



FORMATION OF WAREHOUSES IN LOGISTICS INFRASTRUCTURE

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Abstract: This article examines issues related to the organization of warehouse territory and logistics operations. It describes aspects of warehouse infrastructure formation in logistics. It provides lists of key points that management must follow for proper and uninterrupted operation of the warehouse complex in the logistics infrastructure.

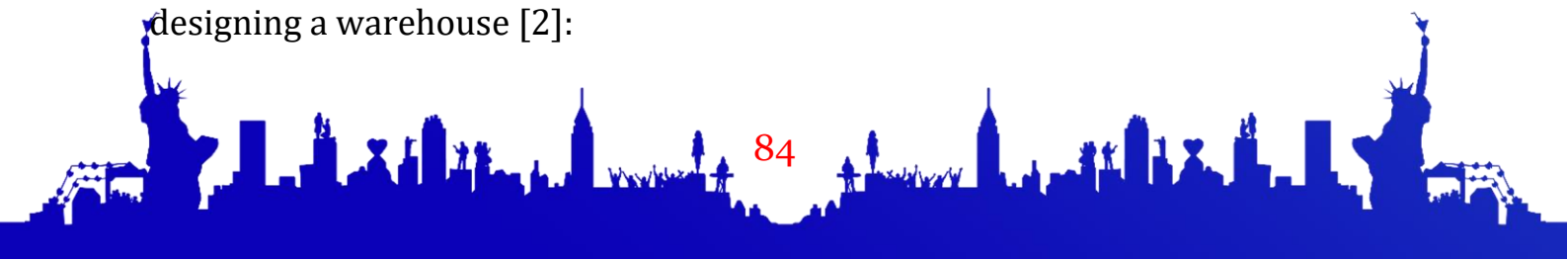
Key words: logistics, warehouses, infrastructure, formation, organization.

The main goal of logistics is the proper distribution of material flows. However, the methods may be different. It depends on the company's activities. For example, in order to produce and distribute goods, companies purchase raw materials and supplies, distribute finished products between distribution channels. When considering in more detail the infrastructure and principles of the division that relate to warehouse logistics, we can understand that the structure will include not only the premises equipped for the warehouse, but also the technological equipment necessary for work, parking spaces, access roads, a communication system and materials with goods that must be delivered intact and safe from the warehouse territory to the recipient to the address specified by the sender.

The nuances that arise in the process of warehouse logistics activities set a number of tasks for management that must be completed [1]:

- Selecting a storage method. Different goods require special storage conditions so that the material does not spoil. In the warehouse, the goods are located taking into account safety, ease of sorting and loading into shipping containers.
- Competent placement. For perishable products, it is necessary to comply with the shelf life. In other cases, the principle of priority is applied, when the first goods received at the warehouse are the first to be shipped.
- Ensuring uninterrupted movement of goods. To fulfill this point, the necessary technological equipment is installed in warehouses and information work is carried out, which requires a sufficient amount of effort from the staff.
- Mandatory maintenance of warehouse premises and equipment in working condition and proper appearance.

Based on the above, the following main stages should be considered when designing a warehouse [2]:





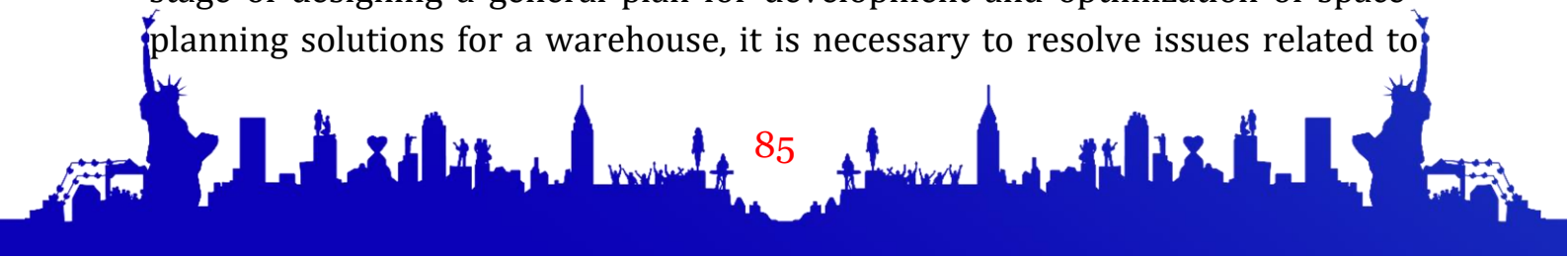
1. Analysis of product characteristics. This issue is raised during the initial design of a warehouse. Depending on the nature of the stored goods, the further work process will be built. For example, for a number of goods and products it is necessary to obtain permission for storage, further creation of temperature conditions, develop safety measures, and so on.

2. Forecasting the need for warehouse space. The forecast of the need for warehouse space is a volumetric parameter that determines the formation of a warehouse network. Forecasting methods should reflect changes associated with the focus on fulfilling logistics tasks.

