ABOUT TERMINOLOGY OF TERMINAL WAREHOUSE INFRASTRUCTURE OBJECTS

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ABSTRACT

The article is devoted to development of a universal terminological apparatus for a clear grouping of various terminal-warehouse infrastructure (TWI) objects by their functional types and position peculiarities in the cargo delivery system. On the basis of the analysis of the scientific literature, a lot of definitions of the concept of «TWI object» are visualized. An analog logistic functional is considered and classified. The interpretation of the term «logistic object» is offered, a comparative analysis of existing and proposed definitions is made. The new terminology will allow to consolidate a comprehensive, unified approach to the study of TWI objects, which can later become an applied tool for compiling parametric series and forming standardized requirements for such objects.

Keywords: logistic object, management system, unified approach, terminal-warehouse infrastructure, terminological apparatus, logistics functions.

Background. *The theoretical and applied topicality of updating the terminological apparatus for designating different types of terminal-warehouse infrastructure objects (hereinafter – TWI) of railway transport is predetermined by:*

1) lack of a unified system of terminology, classification and standardization in the sphere of terminal-warehouse activities;

2) lack of a tool for identification and accounting of TWI objects in the holding company Russian Railways;

3) need to develop customer-oriented solutions in the provision of integrated transport and logistics services, construction of cargo delivery systems and increase the availability of information about TWI [1];

4) an abundance of equivalent terms, a simplistic approach to the definitions of TWI objects: in the domestic market of transport and logistics services, different scientific sources, program documents and the participants themselves call the objects differently, and, consequently, differently understand their essence;

5) there is no clear parametric and terminological division and classification of TWI objects at the official legislative level (standardization base);

6) formation of its own terminal network, in spite of the allocation of the transport and logistics business block, is not backed up by JSC Russian Railways with the proper manageability of the facilities [2].

Analysis of domestic and foreign sources [1, 3–14, 17–20] showed the absence of a single conceptual approach to the essence, terminology, classification and identification of the structures of the transport-warehouse system. Based on its results, a poly-aspect component of the known definitions of the TWI objects was visualized (Pic. 1).

The resulting material provides the basis for constructing a universal terminological apparatus for a clear grouping of various TWI objects by their functional types and features of work in the delivery system.

Objective. *The objective of the author is to consider terminology of terminal warehouse infrastructure objects.*

Methods. *The author uses general scientific methods, comparative analysis, evaluation approach.*

Results.

Typical characteristics of logistic objects.

In the conditions of a presence of a huge number of concepts that are not delimited by parameters and mistakenly used by the participants in the transport process as synonyms, it is required to develop a single terminology as a «common language». Since logistical principles have been actively used relatively recently, the domestic market of transport and logistics services does not have an established terminology, a single classification and conceptual approach to the essence of such different objects of TWI [2].

Logistic objects as one of the types of transport-warehouse systems are a whole group of objects of terminal-warehouse infrastructure on the basis and with the use of which the railway transport performs complex transport and logistics services for cargoes, the complete logistics chain of delivery begins and ends with them.

Transport-warehouse system (TWS) of cargo delivery means a set of elements of the terminal-warehouse transport infrastructure, represented by logistical objects of all types, as well as by such larger objects as terminal networks, logistic villages, hubs and others.

In general, logistic objects (LO) mean any objects of terminal-warehouse infrastructure (warehouses, freight terminals, etc.) physically providing the implementation of transport and warehousing services for various clients, focused on the totality of characteristics in a certain area.

