

Methodical approach to assessing the effectiveness of the result of mobilization planning for the ammunition industry

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Received: March 11, 2021 | Revised: March 27, 2021 | Accepted: March 31, 2021

DOI: 10.5281/zenodo.4651584

Abstract

During the years of independence, Ukraine has restored and developed its Armed Forces to ensure its sovereignty and territorial integrity. The high-quality armament of the Armed Forces of Ukraine is the key to their effective use in the event of modern armed conflicts. One of the most important components of fire destruction is ammunition, the quality, and effectiveness of which are important indicators for achieving superiority over the enemy in modern combat operations. The amount of ammunition cannot be unlimited but must be sufficient. Therefore, it is necessary to carefully plan the production and accumulation of ammunition both in peacetime and in a special period. This process is related to the process of defense planning, which is an important function of public administration.

Effective planning of the development of the country's ammunition production capabilities is impossible without knowledge of the actual state of affairs for the industry, its structure, and ammunition production capacities. The ammunition industry's capabilities must meet the needs of the defense forces. Capacity planning of the industry for a special period is carried out in peacetime by creating an appropriate system of mobilization planning and its further effective use as part of the public administration system. The mobilization plan is the main result of the mobilization planning process for the munitions industry. The aim of the article is to develop a methodological approach to determining and evaluating the effectiveness of the result of mobilization planning for the munitions industry.

Key words: mobilization, mobilization plan, capabilities, munitions industry, ammunition.

Introduction

1. Since gaining independence, Ukraine has been consistently implementing modern elements of defense planning, abandoning outdated Soviet approaches. The development of the Armed Forces of Ukraine in the conditions of armed aggression by the Russian Federation. The economy is taking steps to build effective defense capabilities. It takes some time and guaranteed funding.

In such conditions, there are some limitations and difficulties in the formation and operation

of the defense industry, both in peacetime and in a special period. It applies to the munitions industry, which is the subject of this study. Therefore, with the beginning of the conflict in Donbass, the mobilization plan of the national economy was not adjusted in time, was formally implemented, could not be realistic and did not correspond to real circumstances, during which there were problems not only with ammunition supply, but also with their development and production.

2. Ukraine conducts independent development of the defense industry. At the same time, there was an urgent need to form and develop a self-sufficient munitions industry with enterprises of various forms of ownership, governing bodies, and to adapt it to NATO standards.

3. The implementation of the target program for the production of ammunition and special chemicals, which conceptually changes the approaches to the development and production of ammunition, namely:

The General Staff (GS) of the Armed Forces of Ukraine determines the needs for ammunition;

The Ministry of Defense (MoD) of Ukraine assumes the functions of development and assembly of ammunition, their maintenance and disposal;

The Ministry of Economic Development, Trade and Agriculture of Ukraine prepares the production of components for ammunition, in accordance with the tasks and agreements with the MoD.

However, the mobilization issues were not properly identified by the program.

4. The Main Department for Ammunition Production and Construction of Special Purpose Structures of the MoD is a new structure of the MoD, develops a methodological apparatus, guidelines for planning the development of the ammunition industry.

5. At present, the state of scientific and methodological support for mobilization planning of the munitions industry is characterized by the absence of:

clear and scientifically substantiated criteria and indicators for assessing the effectiveness of the formation and implementation of public policy and public administration in the field of mobilization planning of the munitions industry;

appropriate methods and comprehensive models for assessing the mobilization capabilities of the munitions industry and the quality of mobilization planning at all levels of management in this area;

the necessary conceptual and categorical apparatus, systems for monitoring and forecasting the development of processes in the field of mobilization training and mobilization.

Material and methods

The general tendencies of the defense-industrial complex of Ukraine activity and questions of mobilization, mobilization preparation, mobilization planning of activity for the enterprises of the national economy, a defense-industrial complex of the state are engaged by R. Sh. Shiraliev, M. M. Denezhkin, P. B. Volotovskiy, O. P. Angular, O. I. Grinenko, S. P. Leontovich, I. M. Tkach. These issues were widely discussed at interspecies scientific and practical conferences [6-8].

