ✓ select material resource positions for which excess inventory has been formed and they can be sold;
- ✓ evaluate the availability of reserves and their structure;
- ✓ analyze the working capital structure at the enterprise;
- ✓ determine what and when to order, how much to order, dates of next orders for material resources (i.e. to form a logistics plan for the next month);
- ✓ determine the need for financial resources to ensure the necessary supplies of materials in the planned month, etc.

With this information, it will be easier for the manager to make a decision on replenishment. The main task is to determine a rational level of reserves, which depends on different conditions related to both the production itself and external factors.

5. Identification and classification of indicators that affect the formation of warehouse stocks

Inventories belonging to this or that group indirectly allows to determine the terms of order placement, delivery volume, and the level of inventories available at the warehouses. The manager should be guided by the factors that directly affect the determination of these values. Such factors are for the road transport company:

- In terms of material stocks:
 - ✓ assortment structure of used materials;
 - ✓ Frequency of deliveries and terms of realization of orders (i.e. the period between confirmation of the need for an order and receipt of delivery);
 - ✓ the nature of the material use processes (continuous, discrete, variable, etc.);
 - ✓ conditions of storage.
- As for stocks of finished products:
 - ✓ organization and structure of distribution channels;
 - ✓ assortment structure.
- In terms of raw material reserves:
 - ✓ structure and terms of production;
 - ✓ storage time;
 - ✓ production process organization.

The tasks of ATP inventory management can, in turn, be divided into the following attributes:

1. peculiarities of stock receipt and issue. Both receipts and delivery of goods at warehouses can be uninterrupted or discrete.
2. Information about demand. It is necessary to take into account cases of complete information on demand (deterministic tasks), cases of risks, when static characteristics of unexpected demand are allowed by known and cases of unknown demand.

3. Decision-making procedure. There are single-stage and multistage solutions, i.e. static and dynamic inventory management.

4. Channels of stock movement. A sophisticated inventory management system may consist of several interacting delivery and storage facilities. The system of objects is considered sequential if output from one object is an input to another. The sequence of objects has different levels. The system of objects that are on the same level is called parallel. Each object may have several mutually exclusive input and output channels or both. Objects, channels and their interaction schemes create a channel of stock movement.

5. Division of demand. Stationary and non-stationary demand should be taken. In the first case, static characteristics of random demand are stable in time, and in the case of non-stationary demand are variable.

6. Sources of supply. At ATP there are sources of own production and receipt of goods from the outside.

7. Nature of delays. It is necessary to analyze the deterministic time shift between orders and deliveries, and random costs.

Determined demand is precisely known in advance, as opposed to probabilistic demand. In a static type of demand, the intensity of resource consumption remains constant over time; in a dynamic type of demand, the intensity of consumption changes with time. In a stationary type of demand, its probability density function remains unchanged in time, while in a non-stationary type of demand, its probability density function changes in time.

So, when making a decision on forming the stockpile, consider the following indicators:

- ✓ demand;
- ✓ stock replenishment;
- ✓ costs (linear, nonlinear, fixed);
- ✓ constraints; management strategy.

The detailed classification of these indicators will be displayed in this form (Figure 4).