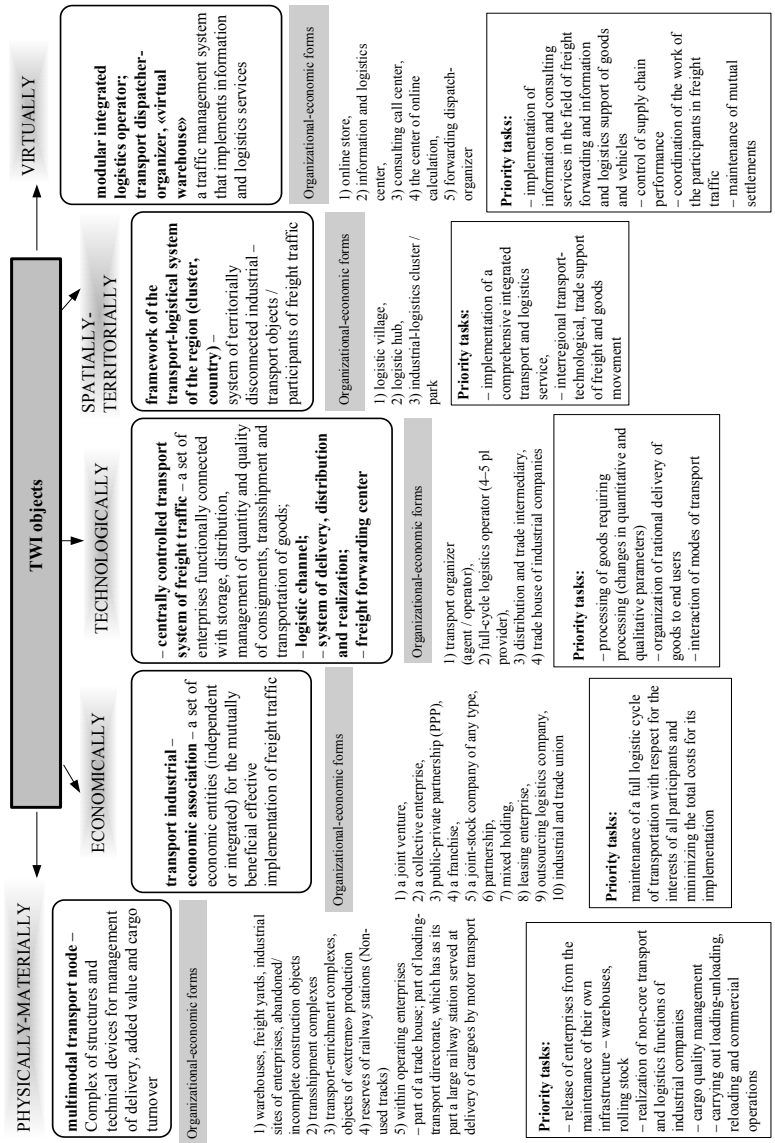
LO type is a set of functional, technical and technological and organizational features inherent in a specific object and determining the format of its work in the delivery system of goods in accordance with the functional-logistic distribution of responsibility zones in the established hierarchy and evolution process.

Given the hierarchy of its position in the transport and logistics system, the logistic object is transformed into more complex entities – the district and the region.

Logistic district – a combination of LO of a certain degree of economic and technological interaction located in geographical proximity for integrated logistic support of cargo transportation.

Logistic region – territorial logistical entity of a global scale that occupies a significant part of the country's transport and logistics infrastructure and integrated into national and international transportation processes [15, 16].

Table 1 presents the proposed typology of LO with their brief description. Authors' definitions are given from the point of view of transport and logistics science and synthesize the features of managing transportation processes, logistics technologies and the theory of storage systems of O. B. Malikov [9]. The updated terminology corresponds to the concept of development of transport and logistics business of the holding company Russian Railways [17] and the concept of creating a TLC in the territory of the Russian Federation [18]. The logic of terminology is as follows: from the maximally universal, suitable for all the general



Pic. 1. Definitions and aspects of the essence of the concept of TWI objects.

sense to specification of the entity by narrowing the functional-logistical, technical and spatial parameters of the object being characterized.

The basic definitions of the terminology are:

«Warehouse» – for the group of LO WY, W, TWC – «a stand-alone cargo handling complex on the main transport, as part of an industrial, construction or trade enterprise or located separately from these enterprises and intended to perform logistics operations to convert freight flows»; or «buildings, structures and various devices intended for receiving, placing and storing goods received on them, preparing them for consumption and release to the consumer» [9, 6].

«Logistic center» – for the group of LO TT, DC, LC – «a structure that unites several companies that carry out integrated logistics activities in a particular region with the provision of equipment and services to customers in centralization of management»; or «a complex technical structure that consists of a number of different subsystems (a complex of buildings, a set of processed goods, an information support system) and elements of a specific structure that are combined to perform specific functions for conversion of cargo flows», or a «spatial-functional object, together with infrastructure and organization, in which logistics services related to acceptance, storage, distribution and delivery of goods are realized, as well as related services provided by the subjects which are independent of a consignor or a consignee» [7, 13].

«Transport node» – for the group LO TN, TLS, MTLC is «a set of stations, approaches and branches arranged at the junction of at least three major or local railway lines, as well as a set of interconnected stations serving a large city or a large industrial point» [11]; or «points of junction of three or more railway lines, as well as individual points, which include several railway stations and branches serving large industrial enterprises of the city or district» [14].

