DOI: 10.31520/2616-7107/2023.7.1-2 *ISSN 2616-7107*

UDC 656.078.12, 330.46
JEL: C82, D81, L91, L96

RISK ASSESSMENT OF WATER TRANSPORT ENTERPRISES BY MODELING DIRECT AND INDIRECT THREATS

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Received: December 26, 2022
Accepted: February 28, 2023

DOI:10.31520/2616-7107/2023.7.1-2

Introduction. The methods of traffic modeling by water transport and assessing the risks associated with it is needed to identify the issues of the past period, proposing methods for assessing not only direct but also indirect risks to form the preconditions for preventing them in the postwar reconstruction. The coordination of different transport type's actions of transport requires an assessment of risks impact of the previous stages of mixed transportation on the formation of the following risks' stages. Existing methods of assessing such impact need to be improved.

Aim and tasks. The aim of this study is creation of methodological approach to risk management in water transport based on a mathematical model for assessing the impact of both direct and indirect risks. The tasks are: to prove that the additive approach of taking risks into account leads to the systematic deviation appearance from the result; take into account the impact on the risk of cargo transportation.

Results. It has proved that the calculation of risk as an additive function leads to a systematic deviation from the relevant result. It stated that the risk of each of the next stages of transportation depends on the risks of the previous stages. To increase risk analysis relevance in water transport, the use of an oriented graph in a multidimensional parameter space proposed. It stated that in order to calculate the integrated risk, it is essential building not only the risk matrix but also the risk incidence matrix to take into account their relation to business entities. It established the impact of even minor risks could take the form of a catastrophe, which leads to cargo flows reorientation. It established that: for calculation of integral risk, it is crucial consider direct and indirect influences of risks; risk calculation for water transport also requires risk analysis in related modes of transport.

Conclusions. It was established that, when calculating integral risk, it is necessary to consider direct and indirect influences on risks and that the risk calculation for water transport also requires risk analysis in related modes of transport. The proposed approach significantly increases the relevance of water transport risk analysis and allows for managing changes in transportation routes in real time.

Keywords: risk management, water transport, mathematical model, indirect risks.

1. Introduction.

There are numerous methods of modeling the process of traffic by water transport (WT) and assessing the risks associated with it. However, the relevance of these methods, especially for complex systems using many interconnected modes of transport, is not significant. Traditionally, only direct risks are taken into account for the transportation risks assessment. Here and further, risk is defined as the situations uncertainty that may lead to adverse consequences. From a mathematical point of view, risk is a function, the parameters of influence of which are defined as "risk factors".

There is no methodology recognized by the scientific community for taking into account the indirect effects of risks on the transport process. Assessment methods that do not distinguish between indirect and direct risks do not provide relevant results. In the volume of traffic by water transport, an increasing share occupied by mixed transportation, which, by definition, uses several modes of transport. However, even for the transportation of traditional types of cargo in export transportation, such as container or bulk, also use several modes of transport and the consistency of their actions determines the efficiency of the freight process.

The coordination of actions of different types of transport requires an assessment of the impact of the risks of the previous stages of mixed transportation on the formation of the risks of the following stages. Existing methods of assessing such impact need to be improved.

Therefore, it is especially crucial to identify the issues of the past period in related modes of transport, to propose methods for assessing not only direct but also indirect risks to form the preconditions for preventing them in the postwar reconstruction. Such methods are needed for reliable forecasting and planning in the transport industry.

2. Literature review.

Dynamic nature of risk changes is often neglected in the modeling of WT cargo transportation for the leading countries of the world. For instance, with changes in the level of risk (Wolfinger et al., 2019), the heuristic method that uses an iterated local search to optimize multimodal long-distance transportation becomes impossible to implemented.

The relevance of the economic-mathematical forecasting model (Gryshchenko & Gryshchenko, 2021) of the relationship between GDP and freight traffic by WT in Ukraine decreases significantly with fluctuations in risk over time. The two-object model of freight chain formation using multi-purpose algorithms based on the Pareto method (Mogale et al., 2019) does not take into account dynamic processes.