Publications (Volotovskiy P. B., 2019; Volotovskiy P. B., Angular O. P., 2019) define the role and place of mobilization planning in the field of state preparation for defense. Concepts such as "state defense planning", "state defense plan", "defense planning", "mobilization planning", "mobilization plan" are carefully considered. It is argued that mobilization planning is a component of planning in the areas of national security and defense. It is noted that

mobilization planning is an ongoing systemic process that includes the development and regular adjustment of the mobilization plan of Ukraine, mobilization plans of the Defense Forces, mobilization plan of the national economy and its industries, mobilization plans of public authorities, local governments, enterprises, institutions and organizations of all forms, which are involved in the implementation of mobilization tasks, the development of other documents provided by regulations adopted in accordance with the laws "On Mobilization preparation and mobilization", "On Defense of Ukraine", "On the legal regime of martial law".

In (Kosaretskyi Ye. I., 2020) a methodological approach is proposed to determine and assess the mobilization capabilities of munitions enterprises to meet the needs of the Armed Forces of Ukraine in firearms in a special period, which are necessary for proper mobilization training (mobilization planning) of this industry.

The introduction of this methodological approach will contribute to the goal of mobilization planning of the munitions industry, the solution of specific tasks facing the industry in the field of mobilization. But there is a question of assessing the effectiveness of the result of mobilization planning - the mobilization plan of the munitions industry, its effectiveness.

The purpose of the study is to develop a methodological approach (methodology) to determine the main indicators and criteria that

characterize the effectiveness of the result of mobilization planning – the mobilization plan of the munitions industry of the national economy of Ukraine.

The introduction of the methodology will contribute to the goal of mobilization planning of the munitions industry – the formation of a mobilization plan, the implementation of which will contribute to the solution of specific tasks facing the industry in the field of mobilization.

Results and discussion

Ammunition mobilization planning is carried out within the framework of strategic and defense planning of the state and is a complex

systemic management process. The planning process takes place within the mobilization planning system.

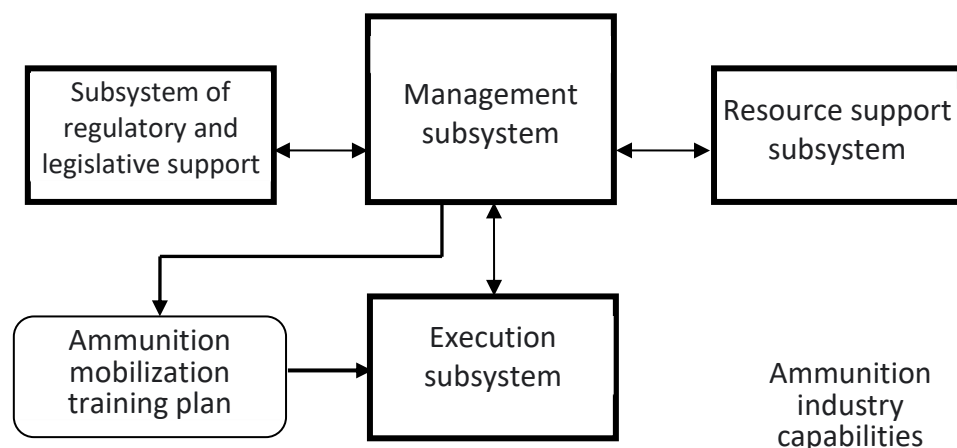


Fig.1. Simplified general structure of the ammunition mobilization planning system to meet the needs of the Armed Forces in ammunition

Using the apparatus of system research, the system of mobilization planning of the munitions industry can be conditionally represented in the form of four interconnected subsystems: management (managerial), regulatory, executive and support (Fig. 1). Coordinated interaction of these subsystems ensures the overall effectiveness of the result of mobilization planning, namely the mobilization plan of the munitions industry.

Evaluation of the effectiveness of the tasks of each of these subsystems is defined as an organizational and managerial procedure that involves determining the degree of the result achievement (goal) by analyzing quantitative and qualitative indicators (degree of the Armed

Forces satisfaction in ammunition in a special period for fire), information on the implementation of measures and tasks, taking into account costs, identifying factors that impede implementation, and making decisions on the revision of public policies, goals, indicators of goals achievement.

Thus, each of these subsystems has its own functional purpose and some impact on the overall effectiveness of the mobilization planning result. Consider each function of the subsystems.

