

## ЛОГІСТИЧНИЙ МЕНЕДЖМЕНТ У КРИТИЧНИХ СИТУАЦІЯХ

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Логістична підтримка необхідна для впровадження кризового менеджменту. Сенс логістичного менеджменту передбачає використання основних правил діяльності, що стосуються економічного тлумачення як мінімізації витрат, необхідної і для досягнення поставлених (деталізованих) цілей, і впливу максимізації результатів під час використання запланованих видатків. Однак високий рівень складності та невизначеності умов кризового менеджменту, незважаючи на економічні закони, вимагають компетентного та раціонального використання багатьох інших правил, запропонованих науковцями і перевірені на практиці. Їх варто було б зарахувати до загальних норм, правил діяльності, однак, знання і навички дають нам можливість вибрати відповідну модель поведінки у певних умовах, тобто, кризових ситуаціях.

**Ключові слова:** логістика, логістичний менеджмент, логістичний ланцюг, кризові ситуації, логістика кризових ситуацій, кризовий менеджмент, логістична безпека.

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## LOGISTICS MANAGEMENT IN CRITICAL SITUATIONS

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Logistic support is necessary in order to accomplish crisis management. The sense of logistic management is expressed in obeying basic rule of action, which refers to economy meaning both minimizing outlays necessary for achieving intended (described in details) aim and effects maximization while using possessed outlays. However, high complexity and changeability of crisis management conditions, apart from economy rule, require competent and rational use of many other rules worked out by logistic theoreticians and verified in practice. They should refer to binding norms, rules of conduct, knowledge and skills enabling us to behave in an appropriate way in particular circumstances – critical situations.

**Key words:** logistics, logistics management, logistic chain, critical situation, critical situations' logistics, crisis management, logistic security

**Determining scientific problem.** People from the beginning of their existence faced with critical situations and critical itself whose causes were various – natural catastrophes, mechanical failure, social anxiety, the acts of terrorism as well as war threats. Nowadays a human being and his everyday activity are surrounded by different kinds of threats, and often – as it is shown in practice – new and unusual which generate critical situations. They affect the sense of safety of societies, destroy invaluable nature sources, nations' cultures which are necessary for peace and safe functioning of units, social groups, the entire society (national structures). Meanwhile, one of the priorities of functioning of each state is unchangeably assuring stable bases conditioning widely understood safety. On the other side, it is assessed that in recent years we live under psychological pressure of critical situations showing our helplessness, although there are more and more precise achievements in communication, organization or technology [10, pp. 309–323;

11, pp. 317–329]. In above-mentioned determinants, the issues connected with crisis management, whose integral element is critical situations logistics, are more and more meaningful.

**Analysis of recent scientific research and publications.** Logistics of critical situations is a relatively new area of logistics. Its precursors were military logistics and civilian logistics. In accordance with W. Stankiewicz’s definition the content of military logistics is creating and constant sustaining of armed forces’ supply in order to maximize their battle capability [12, p. 14]. E. Nowak describes military logistics as a field of knowledge referring to the process of delivery and services chain management for fighting armies and for commanding logistic units and sub-units [12, p. 15]. However, definitions of civilian logistics can be classified to one of three aspects: [5, p. 46; 12, pp. 15-16; 14, p. 17]:

1. From functional aspect, logistics is noticed as a general process of management which includes forming action strategy, planning, organizing, initiating, motivating and managing.

2. Referring to the subjects, logistics, as a scientific discipline, deals with physical flow of materials, goods, services and information between suppliers and recipients. It aims at streamlining (optimization) of these flows, and especially in terms of time and costs incurred.

3. Concerning the assessment, logistics is oriented at the effective economic process whose aim is to satisfy customer’s wants. It should be emphasized that above-mentioned effectiveness can be achieved by ensuring high standards of customer service.

It can be recognized that general assumption of logistics is optimization of flows occurring in the processes so as to maximize the effects and value. Systematics of logistic determinants referring to effects, creating value and its specific aspects is presented in Table 1.

