Methods of evaluation of efficiency of formation of the operational reserve of the first phase of the armed forces of Ukraine

Sergey Kniaziev [*] [1] [A]

***Corresponding author:** [1] PhD student, e-mail: knazich@gmail.com, ORCID: 0000-0002-9746-704X

[A] The National Defence University of Ukraine named after Ivan Cherniakhovskyi, Kyiv, Ukraine

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Abstract

A method for assessing the effectiveness of the formation of the operational reserve of the first stage of the Armed Forces of Ukraine has been developed. The basis of the methodology is the set of indicators developed by the author in previous studies to assess the effectiveness of the formation of the operational reserve of the first turn of the Armed Forces of Ukraine and the planning model of training the operational reserve of the first turn of the Armed Forces of Ukraine.

In the course of the research the basic provisions of the theory of complex systems, as well as general scientific methods of analysis and synthesis were used. This study was conducted to develop new approaches that allow you to objectively and comprehensively assess the process of forming an operational reserve of the first turn of the Armed Forces of Ukraine.

Novelty of the methodology: when calculating the required number of personnel of the operational reserve of the first turn of the Armed Forces of Ukraine, what needs to be selected takes into account the current shortage, temporary shortage, projected loss of personnel during the operation (combat); the amount of unfit for service personnel due to health status and the projected outflow of personnel for various reasons and the priority of staffing the unit; taking into account the capabilities of the training and material and technical base for the preparation of the operational reserve of the first stage; distribution of personnel by subdivisions depending on the priority of tasks assigned to subdivisions.

The practical significance of the methodology: allows to substantiate recommendations for improving the educational, material and technical base; to substantiate the periodicity and duration of training meetings with the personnel of the operational reserve of the first turn of the Armed Forces of Ukraine; determine the unit for priority staffing, depending on the tasks; take into account the loss of personnel during combat missions (operations).

Key words: operational reserve, evaluation indicators, efficiency, formation, a special period, reservists.

Introduction

Introduction of forced involvement of citizens in the operational reserve of the first turn (OR-1) after discharge from military service in reserve and carrying out of collective actions with reservists (conscripts) as a part of military units for which staffing they are intended, in the conditions of restoration of their fighting capacity, led to a certain problematic situation.

Based on the analysis of conditions and factors influencing the formation of the operational reserve of the first stage of the Armed Forces of Ukraine [1], the author argues that on the one hand, the command of military units together with territorial centers of recruitment and social support are not able to fully involve to military units of trained reservists for further performance of duties

in accordance with the tasks assigned to military units in which they serve in the military reserve.

On the other hand, there are certain features of the training of troops, which are tasked with organizing and conducting training meetings with reservists, in terms of restoring the combat effectiveness of military units.

The author established that in order to ensure the national security of Ukraine in accordance with the tasks assigned to the defense forces, in particular, the Armed Forces of Ukraine, namely the defense of Ukraine, protection of its sovereignty, territorial integrity, and inviolability, the Armed Forces of Ukraine must contain deterrence and repulse. It is impossible to solve such tasks by the number of servicemen of the Armed Forces of Ukraine in peacetime states. Therefore, in order to timely meet the needs of personnel during the planned transfer of the Armed Forces of Ukraine and other military formations to the organization and staff of wartime, measures are taken to form the OR-1, which is part of the strategic deployment.

That is, there is a contradiction between the need for troops in a high-quality operational reserve of the first priority and the ability of military units to ensure the ability of reservists to perform tasks in accordance with the standards of training military units and units.

In this situation, there is a need to develop and make informed decisions to improve the entire system of formation of OR-1, which cannot be done without objective and impartial evaluation of its effectiveness on the set of quantitative and qualitative characteristics of the system as a whole or its individual elements (subsystems) – a set (system) of evaluation indicators [6].

It is the need to develop a methodological approach to assess the effectiveness of the formation of the operational reserve of human resources of the Armed Forces of Ukraine in the first place and determine the relevance of this article.

Material and methods

It should be noted that recently the leadership of the Armed Forces of Ukraine in the framework of considerable attention is paid to the content, qualitative and quantitative indicators, forms and methods of training reservists, as well as their qualitative selection.

However, despite a large number of original and meaningful works of both foreign and domestic scholars on the subject, it should be noted that there are virtually no studies on the formation of OR-1 of the Armed Forces of Ukraine and the following issues remain unresolved [1-7]:

- non-adaptation of previous approaches to the modern regulatory framework;
- not taking into account the capabilities of the training and material and technical base in terms of training OR-1 of the Armed Forces of Ukraine;
- health and other reasons that do not allow to be involved in military service are not taken into account;
- the number of reservists that need to be selected and prepared as a result of possible losses of personnel during hostilities (operations) is not taken into account.