Optimization by the method of a swarm of particles with differential evolution to solve an NP-complex problem and the use of meta-heuristics of data sets (Maiyar & Thakkar, 2019) requires significant changes to take into account the dynamic changes in risks. The fuzzy mixed integer nonlinear programming model for formulating the capacitive problem of multimodal routing (Sun et al., 2019) can be used only for small fluctuations of risks in time windows.

The method of logistic modeling of the container transportation system using the cybernetic model "white box" (Aulin et al., 2020) is not able to take into account changes in risks at the stages of transportation.

In the article (Prachi & Talari, 2018) the stochastic problem of transportation with several variants is offered to be transformed into a purely deterministic problem, which makes it impossible to take into account the dynamic change of stochastic risks.

Mathematical model (Shramenko & Shramenko, 2018) of the functioning of the production and transport chain of cargo delivery based on a systematic approach, consider the interaction of production, transport and consumption significantly reduces the relevance of changes in real-time risks. The relevance of modeling operational risks in container transportation systems using the method of cognitive assessment (Nguyen & Wang, 2018) also decreases significantly with the dynamic change of parameters.

The method of selection of effective risk reduction strategies in container transportation (Chang et al., 2019) used for determined non-dynamic risks.

Container traffic risk assessment using Bayesian network modeling (Zhou et al., 2022) also does not take into account changes in risks over time.

This also applies to the quantitative model of operational risk of container traffic using the Bayesian Fuzzy Rules network with a two-level parameter structure (Nguyen, 2020).

Vulnerability analysis of the container traffic network due to violation of the main route (Wu et al., 2019) does not take into account the dynamics of risks at the stages of transportation.

Simulation modeling of the interaction of road and river transport (Okorokov, 2020) offers to consider only the direct risks by mode of transport.

The same applies to the network approach to modeling the process of mass delivery of goods (Koskina, 2019).

The simulation approach to modeling the interaction of the port with enterprises (Turpak et al., 2020) takes into account only the integrated risks of transportation by mode of transport. In a study (Rawson et al., 2021) to determine the suitability or validity of each of the methods of risk assessment, it is proposed to apply a systematic multicriteria approach to compare the input data, assumptions, methodologies and results of each method but does not analyze the difference in the relevance of static and dynamic approaches.

The literature review considers a significant number of approaches of modeling freight transport by water and assessing the risks associated with it, but does not differentiate between the impact of direct and indirect risks, for example, in related modes of transport and does not take into account the possibility of significant dynamic changes in risk during the stages of transportation.

3. Aim and tasks.

The aim of this article is to create a methodological approach to risk management in water transport based on a mathematical model for assessing the impact of both direct and indirect risks.

The tasks of this article are:

1. To prove the use of the traditional approach to calculating the integral risk of transportation by water transport as an additive function of individual risks has significant, so far not taken into account a shortcoming, which leads to the appearance of a systematic deviation from the relevant result.
2. To increase the relevance of the analysis of the risks effects on the transportation of goods by water transport, the development of auxiliary mathematical methods of graph theory with the construction of an oriented graph in a multidimensional space of parameters.
3. To take into account the action of individual risks, even those whose weight of influence on the integral risk of transportation is insignificant in some periods of time but can take the nature of a catastrophe, in the mathematical sense of this definition.
4. To take into account the fact that the calculation of cargo transportation risks by water requires not only an analysis of shipping risks, but also risks in related modes of transport and all other types of transport activities specific to the world, country or region, which in one way or another affect the freight process.

4. Results.

Based on the analysis, it has established that the methods of risk assessment proposed in scientific papers are still based on additive models. To do this, first estimate the weight of the risk factor (using the expert method, factor analysis or other similar methods), and then the integrated risk is estimated as the sum of terms taking into account a certain weight of local.

When using the method of system analysis, the disadvantages of this approach are established. For instance:

– researchers often rely based on unreliable assessment methods where the human factor is decisive;

– various variables are used to assess local risks: stochastic, deterministic, fuzzy; different methodological approaches: qualitative, expert, index, calculation; different systems of units: monetary, physical measurement, etc., so the reduction of these risks into an integral function by the additive method is wrong;

– risk parameters are often interval values, the distribution of which, even if represented by real numbers, the interval of existence cannot be uniform;

– risk parameters are often discrete values, so the formation of risk functions using them on continuous scales of measurement of these functions requires additional mathematical apparatus for coordination and further unification.

