

## Seminar 15

**Topic: Warehouse logistics. Objective, strategy of warehouse logistics.**

**Indicators and methods for assessing warehouse logistics.**

Questions on the topic of the lesson:

1. Give definitions of the concepts: warehouse, distribution center, logistics center, transport logistics center
2. Name the types of warehouses in logistics systems.
3. Definition of warehousing logistics
4. Tasks of warehouse logistics
5. What logistics operations are performed in warehouses? Describe each operation.
6. Technological map of the warehouse process. Technological schedule.
7. What indicators of warehouse process efficiency belong to the financial and economic group?

**Question 1.** Warehouse, distribution center, logistics center, transport and logistics center

The activity of any enterprise related to commodity and material assets is based on the need to manage stocks, keep records and ensure their safety. To maintain stocks at enterprises on the way from the source of raw materials to the final consumption of goods, various warehouses are used.

**Warehouses** are buildings, structures and various devices intended for the receipt, placement, storage of goods, their preparation for shipment or delivery to the consumer.

*Warehouses are located at all stages of the material flow in the logistics chain, starting from the source of raw materials to the receipt of goods in the household. Landfills for the disposal of solid household waste can also be considered special cases of warehouses.*

Warehouses are classified according to the following criteria: warehouse size; cargo stacking height; storage conditions (temperature, humidity); number of users; degree of mechanization of warehouse operations; possibility of using rail or water transport; range of stored cargo; warehouse location in the supply chain.

**A distribution center** is a part of a logistics system, a warehouse complex where goods are received from manufacturers or wholesalers. These goods are then distributed to retail outlets.

**The logistics center** is a single terminal that provides a wide range of services: storage and processing of goods, information accounting, customs clearance, and cargo transportation solutions.

**Transport and logistics center** is a modern complex designed to ensure efficient operation in the field of transport and logistics. They combine various functions related to transportation and delivery of goods.

**Question 2. Types of warehouses in logistics systems.**

**According to modern classification, warehouses are divided into classes A+, A, B+, B, C and D.**

Signs of a class A+ warehouse :

✓ a single-storey rectangular building; without columns (or the column spacing is not less than 12 m);

- ✓ concrete floor with anti-dust coating;
- ✓ possible floor load of at least 5 t/sq.m.;
- ✓ ceilings not less than 13 m high;
- ✓ adjustable temperature control;
- ✓ automatic fire extinguishing system;
- ✓ ventilation system;
- ✓ autonomous electrical substation and heating unit;
- ✓ automatic dock-type gates not less than 1 per 500 sq. m.;
- ✓ parking areas for heavy vehicles;
- ✓ fiber optic telecommunications;
- ✓ fenced, 24-hour guarded, illuminated area;
- ✓ location near central highways;
- ✓ railway line.

**a class A** warehouse (difference from class A+):

- ✓ the column pitch is not less than 9 m;
- ✓ ceilings not less than 10 m high;
- ✓ automatic gates with movable platforms of at least 1 per 700 sq.m.

✓ Signs of a class B+ warehouse:

- ✓ a single-story rectangular building with no requirements for column spacing;
- ✓ ceiling height from 8 m;
- ✓ automatic gates with movable platforms of at least 1 per 1000 sq.m.

**Class B** warehouse premises (difference from class B+):

- ✓ a two-storey building is possible;

- ✓ elevators with a lifting capacity of at least 3 tons (at least one elevator per 2000 sq.m.);
- ✓ ceiling height from 6 m;
- ✓ floor – asphalt or concrete without coating;
- ✓ ramp for unloading vehicles.

**class C** warehouse (difference from class B):

- ✓ capital production facility or insulated hangar;
- ✓ ceiling height from 4 meters; gates at zero level.

**class D** warehouse :

- ✓ basements or unheated industrial premises;
- ✓ There are no requirements for ceiling height, floor quality, or the presence/absence of a ramp.

Thus, in the sphere of production and commodity circulation, warehouses with different degrees of mechanization and automation are located. Such division of warehouses is justified, since excessive mechanization and automation leads to an increase in the costs of construction and operation of the warehouse. Warehouses of classes A+ and A should be located only at the intersection of large material flows.

### **Question 3. Definition of warehousing logistics**

**Warehousing** is a logistics function that involves maintaining stocks by participants in the logistics chain and ensuring the safety of goods, their rational placement, accounting, constant updating and safe working methods.

**Warehousing logistics** is a complex of interconnected logistics operations performed in the process of forming a material flow in a warehouse. The object of studying warehousing logistics is commodity and material assets in the process of their cargo handling and packaging.

**Question 4.** The main **tasks of warehousing logistics** include:

- ✓ storage and preparation of cargo for delivery;
- ✓ inventory management;
- ✓ improving the performance of physical processes in the warehouse;
- ✓ organization of warehouse supplies.

The main positive results of using warehouses in logistics systems:

- ✓ reducing costs during cargo transportation by organizing transportation in economical batches;
- ✓ coordination and alignment of supply and demand through the creation of insurance and seasonal stocks;
- ✓ ensuring the smooth running of the production or sale of goods;
- ✓ ensuring maximum satisfaction of consumer demand by transforming industrial assortment into commercial assortment;
- ✓ creating conditions for maintaining an active sales strategy;
- ✓ increasing the geographic coverage of sales markets;
- ✓ creating conditions for a flexible service policy.

**During operation, the warehouse carries out the following actions:**

- ✓ cargo consolidation;
- ✓ cargo disaggregation;
- ✓ concentration and storage of reserves;
- ✓ warehouse assortment management;
- ✓ smoothing out the asynchrony of the production process;
- ✓ provision of services.

**Consolidation of cargo.** To reduce transportation costs, a warehouse can combine cargo from several customers into a larger batch for shipment to a specific sales area.