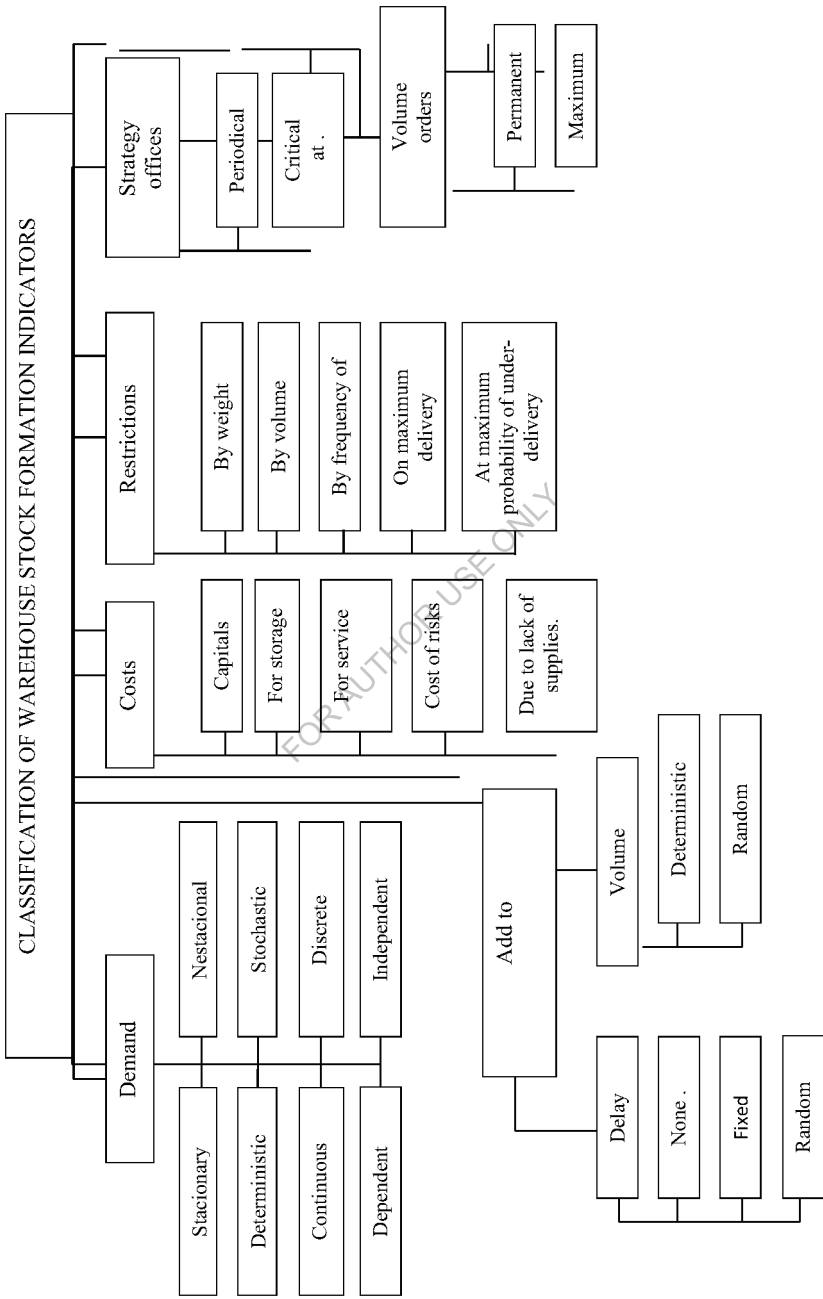


Figure 4 - Classification of indicators affecting the formation of ATP stocks

6. Prognostication methods used in ATP material stock management

But nevertheless, to make a balanced decision concerning the management of the motor transport enterprise stocks the information manager, taking into account the data for the past periods and their condition for today will not be enough. It is necessary to consider what situation is expected for the enterprise on the market. In other words, it is necessary to make a forecast.

Prediction is the process of the sphere of prediction, as it is about predicting information about future indicators. In addition to the formal, scientific-based forecasting methods, it also includes anticipation and foresight.

The result of the forecast is a forecast whose data are of great value for the ATP manager. Usually they are presented as a document with the given numerical values and graphical ones.

The methods of forecasting have a large classification. However, taking into account the specifics of motor transport activity, the expert evaluation method, which in its turn includes such methods, is effective:

SWOT-analysis: is very popular, is original. It was named after the first letters of four English words, which in the Russian translation means: Strengths and Weaknesses, Opportunities and Threats.

This methodology can be used as a universal one. It has a special effect in the study of processes in the socio-economic system, which is inherent in dynamism, manageability, dependence of internal and external factors of functioning, cyclical development.

The methodology of this analysis divides the factors characterizing the subject matter of the study into these four components, taking into account that this factor belongs to the class of external or internal factors.

The result is a picture of the balance of strengths, weaknesses, opportunities and dangers, which suggests how to change the situation in order to have a successful development.

Distributing factors into these quadrants or matrix sectors is not always an easy task. It happens that the same factor simultaneously characterizes both the strengths and weaknesses of an object. In addition, the factors are ad hoc. In one situation, they look like a virtue, in another - a disadvantage. Sometimes they are incommensurable in value. These circumstances can and should be considered.

One and the same factor can be placed in several quadrants, if it is difficult to determine its place unambiguously. This will not negatively affect the study. After all, the essence of the method is to identify the factors, place them in such a way that their concentration suggests ways to solve the problem so that they become controllable.

In each quadrant, the factors do not necessarily have to have the same weight, but they must be represented in their entirety.