The use of the method of analysis and synthesis revealed that these shortcomings reduce the relevance of risk assessment. It was also establishing that the main disadvantage of the additive model of risk assessment is to take into account only those risks whose impact is direct. Risks whose impact is indirect are usually not taken into account or their assessment is irrelevant because the accuracy of the risk impact assessment decreases exponentially from the number of intermediate links in the transmission of this risk impact. For example, the risk of sinking a ship during hostilities is direct. In addition, the associated risk of non-regular nature of port infrastructure, delays in rolling stock of associated modes of transport at port stations, the risk of excessive accumulation of specialized modes of transport at transshipment points with the subsequent formation of congestion are indirect.

The magnitude of the impact of indirect risks, depending on the number of intermediate objects / subjects of influence may be less or more than direct threats. Therefore, the use of the method of induction and deduction indicated that it is important to create a mathematical model that will get rid of these shortcomings and will allow a relevant assessment of risks. This model should be the basis for building a reliable methodological basis for risk assessment because only a reliable mathematical formalization ensures the thoroughness of methodological approaches.

The basis that should serve in the future, as the basis for the formation of this mathematical model is the departure from the linear additive approach and the formation of an original network approach to risk assessment. The implementation of such an approach is facilitated by the peculiarities of transporting goods by water. These features increase the need to involve the impact of indirect threats to assess the integrated risk. Which, in turn, is due to the stages of the transportation process, when each of the next stages depends on the risks of the stages that precede it? Therefore, the assessment of the risks of cargo transportation by vessels cannot be reduced purely to the risks of navigation. It is also worth considering the indirect effects of associated risks, such as the risks of transporting goods to ships by associated modes of transport.

As shown by the method of critical analysis of the overall risks of mixed freight (and almost the full volume of water transport is provided by mixed transport) of Ukraine have a significant indirect impact on the risks of transporting goods by associated water transport, especially -rail transport. Therefore, to increase the relevance of estimating the dynamic effects of direct and indirect risks using the method of mathematical formalization, the use of graph theory methods is proposed.

Thus, Kotenko et al. (2021) consider a mathematical method for detection of unidentified factors that affect the competitiveness of water transport. For this purpose, a method of dividing aperiodic and background effects into the resulting function is proposed. This is used in the improvement of the proposed mathematical model, but for the mentioned mathematical model, it is proposed to depart from the traditional representation of the transport problem by the method of graphs. It is suggested to choose not transport hubs like the nodes of the graph, but the causes of risks and the subjects / objects of their direct or indirect impact.

The concept of "route" on the graph also differs from the traditional identification with the transportation of goods. It is proposed to consider the chain of transmission of the impact of risk as a "route" of direct risk. A feature of this approach, from the traditional application of the method of graph theory to transport problems is the rejection of the principle of locality. That is, subjects / objects are not considered from a geographical-spatial point of view.

It is obvious that a certain set of these subjects / objects of the transport process will be affected by different risk groups. From the point of view of graph theory, this means that from the vertex "cause of risk" there are only source edges, and to the vertex "subject / object of risk" there can be many both input and output edges. The conclusion from the above is that through the top of the "subject / object of risk" there may be many "routes".

To assess the magnitude of the impact of risks on losses of cargo transportation, it is necessary to form a matrix of contiguity for a balanced oriented graph without contours, because transportation is, by definition, oriented technology chain, and the impact of risks on transport entities is also targeted.

Determining the balance of the edges of the graph determines the possibility of taking into account the impact of risk on the sequence of its consequences. Having a condition without contours on an oriented graph will open up mathematical possibilities for planning and forecasting risks.

To implement a mathematical model, it is necessary to determine the approach to the formation of the incidence matrix. The specified incidence matrix is formed on a similar but not identical principle as the adjacency matrix. If the adjacency matrix has size n × n, where n is the number of vertices of the graph, then the incidence matrix has size n × m, where n is the number of vertices, m is the number of edges.