**Cargo disaggregation.** The warehouse receives cargo from manufacturers intended for several customers, sorts them into smaller lots according to orders, and sends them to each customer.

*Consolidation and disaggregation of cargo can be carried out sequentially, since when a consolidated consignment of goods is sent to a certain point, delivery costs are reduced due to the scale effect, but then, when the consignment arrives at its destination, the consignment of goods is split in accordance with customer orders.*

**Concentration and storage of inventories** allows for continuous production or supply in the face of constraints related to resource sources and fluctuations in consumer demand.

**Warehouse Assortment Management.** Forming a product assortment in anticipation of customer orders leads to more complete order fulfillment and more frequent deliveries in the volume required by the customer.

**Smoothing out the asynchrony of the production process** at the enterprise. *For example, to achieve consistency between individual production operations, a stock of material resources of unfinished production is formed in the warehouse.*

**Provision of services.** For example, delivery of goods to customers or information services.

### **Question 5. Logistics operations performed in warehouses**

**When organizing warehouse operations** the corresponding **logistic operations are carried out** , which can be grouped in the sequence of their execution when moving the material flow through the warehouse:

**Group 1.** External inspection of the vehicles in which the cargo arrived, checking their serviceability and the integrity of the seals.

**Group 2.** Unloading and initial acceptance of cargo according to the number of cargo places, moving cargo to the acceptance area.

**Group 3.** Acceptance of cargo by quality and quantity, receipt of cargo, drawing up of an acceptance certificate if necessary.

**Group 4.** Formation of a warehouse cargo unit, its transportation, warehousing and storage.

**Group 5.** Rotation of cargo in the warehouse, i.e. movement within the storage area.

**Group 6.** Selection of product items for completing **consumer orders and their transportation to the completion area.**

**Group 7.** Completing shipment lots and moving them to the loading area.

**Group 8.** Shipment and delivery of consignments to customers.

### **Question 6. Technological map of the warehouse process. Technological schedule.**

In order for logistics operations to be carried out rationally, it is recommended to develop **process maps** that describe in detail either the entire warehouse process or its individual stages.

#### **Technological maps typically include:**

- ✓ list of operations performed (content of work);
- ✓ required labor costs (completion time);
- ✓ qualification and professional composition and number of performers;
- ✓ applied mechanization means.

At the discretion of the compiler of the process map and the warehouse management, it may indicate documents drawn up during the performance of individual operations, as well as instructional materials that should be used by the performers.

The process maps are supplemented by a process schedule, which regulates the time of operation of loading and unloading equipment, the arrival of vehicles at the warehouse, and the performance of warehouse operations.

When organizing warehouse operations, specialized software is used. *For example, on the domestic software market you can find: "IC-Logistics: Warehouse Management". Foreign software products are united under the abbreviation WMS.*

### **Question 7. Performance indicators of the logistics process in the warehouse**

When improving warehouse operations, it is necessary to measure the volume of material flows passing through warehouse sections and determine the exact costs of their processing. **The system of indicators reflecting the efficiency of the logistics process in the warehouse** can be divided into five groups:

**Group 1.** Indicators characterizing the degree of satisfaction of consumer requests. This group includes assessments of the level of order fulfillment:

- ✓ number of product returns;
- ✓ number of delays in shipment of consignments of goods;
- ✓ number of customer complaints.

**Group 2.** Indicators reflecting the quality of warehouse work. This group partially complements the first group, but also contains indicators that directly characterize the quality of warehouse work:

- ✓ accuracy of execution of order parameters;
- ✓ compliance with the internal warehouse operating regulations.

**Group 3.** Indicators of the amount of time required to complete work. Reflect the time of logistics cycles:

- ✓ order fulfillment time;
- ✓ order processing time;
- ✓ cargo delivery time.

**Group 4.** Cost indicators. Include:

- ✓ inventory holding costs;
- ✓ costs of intra-warehouse transportation;
- ✓ costs of cargo handling and storage;
- ✓ acquisition costs,
- ✓ packaging and other logistics operations.

**Group 5.** Financial and economic indicators. They represent a set of derivative indicators from the first four groups. These include:

- ✓ average inventory turnover;
- ✓ warehouse capacity utilization rate;
- ✓ costs per unit of turnover per unit of time;
- ✓ investment payback period.

The warehouse in the macrologistics system is the place where flows of different levels intersect. A minor violation in the warehouse leads to a failure in the movement of material flow along the entire distribution chain. Therefore, it is necessary to pay close attention to improving processes in the warehouse.

### **Conclusions**

1. Warehouses are important links in the technological process of enterprises and organizations carrying out production and economic activities in various areas. Warehouses can be separate links in the macrologistics chain or part of links in the micrologistics chain.

2. There are many different types of warehouses. They are classified in relation to the main functional areas of logistics, participants in the logistics system, type of product by functional purpose, level of specialization, degree of mechanization, possibility of using rail or water transport and other features.

3. Traditionally, warehouses perform such functions as: placement of goods, quantitative and qualitative preservation of stocks, inventory accounting, stock renewal. A modern warehouse, along with traditional functions, also performs other functions determined by market needs: disaggregation of goods, concentration and storage of stocks, warehouse assortment management, smoothing out the asynchrony of the production process, provision of services.

4. Warehousing is a logistics function that consists of maintaining stocks by participants in the logistics chain and ensuring the safety of goods, their rational placement, accounting, constant renewal and safe working methods. Warehousing logistics is the management of the movement of material resources on the territory of a warehouse. The goal of warehousing logistics is to organize an effective warehousing system.

5. To determine the efficiency of the logistics process in a warehouse, it is necessary to measure the volume of material flows passing through warehouse areas and calculate the costs of their processing.