The completed matrix shows the real situation, the state of the problem and the nature of the situation. This is the first stage of SWOT analysis.

The second step is to conduct a comparative analysis of strengths and opportunities, which should show how to use the strengths. At the same time, weaknesses in relation to existing hazards also need to be analyzed. Such an analysis will show how likely a crisis is. After all, danger increases when it occurs in a weakened environment, when weaknesses do not allow the danger to be prevented.

Of course, it is very useful to make a comparative analysis of strengths and existing hazards. After all, the strengths can be badly used in crisis prevention, the strengths should be seen not only in terms of opportunities, but also in terms of dangers.

The use of specially trained and selected experts or internal consultants can improve the effectiveness of this method.

SMART method: there are many modifications of the SMART analysis method. The most interesting of them is the development method and target analysis.

It is known that the goal of management is the decisive factor of success, efficiency, strategy and development. Without the purpose it is impossible to develop

the plan or the program. But it concerns not only the management goal, but also the research goal. After all, it is also not easy to formulate this goal correctly. The research program, the use of its methods depend on the goal.

The goal should be developed according to the criteria of Achievement, Concreteness, Estimability (measurability), taking into account the Place and Time. These criteria reflect the English words - Specific, Measurable, Achievable, Relevant, Timed, in the abbreviated name is SMART. This is the name of this method.

The method involves consistent evaluation of objectives by a set of criteria arranged in a matrix form. Here is a set of comparable factors reflecting target characteristics: hard to achieve - easy to achieve, high cost - low cost, has staff support - has no staff support, has priorities - has no priorities, requires a lot of time, has a broad impact - has limited impact, is focused on high technology - is focused on low (conventional) technology, is associated with a new management organization - is not associated with a new management organization.

At the next stage, a problem definition matrix is compiled. A number of problems must be solved in order to achieve the goal. But for this purpose, they must first be defined.

The distribution of problems is carried out according to the following criteria: existing situation, desired situation, possibility to achieve the goal. These criteria characterize the matrix horizontal. The following criteria are considered vertically: problem definition, problem evaluation (quantitative parameters), solution organization (who, where, when), problem solving costs.

Such a matrix makes it possible to make a research plan.

Ranking and estimation method: according to the method of ranks, the expert carries out ranking (ordering) of the objects under investigation in the organizational system depending on their relative importance (preference), when the most preferable object is assigned a rank 1, and the least preferable one - the last rank, which is equal in absolute value to the number of ordered objects. More precise ordering happens when there are fewer objects of research and vice versa.

In case of preferable (by ranks) arrangement of objects of expertise by one expert, the sum of ranks shall be equal to the sum of numbers of the whole natural series of the number of objects starting from one.

Resulting ranks of objects of ranking by survey data are defined as the sum of ranks for each object. As a result, the first rank is assigned to the object that got the smallest sum of ranks, and the last - to the object that got the largest sum of ranks, i.e. the least significant object (example of determination of the resulting rank of three objects by seven experts).

The more experts are involved, the more objective the assessment result is. However, involvement of a large number of qualified experts and high labor intensity of expert work increases the cost of quality assessment. That is why, in order to reduce labor intensity of experts' work, the method of ranks is used, which provides only for ranking of indicators, not their numerical determination by experts.

Nevertheless, this method is applied in the practice of SU research, despite its simplicity and low labor intensity, comparatively. This can be explained by the large number of objects to be ranked in the study.

Direct evaluation method: is an ordering of the objects under study (for example, when selecting parameters for drawing up a parametric model) depending on their importance by assigning points to each of them. In this case, the most important object is assigned the highest number of points according to the accepted scale (evaluation is given). The most common rating scale range is from 0 to 1; 0 to 5; 0 to 10; 0 to 100. In the simplest case the grade can be 0 or 1.

Sometimes the evaluation is done in verbal form. For example, "very important", "important", "insignificant", etc., which is also sometimes translated into a score scale (3, 2, 1, respectively) for greater convenience in processing survey results.

The direct assessment should be applied with full confidence in the experts' professional awareness of the properties of the objects under study. The grade and weight (significance) of each object under investigation are determined based on the results of the assessments.

7. Factors affecting stock formation and their expert assessment

In accordance with the above methodology for improving the efficiency of inventory management at the motor transport company, shown in Figure 1, we conducted an analysis of inventories for the past periods (Section 1). At the second stage, we found out that it was reasonable to form the stockpile. The third stage was to identify factors affecting stock management and classification.

