



METHODOLOGY FOR APPLICATION OF THE SYSTEM APPROACH IN DESIGN AND CONSTRUCTION OF A LOGISTICS CENTER

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Abstract: *The object of consideration of the present development are the elements clarifying the order in the system, which contribute to the more accurate construction of a system approach. The step-by-step presentation of the steps in the creation of a new logistics center aims to facilitate the logistics activities in the design and construction of large logistics structures.*

Key words: *engineering logistics, system approach, logistics center*

Each system has its own identity and a different number of applied management approaches and mechanisms, and each process in it works according to certain rules and has some result in its outcome. The clearer the input information, the less functional modeling is applied to solve its construction task. On this basis, logistics designers create the model of the system that prevents the chaos created by unforeseen circumstances. Certain scientific papers are known [1 ÷ 7], which pay attention to logistics during construction. The methodological development also uses technical documentation of sites of public importance, collected during the practical implementation by the company "Es En Electro" Ltd., specializing in the construction and maintenance of building installations powered by automated control systems.

The specifics of each design, future construction and operation, requires it to happen in a certain system. It can be seen as an action (approach) or as a

structure. The system gives the functional idea of the end points in which it will be located and allows the implementation of a regular transition from the start to the deployment of the activity. It is built on ideas and serves the purposes for which it arose. Each system has its own functional and organizational structure and can be presented as a system with its subsystems, the number and complexity of which determines its scale. As a structure it represents an accurate arrangement of logically connected concepts, objects, properties, processes, phenomena and events, organized in a planned sequence. Preliminary clarification of the elements in the considered system favors the formation of the logistic approach.

The main techniques that help to clarify the order in the system are: decomposition, analysis and synthesis. Decomposition is a detailed analysis looking at the system as a series of subsystems, the structure of their elements, composed of sub-elements, broken down into separate parts, from which it is possible to get an idea of the nature of each phenomenon or completed process. It can also be presented as the ability to divide the goals into sub-goals, the sub-goals of tasks feasible, through certain activities, and the activities of processes - all with their analytical arrangement. The analysis itself is a kind of mental transformation, through which the whole is considered not as a whole, but as a detailed process of building the connections and relationships between its constituent parts - phenomena, objects, properties, etc .. to succeed in analyzing current or possible subsequent circumstances, it is necessary to be able to decompose everything that impresses us or we guess that it would hinder the process of design (construction). This method allows for the exchange of information, both within it and for the interaction with external factors or systems. The detailed analysis describes the hierarchical construction and determines the parts of the system whose elements are combined on the basis of synthesis. The synthesis considered independently is the opposite in the direction of the analysis process, formulating the general, by connecting the details. It can be used to describe systems as subsystems. These three methods in combination help the functioning, administration and stratification of the systems, individually and in combination. The quality of the thought process that they set is decisive in the creation, organization and tactical development of the logistics system. Its dynamic structure requires their complexity to keep its borders in order, so that they are impenetrable to other people's interests and at the same time meet the needs of customers.

For a start, each system needs an approach that clarifies how to put ideas, solutions and rules into action. The systems approach is a combination of ideas generated on the basis of a set of personal, instrumental and methodological tools used to achieve certain results. The circulation and routing of information between its subsystems is vital. The system approach makes it possible for the data from the decisions taken in a company to be sufficient, accessible and qualified according to the different hierarchical levels in the system, the structure of which is specified in advance. The information circulating between the units is required to work in the direction of innovative ideas for larger-scale development. The actions related to this approach are basically comprehensive and in-depth. That is, the systems approach is a complex effort that uses the data synthesized after in-depth systematic analysis to coordinate and direct creative and physical energy in the desired direction and at the right time.

Due to the tendency to build large logistics structures more and more often, there is a need to develop a methodology that is directly related and built on the stages of development. This approach eliminates competition and increases the profitability of logistics activities in the design of large logistics structures. As most of the construction stages overlap, the methodology helps the tasks to run in parallel with a different range of completion time. Some of them are more voluminous, but inseparable. The impossibility of decomposing requires more steps and the use of many principles.

The methodology of making logistics projects clarifies that the correct organization of thinking lies in the ability to perceive the environment, through a comprehensive assessment of the possible consequences of decisions, which allows in its infancy to fully clarify the problem, its complexity and completeness. The systematic approach in the design is based on numerous studies to extract maximum information at the entrance, which helps to reduce the processing mechanisms during the construction of the logistics structure. At each stage of the logistics project, approaches are used that satisfy the quality of the final product to the maximum extent. The decisions taken in the process of its layout follow a certain order and norms and are subject to the standards for designing a logistics center.