That is, when constructing an incidence matrix in order to formalize the value of the cell, needed to compare not the vertex with the vertex, as for the adjacency matrix, and the vertex with the edge.

This approach gives possibility of estimation and prediction of losses under certain risk scenarios and forming options for decision trees on the choice of transportation routes while minimizing the impact of risks. This, in turn, will reduce the use of computer resources in the future.

As mentioned above, the risk at each stage of the transport chain is not only a factor influencing the losses at this stage but also forms the chain of consequences of the risks of subsequent stages, the rate of decrease / increase in weight of this impact, i.e., accordingly, the chain of losses. For example, weather risk at one stage of sea transportation not only affects the formation of losses at this stage but also at subsequent stages - fines for prolonging congestion, downtime of vehicles at these stages (rail cars, cars, ships, etc.).

This determines the stages of formation of the algorithm, which implements the proposed mathematical model. The algorithm for constructing a risk graph is as follow:

1. There is an analytical presentation of the risk graph:

$$G = (V, E) \qquad (1)$$

That provided:

$$V \in V_1, V_2, V_3 \qquad (2)$$

where G - oriented graph as an economic and mathematical object (subject); V- the set of vertices that are objects (subjects) of risk impact; E - the set of edges that are comparable to the effects of risks and the elements of this set, provided that it is oriented graph, are pairs of elements that belong to the set V; V_1, V_2, V_3 – respectively, not empty sub structural sets of stellar vertices, for each of which there are several input / output edges, which creates the possibility of organizing alternative routes.

2. The degree of vertices of the graph is set $deg\ v$ which depends on their incidence.

3. Each edge is set in accordance with the vector of parameters (in the general case - nonlinear) X^E.

While constructing a graph of losses, the vertices (edges) of the connected digraph are divided into corresponding layers according to the predecessor-successor principle.

If possible, a multivariate approach is performed, which forms a prerequisite for the use of alternative strategies. These layers include not only the main option of transportation but also the probable options. Even those options that are not usually used.

Next, the functional dependence of the magnitude of the impact of the i-th risk $\gamma_i$on the object / subject of impact. This functional dependence is formed in accordance with the rate of change of the risk gradient ($grad\ \gamma_{ij}$) on the object / subject according to the current parameter $\omega_j$with index j=1, 2, … .

The rate of change of the magnitude of the impact is determined by the tangent of the angle of inclination $tg\ \alpha_{ij}$tangent to the gradient attractor on the response surface in space of dimension $(i + j + 1)$where$\alpha_{ij} = \varphi(\gamma_i, \omega_j)$.

To determine in general the effects of $i$risks on the object / subject of influence, should be formed following ~~a~~ matrix of the species:

$$\Omega = \begin{vmatrix} grad\ \gamma_{11} \dots\dots & grad\ \gamma_{i1} \\ grad\ \gamma_{12} \dots\dots & grad\ \gamma_{i2} \\ grad\ \gamma_{1j} \dots\dots & grad\ \gamma_{ij} \\ \dots & \end{vmatrix} \qquad (3)$$

That is, a covariant vector is formed as a condition for the formation of a rank tensor (0,1).

Parameters may or may not take a physical form, such as time, for example, distance may not be measured in physical units (m, km), but in indices of zones separated by isolines on one principle or another. Zone indexation is performed in accordance with the increase or decrease in the level of risk impact.

Losses on one or another feature, for instance, loss of time directly form the cost of fines and penalties for non-compliance with contractual conditions of carriage, loss of related modes of transport due to forced downtime and, indirectly, form a loss of competitiveness. That is, can continue to use traditional approaches to estimating losses in one form or another.

The affected entity / subject suffers losses from the aggregate impact of risks. To determine them, should be found the coordinate positioning of the object / subject of influence relative to the response surface because its parameters "distance" from the maximum zone of influence must be known, determining the matrix of the form

$$\Omega^{/}=\begin{vmatrix} tg\,\alpha_{11}\dots\dots & tg\,\alpha_{i1} \\ tg\,\alpha_{12}\dots\dots & tg\,\alpha_{i2} \\ tg\,\alpha_{1j}\dots\dots & tg\,\alpha_{ij} \\ \dots & \end{vmatrix} \quad (4)$$

which is a matrix of the incidence of losses of the specified object / entity from the aggregate impact of risks.