Let's proceed to the next stage of our methodology - identification and assessment of factors that affect stock levels.

Let's take as a basis literary sources [2] the analysis of the use of inventories in the past periods, as well as the information received at the enterprise about their activities.

In ATP the main activity is cargo transportation. Transportation of goods is carried out according to the client plan.

ATP clients are enterprises, organizations, individuals of Kharkov and the region. ATP customers can be referred to these types of markets: the market of consumers (individuals who use the services of ATP for private purposes) and the market of suppliers (enterprises that use services for industrial purposes).

The clients of this ATP are regular customers, individuals and enterprises. The company has concluded contracts for the performance of motor transport services, at the moment, about twenty orders.

Competitors of ATP are motor transport enterprises or organizations of other types of transport, which provide transport services in a certain market.

Competitors can be active and potential. At the same time, active enterprises are those which in the past and present act as competitors. Potential - existing enterprises, which in the future can position themselves next to a particular ATP as active competitors or only established firms. Competitors of ATP are all freight ATP of Kharkov.

Suppliers are enterprises that provide ATP with necessary material resources. Suppliers influence the stability and rhythm of the ATU.

The company has no permanent suppliers, using the services of various enterprises.

Contact audiences - any group with a real or potential interest. They can be of 7 types:

- ✓ financial, when they contribute to the acquisition of certain capital by the enterprise;
- ✓ Media are interested in ATP, and ATP, in turn, is interested in the media to provide positive information about it;
- ✓ State institutions (Tax Inspectorate of Moscow district, district and regional statistics department, Pension Fund, Employment Center).

Demand for motor transport services of this enterprise is noticeably growing. This is due to the fact that the ATP conducts market research, sales incentives and advertising.

ATP carries out commercial cargo transportation by customers' orders regardless of the form of ownership, as well as transportation of goods in their own needs. If the plan of transportation on the customer is not fulfilled, then even with a general over-fulfillment of the plan of transportation of the company can not be given a positive assessment of the work, because the failure to implement the plan of transportation on the customer adversely affects the rhythm of the company and the objects served, and in some cases leads to disruption in the implementation of work plans of these enterprises.

Let us highlight four main factors that affect the management of inventory:

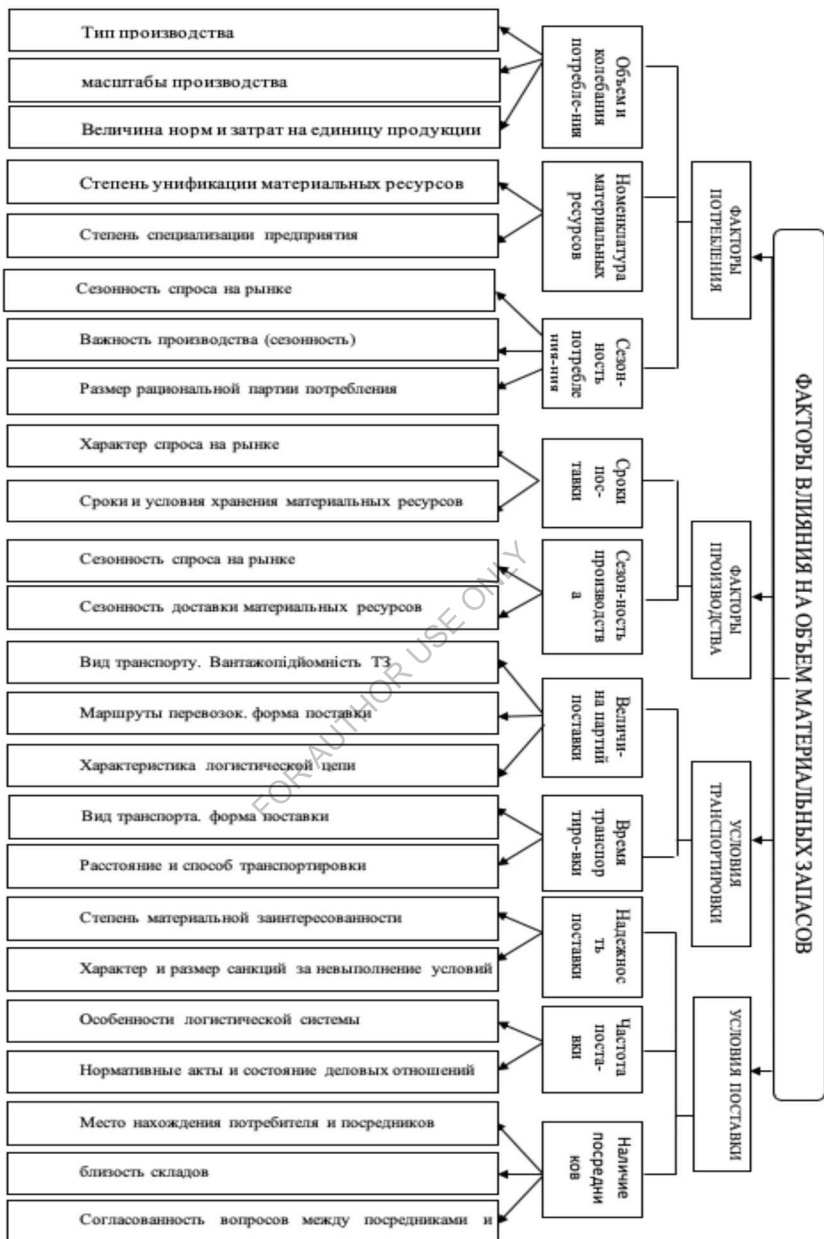
- Factors of consumption:
 - Volume and fluctuations of demand;
 - Nomenclature of material resources;
 - Seasonality of consumption;
- Factors of production:
 - Delivery terms;