General methodology of logistics center design - sequence in preparation of engineering-logistics project.

1) Development of the logistics idea and elaboration of a plan-prospectus:

- clarification of specific needs;
- generating ideas for more than one winning approach;
- consideration of macro and micro economic factors in the sector of the specific business;
- creation of a visualization aimed at the preventive clearing of serious errors of a hypothetical nature;
- use of automated techniques and technologies to the project;
- elaboration of a contract for design of logistics structures.

2) Main stages in project management - decomposition and arrangement of tasks for a clearer sequence of the process:

- First stage - Clear the ambiguities of the main idea - determining the stages of development and proceed to the contract for logistics design of the planned logistics center or park;
- Second stage II - Completion of the concept and study for suitable companies - future tenants, with whose expectations to comply with the design;
- Third stage - Finding a satisfactory terrain and initiating research activities before its purchase - the main stage, deciding the future logistics development;
- Fourth stage - Realization of the investment - negotiation and notarial transfer of ownership of the property (plot), preparation of an up-to-date sketch;
- Fifth stage - Selection of a company (architectural bureau) for the technical design and planning of the costs of the project - include design of all parts: architectural, structural, electrical (together with low-current systems - fire alarm and fire safety, information and sound, structural cable and computer systems, video surveillance, access control, security system), plumbing, HVAC, landscaping, PBZ;
- Sixth stage - Determination of the future investment obligations - includes the additional costs for the institutional approval of the prepared projects, and those for the construction of the logistics center on the basis of the project quantity and value accounts;
- Seventh stage - Engagement (with a contract) of a guaranteed company that has the resources to technically implement the project + Control over their activities

- providing constant technical supervision during the construction of the site and organizing the implementation of the Safety and Health Plan;

- Eighth stage - Interior and Infrastructure layout - construction of permanent communications and approaches to and from the Logistics Center, between the buildings inside it, construction of permanent fences, access control, landscaping, street, park and facade lighting and outdoor video surveillance;

- Ninth stage - Final phase - announced by the specialized commissions completion of the site and its documentary transfer to the investor.

3) The pursuit of innovation and consolidation of proposals to the client is aimed at:

- the long-term perspective of cooperation;

- psychological approach to persuasion;

- visualization of ideas;

- support for new proposals;

- approach to a contract.

4) Valuation of design work - the considered evaluation criteria are:

- the scale of the project - the boundaries within which it is deployed;

- the infrastructure and the number of buildings and facilities;

- concentration of equipment and communications in the nodes;

- the saturation of the installations in the whole volume.

5) Design standards:

- elaboration of a functional scheme according to the concentration of the tasks (solutions);

- specification of processes and factors influencing the system approach;

- development of an algorithm for the operation of the system by asking a question

- answer - number of possible solutions.

6) Processes and factors in a systems approach:

- finding a terrain satisfying the task;

- initiation of research activities before the purchase;

- logistical deployment;

- realization of the investment;

- negotiation and notarial transfer of ownership of the property (plot);

- preparation of an up-to-date sketch.

7) Technology of making an investment project:

- selection of a company (architectural bureau);
- planning the costs of the project;
- design of all parts: architectural, structural, electrical, fire alarm and fire safety, announcement and sound, structural cable and computer systems, video surveillance, access control, security, plumbing, HVAC, landscaping, PBZ.
- valuation by quantity and value accounts in all parts;
- determination of the investment obligations for production.

8) Safety techniques for:

- category of the building;
- types of briefings;
- types of control.

9) Methodology of the project implementation work:

- selection of a company meeting the criteria for general contractor - member of the construction chamber;
- setting a deadline for production;
- control over the activity - initiating operatives and working meetings to clarify current problems;
- providing constant technical supervision during the construction of the site;
- organizing the implementation of the Safety and Health Plan.
- infrastructural layout - construction of permanent communications and approaches, permanent fences, access control, landscaping, street, park and facade lighting and outdoor video surveillance;
- preparation of executive documentation;
- determination of the additional construction costs (compared to the changes);
- legal steps for the institutional approval of the project.
- its documentary transfer in the possession of the investor.

10) Timely updating of approaches and strategies and verification of the change in the normative, in favor of future tasks and development.

Thus constructed stages and steps help the designers of logistics structures in the organization of their design tasks. The methodology for making specific structures, such as that of a logistics center, is determined by the selected components and formulated by the technical rules, which, supported by the consistency and logic of the logistics approach, increase the efficiency of the model. In order for it to be optimally useful and applicable, not only within one project, extensive knowledge and special analytical skills are needed to take into account the specifics.

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