A practical example of the indexation of areas of risk is the impact of the risk of hostilities before the full-scale invasion of Russian troops on the activities of seaports. This impact on the port of Mariupol and other ports in Ukraine (Odesa, Yuzhne, Izmail) was not uniform.

The analysis shows that the level of impact of the risk of hostilities was not even dependent on the physical distance from the combat zone, but was index-based, and in this case the indices correlate with changes in transport chains from one port to another and in the aggregate general change of transport and logistics routes. Tensor graph representation is used to establish the relationships of incidence and contiguity matrices for risk and loss graphs.

The tensor equation for representing risks has the form:

$$WQ = V \quad (5)$$

where W – connectivity tensor; Q – the tensor of the probabilities of the presence of cargo flows at the points of transportation in the specified time intervals; V– risk impact tensor (Kotenko et al., 2021).

The use of tensor representation of graphs reveals the possibility of applying the invariant property of tensors for the formalized connection of incidence matrices for risks and losses.

However, the use of the invariance property of tensors does not preclude the use of a special algorithm for constructing a loss incidence matrix based on a risk incidence matrix.

This algorithm is as follows:

1. A risk-loss relationship is established.
2. Losses are stratified by types, economic entities, risk weight change function (impact force) depending on the number and type of risk and the type and number of indirect elements on the risk-object route.
3. Incidental connections are formed according to the principle of relation to the weight of risk (absence of influence of risk means assignment of an edge of zero value of weight).
4. The final values of the intervals of limiting the weight of the ribs are set, for example, depending on the capacity per unit time of cargo through a certain node, which accordingly respectively to certain functionality leads to a change for losses.

The correlation of the effects of risks in related modes of transport, which is especially important for the provision of mixed transport, confirms this fact (Table 1).

For water transport, the situation is aggravated by the fact that during the studied period there is a tendency of increasing from year to year the average delay time of cars at port stations. This is due to disruptions in the railway schedule due to non-catastrophic accidents, i.e. everyday accidents caused by the critical condition of the railway infrastructure, the use of rolling stock with a long expired safe use period, etc.

Table 1. Correlation between the integrated risk of transportation of goods by rail to individual ports and the risk of delay of water transport for 2019-2021*

№/№	Port name	Integral risk of transportation of bulk and containerized cargo by rail,%			Risk of delay of water transport vehicles,%			The average correlation coefficient by type of cargo,%
		Type of cargo			Type of cargo			
		Loose		Container -artificial	Loose		Container -artificial	
		Ore	Grain		Ore	Grain		
1	2	3	4	5	6	7	8	9
1	Berdyansk Commercial Sea Port	-	10,02	-	-	8, 1	-	95,2
2	Izmail Commercial Sea Port	13,1	-	12,0	11,1	-	11,8	97,1
3	Mariupol Merchant Sea Port	-	10,17	-	-	9,8	-	98,0
4	Mykolaiv Sea Port	-	9,15	7,1	-	8,5	6,9	94,6
5	Odesa Merchant Sea Port	8,34	5,18	2,898	7,8	4,6	2,3	94,8
6	Pivdennyi Sea Port	19,2	21,2	8,82	18,0	19,3	7,72	95,1
9	Kherson Commercial Sea Port	-	-	4,44	-	-	4,2	99,1
10	Commercial Sea Port of «Chornomorsk»	18,6	23,2	3,348	17,4	20,7	3,1	94,9

* *without taking into account the risk of hostilities.*

Source: based on Chernova et al. (2021), Okorokov et al. (2020).

This leads to a decrease of the cargo transshipment volume at port stations, where transshipment is performed from rail transport to seagoing vessels. The analysis insufficiency of their daily processing capacity, which leads to an increase in the risk of delays in cargo, especially bulk – grain, ore, in peak conditions (Fig.1).