*Table 1*

**Logistic determinants of effects and their specific aspects**

Logistic factors (determinants) of effects	Specific aspects of factors (determinants)
Supply (logistic offer)	<ul style="list-style-type: none"> <li>– quality and service scope of logistic supply (offers), especially quality, time of delivery, reliability, flexibility as the elements of deliveries service</li> <li>– process and conditions of logistic offer</li> <li>– costs of logistic offer</li> </ul>
Logistic processes	<ul style="list-style-type: none"> <li>– speed (time of completion)</li> <li>– dispersion of time course and obeying the course deadline (ability and certainty of process)</li> <li>– quality</li> <li>– flexibility</li> <li>– costs</li> </ul>
Logistic stores	<ul style="list-style-type: none"> <li>– diversity relatively uniqueness</li> <li>– usefulness to suport benefits</li> <li>– usefulness to make and convert economic effects (process and costs, quality of links and ability to negotiate between subjects offering logistic benefits)</li> <li>– long-term ability to take action</li> </ul>

Source: study on the basis of the following: [1, p. 107]

One of the important theoretical and empirical areas in logistics is management. Logistics management (also called logistic management) is a decisive process which includes the sequence of activities which create the process of forming of specified (in a logistic plan) entire conception of logistic activities as well as the process of its accomplishment in suitably shaped organizational forms using appropriate steering and control systems [16]. Logistic management is always placed in the sphere of logistic chain regulation which is defined as an integrated management of sequences of logistic flow, converting and activities concerning service – from suppliers to the end users – necessary to make product or service in an efficient way [2, p. 30]. A necessary reliability in recipient service entails the sequence of operations forming the process of product delivery chain management to the recipient.

**Aims of the article.** The aim of the article is to identify and describe the categories of logistics management in critical situations on the basis of the critical analysis of the subject literature. In order to achieve the aim mentioned, the article's structure was subordinated including explanation of the essence of logistics of critical situations and logistics management in critical situations as well as description of logistic activities in particular stages of logistic management.

**Basic scientific material of the article.** A point of departure in considerations concerning management of logistics in critical situations is the notion of crisis. It is a multi-faceted term which gains a practical meaning as well when the area where crisis can occur is indicated. Crisis can be analysed in a unit or organization context including the entire state. It should be emphasized that crisis is identified with many fields of human's activity. Mainly, it refers to risks of political systems, territorial integrity, economic stability, people's life and health as well as goods and environment. It is also connected with social, religious, ethnic and cultural problems.

The ability to identify causes, factors and symptoms of crisis is very important in management so as to take action on time. The cause of crisis can be a particular occurrence, a state, or a tendency in organization's functioning or occurring in its surroundings and as a result of them, there are factors proving that a critical situation has occurred. Symptoms, however, are visible in particular indicators and tendencies of their changes which reflect an organization's functioning and development. The state of indicator can be assessed in relation to normative quantity (acceptable range of changes) and relations between the indicators. Symptoms do not always reflect causes of crisis. The causes often underlie deeper than it is shown by external indications of crisis. The symptom is an initial, external indication of critical phenomena which does not always render real causes of crisis, but with the use of which these causes can be determined [8; pp. 108–109; 9].

High probability of ensuing critical situation causes the need of organizing crisis management whose task is to prevent critical situations, prepare to take over control while fulfilling planned tasks, critical responding in case of critical situations and reconstructing infrastructure or restoring its primitive nature [13]. The effective accomplishment of crisis management requires its multi-faceted support whose one basic element is logistic support. The effective accomplishment of logistic support extorted development of its theoretical and practical bases in the form of logistics of critical situations.

The foundation for considerations on logistics in crisis management refers to management sciences and on their bases mechanisms of planning, taking decisions and accomplishing them are constructed. The term management is met every day while taking action in different organizations. It is a complex process consisting of the chain of activities of people who act managerial functions. In general, management is understood as coordination of humans' activities to achieve intended aims in most effective way.

The term management refers to an organization's activity and achieving beneficial results and what is more, it includes the influence on people using the resources in management process. Management is an inherent element of any organization's functioning where the process of managing its sources is present. Management is an activity whose subject is a human or a group of people and the object is a human (or a group of people) and items which uses in managing process [3, pp. 23–24].

Before the notion crisis management is defined, it is necessary to adopt a particular assumption of an area for which further considerations will be carried out. Crisis management can refer to different areas, among other the following [6, p. 14]:

- business, i.e. economic organizations functioning (e.g. banks, companies);
- military (participation of the Armed Forces in civilian and armed missions);
- civilian (refers to safety of people – mainly as a result of natural risks, mechanical i anthropogenic).