The above definitions are sufficiently one-sided, since they reflect certain aspects of the essence of LO – technical, logistic, transport and design, but do

Table 1

The proposed terminology for TWI objects

LO	Definition Level of development	Key characteristics	
		Level of service	
1. The simplest components of the transport-logistics system of cargo delivery, which are the basis of all subsequent types of LO			
WY, warehouse yard	An elementary component of LO, an open platform, equipped for processing, transshipment, loading and unloading and storage of goods that allow open storage. It can be a separate cargo front, consisting of a PRM, a stack of cargo and a transport approach.	Technical-technological, «warehouse», freight-oriented	Basic (transport + loading-unloading + storage)
W, warehouse	The simplest nodal element of the cargo delivery system, which is a set of buildings, structures and technical devices, designed and equipped to effectively convert cargo flows and minimally necessary services for primary registration, acceptance, delivery and storage of goods during transportation.		
TWC, terminal-warehouse complex	A set of specialized technologically interconnected warehouse yards and warehouses with a developed engineering, administrative and transport infrastructure.		
2. Integrated coordinating components of the transport and logistics delivery system			
TT, transport terminal	The simplest LO of the «center» format, located at the initial, final or intermediate point on the main transport, which is a geographically integrated and spatially localized set of warehouses and TWC, which provides for efficient interaction of modes of transport.	Functional «center», logistics-oriented	Advanced (basic + additional transport services)
DC, distribution center	A large transport terminal with enhanced coordinating functions for management of freight flows at the breakpoint of the transport network, providing customers with a wide range of terminal-warehouse and logistics services in multimodal transportation.		
LC, logistics center	Multifunctional and most developed LO of the «center» format, according to the definition of the UNECE – an association of independent companies and bodies involved in freight transportation and related services, including at least one transport terminal. Having direct access to TN, a high degree of automation of management processes and an information system integrated with the systems of other participants in multimodal transportation.		
3. Large network components of the transport and logistics system of cargo delivery, which are the infrastructure basis for formation of logistics districts			
TN, transport node	Basic LO of the «node» format, located at the point of junction and interaction of several modes of transport, including railway stations, sea and river ports, airports, warehousing, repair and auxiliary facilities. Organizationally, economically and technologically interconnected enterprises of independent participants in the transport process interacting «in one place», integration of freight flows and the effect of scale with direct access to multimodal transport services and the availability of direct communication with other nodes of the transport network.	Nodal («node»), network, client-oriented	Maximum (advanced + wide range of value added services)
TLN, transport-logistics node	A compact spatially localized association of enterprises of independent subjects of the transport and logistics market on the infrastructure basis of the transport node, with a high concentration of value-added services for the focused implementation of integrated transport and logistics services to customers on an international scale.		
MTLC, multimodal transport and logistics center	A large transport and logistics node located in close proximity to the logistics district, integrating the multimodal and terminal-logistics infrastructure of various modes of transport and independent market entities into a single network-wide complex, with a single multimodal transport operator with direct access to transport corridors for implementation of a through seamless management of transportation processes and maximum provision of clients with value added services on an international scale e. It implements a synergistic and multiplicative effect.		

not have a character integrated with the logistics and transport technologies.

Thus, the author's definitions (Table 1) do not contradict the terms known in the transport and logistic literature, but systematize and integrate them in the context of a single approach. In the terminology, the view of the essence of LO is changed. Known terms are not refuted, but are transformed according to the positions of modern logistics and economics.

Novelty of the proposed interpretations

In the definition of «logistic object», one universal term generalizes the characteristics of a whole group of enterprises, technical structures and devices with which, or with the use of which, logistic functions are performed in railway transport. The function of «transport and warehousing» is the main and typical for all LO as a buffer transport-warehouse system, which carries out the interrelation of transport, warehouse and client.

Let's show, what is a difference between some new terms and existing ones.

1. Transport node, TN:

a) our definition – this is a complex logistic concept given in a generalized form, integrating the understanding of TN both from the point of view of transport logistics and transport technology, and not

Table 2

Functional characteristics of LO according to the new terminology [15]

LO	Package of services	Coefficient of complexity of logistics service, CLOG	Direction of evolution and hierarchy of LO
Basic package: provision of standard «transport + storage» services		minimal	the simplest LO
WY	Up to 10 % of complexity of services	0,1;...; 1,3 (+,-0,5)	
W	Up to 20 %		
TWC	Up to 30 %		
Extended package: basic + «near-transport» services		1,4;...; 1,8 (+,-0,5)	
TT	Up to 50 % of complexity of services		
DC	Up to 60 %		
LC	Up to 70 %		
Maximum package: expanded + services, essentially raising added cost of cargo			
TN	Up to 80 % of complexity of services	> 1,8(+,-0,5)	the most complex LO
TLN	80–90 %		
MTLC	Over 90 %	maximum	

only in purely engineering, technical aspects, as a set of stations, connecting tracks, etc.

b) key features of the node as a logistic object are the parameters of transport dislocation, logistics technology, service and the typology of participants, rather than traditional geometric and geographical parameters;

c) a new group of significant features made it possible to classify TN as logistic objects, integrating aspects of logistics, transport technology, design, as well as transport and economic geography.