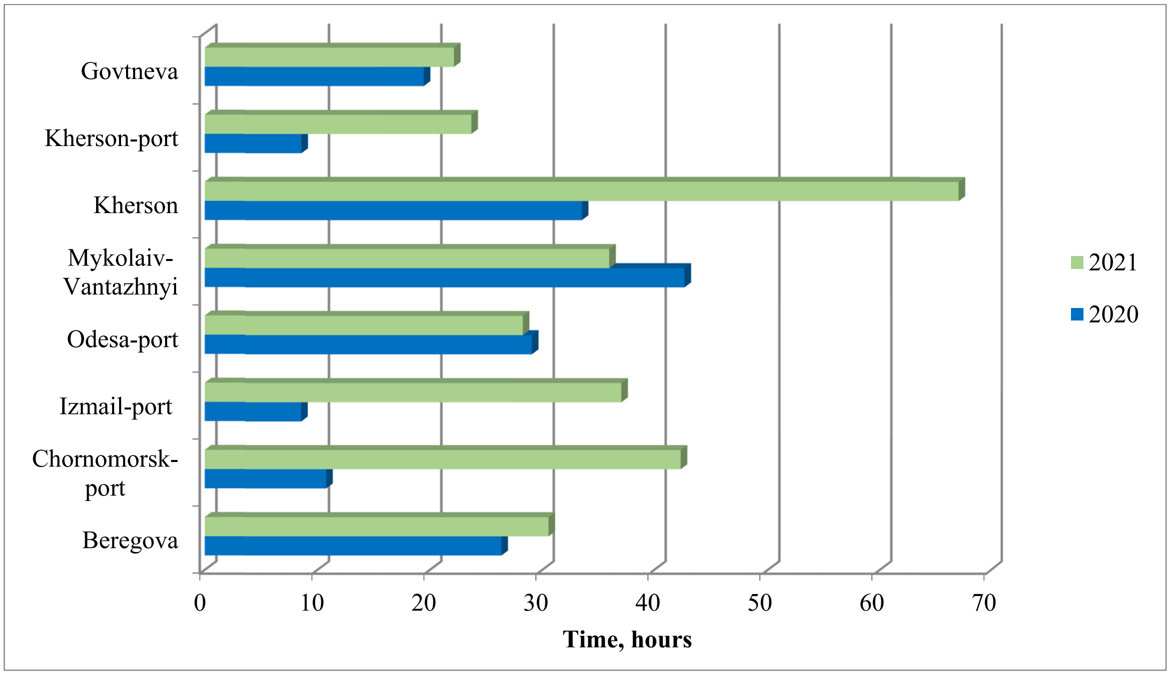

Fig. 1. Delay of cars at port railway stations, hour.

Source: based on Chernova et al. (2021).

As can be seen from Table 2, the average daily shortage of cars at the most important port stations is 15.59% but for some ports ranges from 9.45% to 74.24%, which increases the level of risk to an unacceptable value.

Table 2. Comparison of the required volumes and volumes of cargo handling in fact at freight port stations for 2020.

№/ №	Name of the port freight station	Parameter			
		In fact (design), railway carriages per day	Required railway carriages per day	The share of relative shortage of railway carriages	Relative shortage of railway carriages, %
1	2	3	4	5	6
1	Mykolaiv-Vantazhnyi	1197	1322	0,09	9,46
2	Beregova	602	1192	0,49	49,49
3	Izmail-port	803	924	0,13	13,09
4	Chornomorsk-port	1539	1891	0,19	18,61
5	Odesa-port	1173	1398	0,16	16,09
6	Kherson-port	324	521	0,38	37,81
7	Govtneva	480	1864	0,74	74,25
Total		6118	7248	0,16	15,59

Source: based on Chernova et al. (2021), Okorokov et al. (2020).

The risk of cargo delays at port stations is proportional to the relative shortage of wagons for each of them. The risk of cargo delays for seaports should also take into account the share of total cargo to each of the ports served by rail. This proves both the presence of indirect impact of risks, even on the objects / subjects of the transport process that are formally related to other modes of transport, and, accordingly, the possibility of applying the proposed mathematical approach to the analysis of indirect impact of risks.