- Seasonality of production;
- Conditions of transportation:
 - Volume of deliveries;
 - Transport time;
- Delivery terms and conditions:
 - Reliable delivery;
 - Frequency of delivery;
 - The presence of intermediaries.

Detailed classification of these factors is shown in Figure 6.

When making a forecast, given this classification of factors, the manager will be easier to work with them, having information about the importance of each of the factors.

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8. The process of expert assessment of factors affecting the formation of ATP warehouse stocks

The main stages of the expert evaluation process include:

- forming the goal and objectives of expert evaluation;
- formation of the management team and execution of the decision for expert evaluation;
- choice of the method of obtaining expert information and methods of its processing;
- selection of an expert group and formation of survey questionnaires;
- expert survey (expertise);
- Processing and analysis of the examination results;
- interpretation of the results obtained;
- report preparation.

The purpose of the work is to increase the efficiency of the ATP material stock management.

Method of obtaining expert information - method of direct evaluation.

The members of the expert group selected six employees of ATP and two employees of JSC "ATP-16363" in Kharkov. (Table 3).

Four main factors have been identified. In turn, they are divided into subgroups, each of which is characterized by several factors - let us call them microgroup factors. Each factor of the microgroup is assigned a score from 1 to 10 (1 - minimum, 10 - maximum), in accordance with the impact on the formation of stocks.

The average score of each microgroup factor will be evaluated first, which will make up the microgroup score. Accordingly, we will then calculate the ratio of the sum of points of all microgroups to their total number and obtain the value of the main factors.

$$K\phi = \frac{\sum_{i=1}^n P_i}{n}$$

where P_i - value of the factor, point;

n - number of factors.

Table 3 - Members of expert evaluation

FULL NAME	Company	Position .	Experience in this position, years	General work experience, years
Kulbech V.I.	ATP	Director	13	32
Bilous I.V.	ATP	Chief Accountant	10	18
Zubchenko A.N.	ATP	Head of Operations	8	25
Corchel A.M.	ATP	Head of Technical Department	13	35
Mikhailov M.M.	ATP	Chief engineer	13	33
Malotikov R.L.	ATP	Chief mechanic	12	30
Zvenen L.O.	ATP	Driver	12	22
Skorobogatov V.S.	ATP	Driver	13	35
Mikhailova N.N.	JSC "AP-16363"	Transport Logistics Officer	3	3
Kornienko P.V.	JSC "AP-16363"	Head of Planning and Economic Department	5	11

As a result of expert evaluation we have such values of the factors of the degree of their influence on the formation of the volume of warehouse stocks for the ATP of Kharkov: the greatest degree has the factor of conditions of transportation of resources (8.54), almost the same degree have the factor of consumption and conditions of delivery, the smallest degree has the block "factors of production" . but given that this average value, it becomes clear that the number of factors in the microgroups is different and, therefore, the value for the common blocks is not quite correct. When making a forecast, we recommend the manager to be guided by the values of microgroups, and the obtained values represent the real and correct assessment.