Although general rules of management are unchanged and can be used in every area in many cases, there are various means used to achieve a particular aim, and many times an aim itself. In a proposed model (civilian) crisis management which is analysed in the following article, its particular elements can be described as follow [6, pp. 15–16]:

- the aim of action – limiting the risk of occurrence of critical situation, reduction of results of a critical situation. As its part, the activities are taken aiming at counteracting risks, preparing entitled subjects (including people) when they occur and keeping or restoring stability;

- the idea of action – ensuring peoples' safety as a result of critical situation in a particular area by using non-military means (it does not exclude the use of the armed forces with binding law as the support for civilian administration). Crisis management in the state is an integral element of management of its internal and external safety. It functions as a service in relation to society.

- methods – carrying out preventive activities which reduce the occurrence of critical situation and activities minimizing the results of critical situation which has occurred with the use of structural and non-structural means;

- participants – crisis management is accomplished by entitled subjects at all levels of state's safety management (national, departmental, regional, county, district). Not only managing subjects participate in it, but also specialized organizations, services, guards, inspectorates and society;

- the area of action – crisis management includes mainly undertakings within the country, in specific cases – external activities – which occur abroad, on the basis of bilateral agreements, membership of international organizations or for the request of other state (international cooperation).

Modern essence of crisis management does not limit to activities aiming at solving existing action. Then, we would face with planned use (under pressure) of any available organization's sources to solve difficult (tense) existing situation. Meanwhile, crisis management includes preventive and preparation undertakings which are planned and accomplished as the chain of activities in order not to admit to occurrence of critical situations and soften their effects. Next area, i.e. responding in critical situations, is a typical action that is using available forces and means in a particular situation aiming at limiting its development, taking over control, and not admitting for arising crisis or reducing negative effects as well as undertakings referring to reconstruction, i.e. restoring normal functioning state. The aim of crisis management is preventing situations which create risk, preparing responding system and when risks occur responding and reconstructing after crisis [15, p. 14].

Crisis management consists of two main periods: stabilization and accomplishment. In stabilization period, undertakings preceding critical situation's occurrence are taken up. They include preventive and preparation stages – these are the line of organizational activities at national, regional, county and district levels whose aim is to prepare and implement worked out decisions resulting in not admitting for any risk and minimizing its negative effects. Furthermore, managing and executive subjects accomplish activities without necessity to use alarm procedures.

In accomplishment period, undertakings connected with combating risks and their effects are carried out as well as these connected with reconstructing destroyed infrastructure. They are conducted on the basis of worked out and implemented proceedings procedures by entitled managing subjects, specific executive subjects and, in justified cases, society. This period includes responding and reconstructing stages [17, p. 43–44].

Accomplished mission is a distinctive feature of critical situation's logistics which differs from its precursors (military and civilian logistics). This mission refers to saving health and life of people who are wounded or ill as well as aiming at ensuring all the injured conditions to survive critical situation. The aim of the mission is creating conditions to deliver supplies and basic logistic and medical services to all the injured as fast as possible (Table 2). The practice of functioning in critical situations includes all activities which are accomplished as part of shaping, controlling supply and service processes in logistic chains organised in the area where critical situation occurs [7, p. 184–185].

Logistics security is supply delivery and logistic and medical services are accomplished for injured people in critical situations. Security is seen as accomplishing function (practical one) of logistics of critical situations. It is a complex notion which describes accomplishment of supply deliveries as well as logistic and medical services organised by logistic units (logistic security group and health care group and social and living help) of crisis management groups and accomplished by forces and means which are at disposal by these units [12, p. 34].

In supply deliveries for injured people, drinkable water and basic food products have priority. Depending on the situation, other popular goods, energy carriers, fire equipment, etc. are delivered as well. These goods can come from local reserves, national material reserves, orders at indicated suppliers as well as goods benefits and humanitarian aid. In critical situations, logistic security is mainly based on local supply warehouses, repair shop, a forwarding company, economic and medical places. When the lack of materials occurs then they are rationed.