Since large-scale military actions revealed a significant level of vulnerability, mainly of sea transport, the first task in the post-war period occurs: rational coordination of the interaction of all types of transport; introduction of new methods of risk assessment and planning measures to mitigate their consequences; in the process of economic reconstruction in the post-war period, the introduction of a measures system to correct the shortcomings revealed by the war in the field of cargo transportation.

The identified water transport vulnerability is primarily lased on the fact that mixed transportation until the active phase of hostilities was carried out according to the principle of the shortest logistical arm. A shorter delivery arm guaranteed the participants of the transport process a lower cost of transportation. The choice of transportation ground stages based on the principle of the shortest logistical arm of cargo delivery for many years has largely led to the stagnation of those transport highways, the support of which was considered costly and unprofitable. As a result, this led to a decrease in the number of possible options for cargo transportation routes, which, under war conditions, increased the risk of transport collapse. In the post-war period, this necessitates the formation of new opportunities for connecting ports with the country's transport system.

In the period before the active phase of military operations, a tendency towards the centralization of logistics centers was observed. Military actions proved the need for the reverse process – decentralization, since the centralization of logistics centers indicated a significantly increasing level of risks for the transportation of goods.

Since it is necessary to combine these trends, taking into account both the needs of peacetime and the tasks during martial law, it is therefore proposed to form a network of distributed logistics centers connected to each other by transport routes using different types of transport and sub-networks of logistics centers connected as among themselves and with main logistics centers.

The network approach is based on the lower vulnerability of network systems than centralized, hierarchical systems to crisis manifestations of any nature. Due to the network principle reliability, it should be extended to the system of transport connections adjacent to the sea modes of transport.

The proposed measures will lead to a reduction in the level of risk for freight transportation using water transport and an increase in the reliability of its interaction with adjacent modes of transport and an reliability increase of the operation of loading and unloading points on mixed cargo routes (for example, at port railway stations).

Also, the military actions indicated the low adaptability of the existing port infrastructure to new types of cargo. Re-equipment of intact berths of active ports was completed in a time unacceptable for dynamic threats. There are two ways to solve this problem – to create technologically universal berths in advance, which can be reoriented in a short time to handle other types of cargo, or to create specialized berths with the provision that they will not be loaded under various external conditions.

Military actions indicated that inland water transport turned out to be less vulnerable compared to sea transport during the naval blockade of the Ukrainian coast.

Goods transportation by inland water transport can be considered, including, as another logistical alternative to the country's transport links. This leads to a reduction in the risk of blocking individual stages of mixed, transit or internal transportation and, as a result, to a transport collapse risk reduction.

6. Conclusions.

It is proved that the use of the traditional approach to the calculation of integrated risk as an additive function of individual risks has significant, still unaccounted for shortcomings, which leads to a systematic deviation from the relevant result. It was established that for the integral risk calculation it is necessary to take into account not only direct but also indirect effects of risk factors. It is pointed out that the peculiarities of cargo transportation by water transport increase the need to involve the impact of indirect threats to assess the integrated risk. This is due to the staged process of transportation, when each of the next stages depends on the risks of the stages that precede it. To increase the relevance of the analysis of the effects of risks on the transportation of goods by water transport, it is proposed to use the methods of graph theory with the construction of an oriented graph in a multidimensional parameter space.

Using a matrix approach during the calculation of integrated risk in a particular area of economic activity, it is necessary to rebuild not only the risk matrix (linear, dimeric or even multidimensional) but also the matrix of risk incidence and taking into account their relationships with entities / objects of economic activity. The effect of individual risks, even those whose impact on the integral risk of transportation is insignificant, may take the form of a catastrophe, in the mathematical sense of this definition. That is, their point influence can promote reorientation of cargo flows from one port to another, in some cases leading to the actual termination of transshipment of certain types of cargo through separate ports.

It is stated that the calculation of risks of cargo transportation by water requires not only a shipping risk analysis, but also risks in related modes of transport and all other activities specific to the world, country or region, which in one way or another affect the freight process. The study should be continued in the direction of developing proposals to reduce the impact of risks associated with water transport in the postwar reconstruction of the economy.

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