2. Logistic object, LO. The need to introduce a new term is dictated by the need to designate a whole group of terminal-warehouse infrastructure objects that have a number of parametric and functional differences in the cargo delivery system, but not systematized by scale of activity, capacity, complexity of service and technology.

It is proposed to call as «logistic» elementary terminal-warehouse objects, which are the basis for more complex formats of providing logistics services with added value – logistic districts and regions.

Unlike many definitions concerning terminals, warehouses, logistics centers and other things, the term «LO» covers a wide field of distinctive logistical functions, transport and storage technologies, and does not contradict the well-known terminology in the field of logistics.

Table 2 shows the packages of logistic functions of TWI objects taking into account the new terminology. The range is formed from current offers working in Russian conditions, and also according to segmentation of services of the concept of creating the TLC in the territory of the Russian Federation and the author's system of classification, hierarchy and evolution of LO [16].

The basic package involves the provision of standard «transport + storage» services – loading-unloading, receipt-delivery, documentation, storage, door-to-door services, last mile, cargo transshipment.

Extended: «near-transport» services are added to the standard basic package of services, including marking, sorting, packing, subgrouping, customs support, freight forwarding, rolling stock operation, cargo lot management, marking and packing of cargo.

The maximum (integrated) set of logistics functions to the expanded package adds services that significantly increase the added value of the goods (goods): logistics consulting, multimodal transport operator services and provision of seamless service, construction and management of supply chains, development, transshipment, stevedoring and survey services in cooperation with maritime transport, in the same series, distribution and/or sale of cargo, pre-sale preparation, assembly (installation), enrichment, i.e. transformative effect on the consumer properties of cargo (goods). Such a complex operates «from one person» and spatially in one place.

The key features of LO definition are the following:

1) LO is a deeper concept than just the start and end point of the route transportation, it is a part of the logistics chain in which the added value of goods is generated with provision of an integrated transport and logistics service in the transport-warehouse system from the client-sender to the client-recipient.

2) LO is not a station. The term says «station-based». LO is a completely different technological structure that does not fulfill the functions of a railway freight station. At the same time, LO can function on an infrastructure basis or near a station, be in a technical and organizational and technological connection with it, but does not directly serve as a station. Work on all types of cargo, warehouse and logistics operations is paramount for LO, and concerning operations with trains is of secondary importance.

3) LO is not a warehouse. The term says «as a part of LO». A logistics object is a more capacious and broader concept, involving not only implementation of basic services and a key role in the delivery system. It is a multifunctional, multimodal, logistically developed complex, whose activities are not limited to the work of the warehouse included in its structure.

4) LO is not a service or a transport product. The term says «by means of LO / LO as a service provider / LO as a physical basis». A logistics object is a physical infrastructure foundation for implementation of a comprehensive service by integration of several

executing companies. It is an infrastructure for direct provision of a service, more precisely – a whole range of services «from one person in one place with end-to-end management».

That is, LO is a new, independent definition of the logistic structure of a wide range of technical composition, spatial size, technological capacity and functional purpose that is common today in the market of transport and logistics services.

Conclusions. *The developed terminological apparatus is distinguished by: 1) designation of a whole group of objects that implement logistic services; 2) universality of the definition of basic properties, characteristic for the objects of TWI as transport-warehouse systems; 3) the complexity of approach, integrating the terminology of railway and logistics theory and established practice; 4) reflection of the logistic role of TWI in the system of cargo delivery; 5) emphasis on the ability of TWI to provide a multifunctional logistics service for the entire transportation process.*

2. The purpose of the new terminology is theoretical provision of a unified approach to the definition of the essence, classification and functional of TWI objects acting as transport-warehouse systems.

3. The proposed terminology can be used as a theoretical basis for development of common conceptual bases for new applied interdisciplinary research. In the field of practical transport business, terminology as a draft of formal legislative fixing of requirements for TWI objects can be used by participants in the transportation process when identifying LO type, choosing approaches to calculation and evaluation of performance indicators, and also as a unified approach integrating problem fields at terminal and warehouse infrastructure facilities.

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