The control subsystem performs the functions of managing the entire process of mobilization planning of the munitions industry, has a multilevel structure and currently remains

unbalanced. The main function of the mobilization planning subsystem is to formulate proposals by the MoD to the Ministry of Economic Development, Trade and Agriculture (according to the Law of Ukraine on Mobilization Planning and Mobilization) indicators of mobilization tasks for munitions enterprises for a special period.

The mobilization plan is the main result of the mobilization planning process. According to the Law of Ukraine “On Mobilization preparation and mobilization”, a mobilization plan means a set of documents that determine the content, scope, executors, procedure and timing of measures for mobilization deployment of the Armed Forces of Ukraine, other military formations, Civil Rescue Service protection, transfer of the national economy, the activities of public authorities, other state bodies, local governments, enterprises, institutions and organizations, the system of ensuring the livelihood of the population to operate in a special period. Thus, the mobilization plan of the munitions industry is an integral part of the mobilization plan of the national economy.

The main indicators of the mobilization plan are the estimated needs of the state for a special period, formed in kind and cost, to meet the needs of the Armed Forces of Ukraine, other military formations, civil defense forces, ensuring the functioning of the national economy and livelihoods.

In the same law “On Mobilization preparation and mobilization” under the mobilization task (order) certain requirements of the mobilization plan concerning the nomenclature, volumes of necessary production, formation and preparation for deployment of special formations are defined, and also the priority measures of mobilization preparation which are brought to performance to central and local executive bodies, other state bodies, the Council of Ministers of the Autonomous Republic of Crimea, local self-government bodies. To enterprises, institutions and organizations involved in the implementation of mobilization tasks (orders), mobilization tasks (orders) are brought on the basis of approved basic indicators of the mobilization plan and

agreements (contracts), concluded in the manner prescribed by law.

The effectiveness of the management subsystem P_{ynp} can be assessed as the ratio of the number of established mobilizations M_{BCT} and contractual relations to the number of required mobilization and contractual relations:

$$P_{ynp} = \frac{M_{BCT}}{M_{потр}} \quad (1)$$

Subsystem of regulatory and legislative support. In order to carry out effective mobilization planning of the munitions industry, management of this process and formation of mobilization tasks, it is necessary to have a complete legal framework, which requires mandatory consideration, conclusions, management decisions to improve and build, as it affects the content of the mobilization plan. It database includes:

legislative and normative documents that establish the principles and tasks of mobilization training, staffing of military formations, norms of ammunition separation, etc.; The main indicators of the mobilization plan – the estimated needs of the state for a special period, formed in kind and cost, to meet the needs of the Armed Forces of Ukraine, other military formations, civil defense forces, ensuring the functioning of the national economy and livelihoods:

ammunition needs for a special period N_i^{BD} (number by nomenclature);

the ammunition industry's capacity for mobilization production M_i^{BD} (number by nomenclature);

time spent on making a certain batch of ammunition;

time for the deployment of mobilization production;

resources involved in mobilization production and their cost, etc.

The process of determining and assessing the mobilization capabilities of munitions enterprises to meet the needs of the Armed Forces of Ukraine in the means of fire destruction in a special period is given in detail in the publication (Kosaretskyi Ye. I., 2020).

This information is analyzed by specialists of

the relevant structural units of the MoD and the Ministry of Economic Development, Trade and Agriculture, which are part of the mobilization planning management subsystem.

It should be noted that the regulatory and legislative support of the mobilization planning process must be complete and reliable. Otherwise, this provision will have no reliability and will jeopardize the entire mobilization planning process and the effectiveness of the mobilization plan. Therefore, the value of the efficiency of the subsystem of regulatory and legislative support $P_{\text{інф}}$ should always be as close as possible to 1 (or 100%).

The efficiency of the subsystem of regulatory and legislative support $P_{\text{нзз}}$ can be assessed as the ratio of the number of existing regulations $N_{\text{нзз}}$ to the number required $N_{\text{нзз}}$:

$$P_{\text{нзз}} = \frac{N_{\text{нзз}}}{N_{\text{нзз}}} \quad (2)$$

Execution subsystem. The subsystem of execution includes enterprises of the ammunition industry of ownership all forms with which mobilization relations will be established (mobilization-contractual relations). These enterprises must have a certain mobilization capacity, which means the production capacity of enterprises, institutions, and organizations that are created in peacetime to produce products and meet other needs of the state in a special period (Law of Ukraine “On Mobilization preparation and mobilization”). Mobilization capacities are not subject to privatization, including in the case of liquidation of enterprises, institutions, organizations.