Таблица 4 – Анкета экспертной оценки факторов, влияющих на объем материальных запасов

ЭКСПЕРТЫ				ФАКТОРЫ ПОТРЕБЛЕНИЯ				ФАКТОРЫ ПРОИЗВОДСТВА				УСЛОВИЯ ТРАНСПОРТИРОВКИ				УСЛОВИЯ ПОСТАВКИ							
				Объем и Переменчивость Исполнения		Номенклатура материальных ресурсов		Сезонность Потребления		Срок Поставки		Сезонность производства		Величина партий поставок		Время Транспортировки		Надежность поставок		Частота поставок		Наличие посредников	
1	2	3	4	5	6	7	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	9	7	7	7	10	8	10	8	8	8	7	7	6	8	6	7	9	10	10	10	9	9	8
2	9	8	7	10	10	8	10	8	8	8	7	7	5	6	6	7	8	9	10	8	9	9	7
3	10	9	6	8	9	9	9	7	9	8	6	6	5	5	5	8	9	9	9	8	8	7	7
4	9	10	7	5	8	9	8	10	8	8	7	7	7	7	6	7	9	8	8	7	7	6	6
5	8	8	9	8	9	9	7	10	7	7	8	8	4	9	7	9	9	9	9	9	8	6	8
6	9	9	10	6	10	10	9	8	7	9	6	6	5	7	6	9	10	7	10	9	8	6	6
7	7	10	9	7	7	9	9	9	9	9	5	6	6	7	5	9	10	7	10	9	10	7	7
8	10	10	9	7	9	9	9	10	8	9	7	6	6	9	5	9	10	7	10	9	10	8	7
Ср балл	8,88	9,00	8,50	6,63	8,88	9,38	8,38	0	7,75	3,8	7,38	6,50	5,63	5	5,75	8,13	9,25	8,25	9,50	8,63	8,63	7,25	7,00
Итого	8,15	7,50	8,88	9,04	8,44	8,06	7,67	7,30	8,54	9,78	8,88	8,21	8,63	8,63	7,25	7,00	7,13	8,21	8,21	8,21	8,21	8,21	8,21

Conclusions and proposals

Now the economic situation at ATP is not stable, it has certain difficulties: the clientele has not worked out. The company is not working at full capacity, some parts of the management structure are missing, some employees perform several functions at the same time, poor computer support and others.

It is more expedient for the company to form warehouse stocks. To improve the efficiency of their management, a nine-stage methodology has been developed. The tasks to be solved by the enterprise for its implementation have been revealed. In recent years, in Kharkov, we can see the dynamics of a sharp increase in tariffs for public utilities. Therefore, it will be important to analyze the use of electricity, water and other resources. We have proposed tasks, analysis and solution of which is rational use of material and energy resources of ATP.

The company needs to implement automated enterprise management systems that will allow for the accounting of the movement of material resources (inflow, consumption, daily balances). As a result, the manager will constantly have information about the daily (weekly, ten-day, monthly or other periodicity) availability of stocks in the warehouses of the enterprise and the degree of their compliance with the established norms. This will allow for continuous monitoring of their size, timely and promptly identify the formation of excess balances or deficit on individual items that may disrupt the organization of continuity of customer operation.

Available information about the movement, cost, formed regulatory framework for inventories and working capital, etc. for any of the materials used will allow the manager to promptly manage material and financial flows at the company during the year.

The factors of stock formation have been identified. And their classification is proposed.

Factors affecting the volume of inventory have been identified. The degree of their influence has been calculated using the expert assessment method.

In conclusion, it should be noted that the task of managing the material stocks at the ATP is not an easy one, and therefore we recommend the management to approach this issue comprehensively. To make forecasts for future periods with the help of automated inventory management system, factors of their formation, factors of their volume taking into account their degree of influence and, of course, skills of making forecasts.

At present, the company conducts marketing research, sales promotion and advertising. As a result, the demand for motor transport services and attraction of new clients has considerably increased. Thus, improvement of management within the enterprise and favorable external dynamics will gradually lead to increase of activity of the enterprise as a whole.

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3. Logistics for professionals. Access mode: <http://www.logist.ru/>.
4. Information on training and use of logistics as a way to success in transport, warehousing, trade, manufacturing, finance <http://www.logistics.ru/>.
5. International Logistics Center GU HSE <http://www.mclog.ru/>.
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<http://big.spb.ru/>.

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