### Classification of logistics

LOGISTICS		
Environment and mission of functioning		
MILITARY LOGISTICS	CIVILIAN LOGISTICS	CRITICAL SITUATION LOGISTICS
Scope of functioning		
<ul style="list-style-type: none"> <li>– GENERAL LOGISTICS</li> <li>– DETAILED LOGISTICS</li> </ul>	<ul style="list-style-type: none"> <li>– THEORETICAL LOGISTICS</li> <li>– PRACTICAL LOGISTICS (APPLIED)</li> </ul>	<ul style="list-style-type: none"> <li>– THEORETICAL LOGISTICS</li> <li>– APPLIED LOGISTICS</li> </ul>
ACCORDING TO SUBJECT CRITERIUM		
<ul style="list-style-type: none"> <li>– MATERIAL SECURITY LOGISTICS</li> <li>– MECHANICAL SECURITY LOGISTICS</li> <li>– TRANSPORT SECURITY LOGISTICS</li> <li>– MEDICAL SECURITY LOGISTICS</li> </ul>	<ul style="list-style-type: none"> <li>– SUPPLY LOGISTICS</li> <li>– STORES LOGISTICS</li> <li>– PRODUCTION LOGISTICS</li> <li>– DISTRIBUTION LOGISTICS</li> <li>– SERVICE LOGISTICS (CUSTOMER CARE LOGISTICS, WASTE SERVICE LOGISTICS)</li> </ul>	<ul style="list-style-type: none"> <li>– SUPPLY LOGISTICS</li> <li>– SERVICE LOGISTICS (LOGISTICS OF TRANSPORT SERVICES, LOGISTICS OF ECONOMIC AND LIVING SERVICES, LOGISTICS OF MEDICAL SERVICES)</li> </ul>
SUBJECT DEALT WITH		
ARMED FORCES	CUSTOMER	INJURED PEOPLE
Environment of functioning		
AREA OF FIGHT	FREE MARKET	AREA OF CRITICAL RESPONDING
Main aim of functioning		
Ensuring high effective logistic security of the army	Maximizing the profits of enterprises	Ensuring conditions to survive for injured people

Source: [12, p. 19]

Service activity includes specific services (e.g. transport, handling, renovation) as well as economic and living (gastronomic, council, bathing and washing). With the use of transport means both evacuation of people and supply deliveries and materials needed to repair objects and equipment are accomplished. With transport means, the evacuation of people is done and deliveries of supply and materials needed to objects and equipment repair are accomplished. Gastronomic services mean in general preparing meals which can take place individually on the basis of products delivered for people or in centralized points of group eating. Organization of temporary accommodation places includes ensuring sleeping places, delivery of council equipment, bed coverings and household detergents.

Within medical services, treatment, evacuation, sanitary and hygienic undertakings are done. The injured are given health care, the segregation of them is done, and seriously injured and ill are evacuated to higher levels of health care. Sanitary and hygienic undertakings include sanitary supervision on conditions of people's accommodation, drinking water deliveries as well as feeding and food organization. Within anti-epidemic actions, sanitary and epidemic reconnaissance must be carried out, contagious diseases are isolated and cured, protecting vaccinations, disinfection and pest control are done.

In critical situations, social aid is carried out as well. It is directed especially at injured people which lose their possessions and are in difficult situation. This usually means payments of benefits and nature gifts (clothes, common use goods, food parcels) [12, p. 36].

Function of critical situation logistics is coordination of necessary flows of supply, logistic and medical services. Logistic security of injured people in critical situations is organizing and accomplishing under pressure. These are time limitations as well as people's expectations (of the injured) formed as

demands of ensuring them conditions for surviving in case of critical situation, and moreover risks resulting in loss of health, life and destroying natural environment. Efficient accomplishment of logistic and medical tasks for injured people in critical situations requires logistic management [13, p. 89].

In every phase (stage) of crisis management tasks assigned to logistic security group, health care and social and living aid play an important role which ensure fast help for injured people including saving lives and health of the injured and ill as well as material and technological conditions (infrastructure) to survive critical situation. Logistic management is a component of crisis management aiming at efficient and effective accomplishment of logistic and medical activities for the injured. Logistic management in critical situations include: strategy forming actions, initiating and controlling of accomplishment process of logistic tasks, exchanging necessary information form charter points (from supplier) to points of destination (to the injured) in order to save their lives and health and ensure necessary conditions to survive [4, pp. 70–71].