Thus, the main function of the execution subsystem is to create mobilization capacities by enterprises, according to which they are able to perform mobilization tasks for the relevant products.

Formation of the necessary mobilization capacities is the competence of enterprises of all forms of ownership, if mobilization contractual relations are established with them.

The efficiency of this subsystem $P_{\text{вик}}$ can be assessed as the ratio of the achieved volumes of mobilization production, in accordance with the

mobilization tasks $O_{\text{досягн}}$ to the required volumes $O_{\text{потр}}$:

$$P_{\text{вик}} = \frac{O_{\text{досягн}}}{O_{\text{потр}}} \quad (3)$$

Thus, this expression determines the degree (efficiency) of meeting the needs of the Armed Forces in ammunition in a special period for firearms.

The subsystem of resource provision is important, because the ability to implement the planned measures of mobilization planning of defense enterprises depends on the availability of resources (financial, material, human).

The main function of the support subsystem is to comprehensively provide the enterprises of the defense industry with resources to implement the ability to perform mobilization tasks for relevant products.

Resource indicators have different dimensions (quantity, tons, liters, etc.) but all of them can be reduced to a single financial indicator – the required amount of funding for activities defined in the mobilization agreements.

The efficiency of this subsystem $P_{\text{рз}}$ can be assessed as the ratio of financial support $R_{\text{отр}}$ to the required $R_{\text{потр}}$:

$$P_{\text{рз}} = \frac{R_{\text{отр}}}{R_{\text{потр}}} \quad (4)$$

The effectiveness of the result of mobilization planning (mobilization plan) of the munitions industry can be assessed by an indicator that is the result of multiplicative convolution of partial indicators of efficiency of their functions by the constituent subsystems of the system of mobilization planning of the munitions industry.

Multiplicative convolution in the classical form has the form:

$$K = k_1^{c_1} \times k_2^{c_2} \times \dots \times k_M^{c_M},$$

where K – the overall efficiency of the system (process);

k_1, \dots, k_M – partial indicators of efficiency of performance of the functions by component subsystems;

c_1, \dots, c_M – weights of partial efficiency indicators;

M – the number of partial performance indicators.

Weights are usually C_i determined by the method of expert assessments, and only when it is impossible to conduct an expert survey, the weights of all partial indicators are taken as equilibrium $C_i = 1/M$.

Based on this, the effectiveness of the mobilization plan $P_{МП}$ can be assessed as the result (or level) of the entire planning process, according to the formula:

$$P_{МП} = P_{уп}^{C1} \times P_{НЗЗ}^{C2} \times P_{Вик}^{C3} \times P_{пз}^{C4}. \quad (5)$$

Thus, each of the four conditional subsystems that are part of the mobilization planning system contributes to the effectiveness of the mobilization plan of the ammunition industry of the defense industry. As follows from the analysis of expression (Volotovskiy P. B., 2019), the efficiency of each of the subsystems should be quite high. Otherwise, the effectiveness of the mobilization plan will be low, and the plan will be imperfect, with a low “utility function”.

Conclusions

1. In Ukraine, in difficult conditions, there is an independent development of the military industry. At the same time, there was an urgent need to form and develop a self-sufficient munitions industry with enterprises of various forms of ownership, governing bodies, and to adapt it to NATO standards.

2. The establishment of a structure within the MoD that deals with comprehensive support for the implementation of the state program for the development of the ammunition industry requires perfect methodological support for this activity.

3. The proposed methodological approach is

aimed at achieving the goal of mobilization planning of the munitions industry – the mobilization plan, the implementation of which will contribute to the solution of specific tasks facing the industry in the field of mobilization. The mobilization planning system is conditionally considered in the form of four main components, which allows to assess the effectiveness of each of the components and assess their impact on the effectiveness of the entire system of mobilization planning of the munitions industry of the national economy – mobilization plan.

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