3. Calculation of the number of warehouses, determination of their location. Depending on the company's strategy and management requirements, the number of required warehouses should be calculated. In order to ensure the fastest possible delivery of goods to the client, it is possible to organize warehouses in all regions where the company operates, but such a decision can lead to an increase in costs with a subsequent increase in the cost of the company's services.

4. Selecting a warehousing strategy. At this stage, the issue of warehouse ownership arises. If the warehouse does not have its own storage area, greater efficiency will be achieved if it rents warehouse premises for a long term. More advantageous situations are also possible when the goods are transferred for storage with further processing and shipment by a third-party company. In the future, with the development of logistics infrastructure, responsible persons will need to calculate options for transferring existing orders to intermediaries even with their own warehouse capacities. In addition to the above information, it is necessary to take into account a number of technical, economic, demographic and technological restrictions that can negatively affect the operation of the enterprise.

5. Development of a general plan for warehouse management. The purpose of this section will be to design a warehouse system that can adapt to possible changes in the goals and objectives of the enterprise and its logistics system. When designing a logistics system or reorganizing it, the optimization criteria for the entire system and the constraints within which it will supply customers are primary for all of its elements, not excluding the warehouse system. The creation or modernization of a warehouse system should be carried out in accordance with the optimization criteria within the logistics system. At the stage of designing a general plan for development and optimization of space-planning solutions for a warehouse, it is necessary to resolve issues related to





the required volume of the building, the location of the development, and the number of loading and unloading places. Requirements will also be put forward for building structures, issues with the distribution of vehicle traffic across the territory will be resolved, it will be necessary to select lifting and transport equipment and the required warehouse equipment.

6. Determination of storage technology. Depending on the nature of the cargo, the space-planning solution for the warehouse, the issue of storage technology is decided. The main storage methods are listed below [3]:

- Rack storage. With this method, goods will be stacked on racks in rows, dozens and other possible ways. The greatest efficiency will be achieved when storing goods on pallets.

- Storage in cells. This method is effective for small-sized goods that will be distributed among numbered cells. This method of storage is also called address storage. It is characterized by assigning an individual number or address to each storage location, which is developed by the company.

- Storage by the stacking method. When using this method, goods, most often food, are stored in bags, boxes or barrels. Loads in such containers must be stably assembled, meeting height standards with access to other goods. There are direct, cross (using loads of different sizes) and “reverse cell” stacking methods.

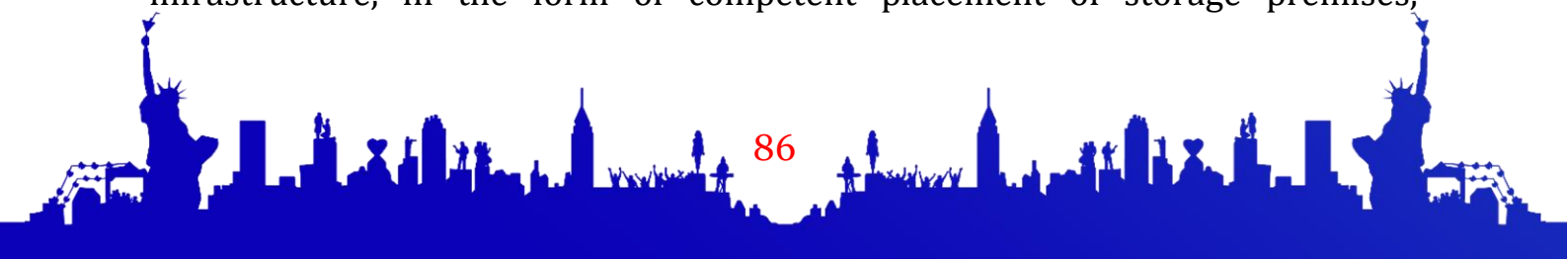
- Bulk storage. A similar method is used to store bulk goods located in specially designed containers or platforms for them. This type of storage allows using almost the entire useful area of the warehouse, but it is necessary to create conditions with high-quality ventilation due to the large volume of products.

- Storage in tanks and reservoirs. This method is used to store bulk cargo.

7. Determining the need for warehouse equipment, warehouse personnel, and a computer information system for the warehouse. Depending on the volume of cargo flow, the warehouse imposes requirements on warehouse equipment, warehouse personnel, and the creation of a computer information system for the warehouse.

8. Monitoring and optimization of the warehouse infrastructure. At this stage, various measures are developed that will allow monitoring the warehouse's achievement of the set key performance indicators, as well as adjusting the warehouse's operation and optimizing its operation.

In addition to the above points, one should remember about the warehouse infrastructure, in the form of competent placement of storage premises,





planning of parking spaces, and the use of specialized equipment, the productivity of the warehouse directly depends on it.

Based on the material presented in this work, it can be concluded that the process of designing a warehouse is a voluminous, labor-intensive, and complex process. This is due to the need not only to know, but also to take into account a fairly large number of factors directly related to the activities of warehouse logistics.

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