In critical situation logistic, the following four elements (subsystems) play a crucial role [4, pp. 96–97]:

1. Logistics Supply Subsystem – its task is to ensure the continuity of activities on the basis of regular resources supplement of all needed materials which are at subject's disposal in order to function effectively (accomplish particular tasks). It includes the processes of transport, storing (supplement, storing itself and serving) and controlling (selected state, the number and quality of resources).

2. Logistic Storing Subsystem – the issue of storing means keeping the range of supply which is enough for covering real demand. Storing refers to the group of activities connected with supply economy meaning minimizing both direct and indirect costs. It is a kind of a buffer between a distinctive structure of flows and outflows of goods and services. The amount of resources stocked up on suitable storage spaces should be optimized meaning not less than the need and not more than is necessary to cover planned demand.

3. Logistics Distribution Subsystem – it imposes an obligation of identifying potential needs in time and in particular area on logistic bodies in order to provide people in need all necessary power resources. It includes: operating power resources deliveries, information processing and keeping the resources on the appropriate level.

4. Logistics Service Subsystem – Logistics is not included in factual or technological processes (medical care, rescue or fire-fighting service); the task of logistics is leaving at organizational units all (performing) needed materials, tools, equipment so as to protect the continuity and effectiveness of accomplishment of service processes.

Logistic management in critical situations is carried out in all phases of crisis management, i.e. preventing, preparing, responding and reconstructing. [5, p. 54–56].

In prevention phase, logistic management refers to forecasting logistic situation (including medical situation), describing sources of supply and service potential (concerning logistic services), assessing available logistic resources with injured people's needs forecast and planning the accomplishment of logistic tasks in case of critical situation.

In preparation phase, procedures of supply deliveries and logistic services in critical situations should be planned as well as taking up action whose aim is to ensure (stock up on) logistic resources needed to accomplish logistic tasks effectively which particularly refer to:

- verifying worked out functional (logistic) attachments to critical responding plans, including planning the ways (variants) of accomplishment of logistic tasks;
- creating organizational and technical conditions for effective logistic management;
- creating conditions to accomplish logistic tasks referring to: medical care, supplies of water, energy, food, clothes, beddings, medicines, sanitary and personal hygiene and organization of temporary accommodation places in case of evacuation of people;
- training and improving the executive bodies and units appointed to accomplish logistic tasks.

In responding phase, logistic management refers to taking up logistic undertakings concerning providing medical care for ill and injured people, organizing supply deliveries for injured people (first of all drinkable water, food, medicines, clothes, sleeping bags, blankets) and economic, living and special services, organizing temporary accommodation places (in case of evacuation of injured people), sanitary and hygienic activities and anti-epidemic as well as saving cultural heritage resources, environment and critical infrastructure. Due to the fact that the phenomena occurring in critical situations are mass in their nature and the action taken up is interdisciplinary, particular role of logistic management concerns

coordinating the use of all forces and logistic means which are at the disposal of public administration bodies, entrepreneurs, humanitarian and social organizations as well as particular citizens.

In the last phase of critical management, i.e. the reconstruction phase, our attention should be drawn to ensuring the participation of logistic forces in assessing any losses occurred because of the threats, organizing campaigns for individual and group help for the injured, temporary ensuring functioning of municipal utilities (water, electricity, heating, utilizing sewage and garbage, etc.), reconstructing critical infrastructure, reconstructing and replenishing logistic resources, etc. In this phase, compensation payment occurs, replenishing the resources and restoring balance and environment's safety.

**Conclusion and perspectives for future scientific research.** Elements of critical logistics reflect in assumptions of crisis management where the role of logistics means effective human resources, material and information management in order to take preventive action and in case of any risks – intervene and remove its effects. Logistic securities in critical situations are activities as well as resources aiming at ensuring the means necessary for injured people to survive, to minimize the time of supply deliveries, services as well as optimize action. Without deliveries of necessary material products and providing special logistic services it is not possible to carry out the tasks which crisis management subjects have to complete. It must be emphasized that accomplishment of logistic processes in the area of logistic management occurs not rarely in specific conditions difficult to be forecasted in a clear-cut way occurring in critical situation.

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