Given the above, there is an urgent scientific task, which is to increase the accuracy and adequacy of the process of assessing the process of formation of the OR-1 of the Armed Forces of Ukraine by developing methods for assessing the process of forming the OR-1 of the Armed Forces of Ukraine.

The purpose of this article is to develop a methodology for assessing the process of formation of the OR-1 of the Armed Forces of Ukraine.

Results and discussion

The method of evaluating the effectiveness of the formation of the PR-1 of the Armed Forces of Ukraine consists of the following sequence of actions (Fig.):

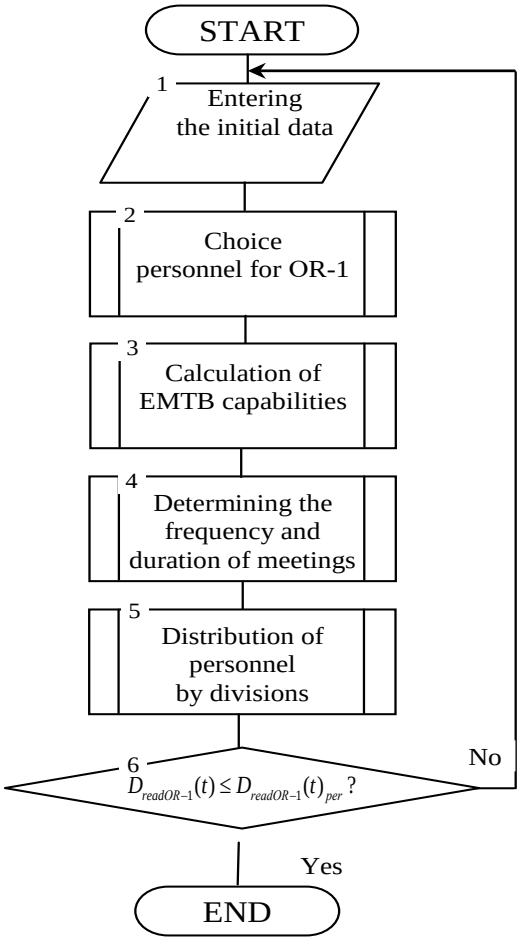

Figure – Algorithm for implementing the method

1. Entering the initial data. At this stage, the initial data on the OR-1 of the Armed Forces of Ukraine are introduced.

2. Selection of the required number of personnel of the Armed Forces of the Armed Forces of Ukraine. At this stage, the number of personnel of the Armed Forces of Ukraine is determined, which must be recruited taking into account the outflow, by categories and special military number, as well as possible unfitness for health in the service of the Armed Forces of Ukraine.

Determining the required number of OR-1 personnel to be selected is determined as follows:

1. Determination of the total staff shortage in each unit, taking into account the current and temporary staff shortages, as well as personnel losses, the outflow rate and the possible unfitness of health:

$$H = H_{1i} + H_{2i} + B_{loss} + H_h + H_{out}, \quad (1)$$

where H_{1i} – current incomplete *i*-th unit;

H_{2i} – temporary incomplete t-th unit;

B_{loss} – projected loss of personnel OR-1 during the operation (combat);

H_h – the amount of unfit personnel for health reasons;

H_{out} – the projected outflow of personnel for various reasons (relative to the initial number of reservists) the amount of outflow of reservists at a certain point in time *t* (months) defined as:

$$H_{out} = 1 - e^{-\left(\frac{t}{A}\right)^B}, \quad (2)$$

where A = 899,5 – function scale parameter; B = 0,69 – function form parameter. Parameters A and B determined by the method of least squares.

2. Determining the share of the shortage of personnel in the unit in relation to the total number of staff of all units of the armed forces. To solve this problem, you need:

determine the value of the total shortage of personnel in all units of the armed forces

$$H_{sum} = \sum_{i=1}^{I} H_i \, , i = \overline{1, I}, \tag{3}$$

where H_i – incomplete personnel i –th unit at the time t.

3. Determining the indicator that characterizes the priority of staffing and i-th units, taking into account:

- the required number for the complete replenishment of the i-th unit;
- the importance of many of the tasks assigned to them in the i-th unit:

$$Z_i = \gamma_{if} \times V_i, \tag{4}$$

where γ_{if} – the coefficient of the significance of the set of tasks assigned to i-th unit;
V – the percentage of understaffing in i-th unit regarding the total number of staff of all units of the armed forces.

4. Determination of the coefficient of completion i-th unit, which is a normalized value and is defined as a share of the total number of personnel included in the reserve:

$$\mathrm{K_i} = \frac{Z_i}{\sum_{i=1}^{I} Z_i}, \tag{5}$$

Z_i – the value of the indicator that characterizes the priority of staffing i-th unit.

Determining the number of unhealthy personnel H_h.

3. Calculation of possibilities of educational-material-technical base for preparation of reservists.

At this stage, the maximum capacity of the training and material and technical base is determined by the number of personnel of the Armed Forces of the Armed Forces of Ukraine who are able to undergo training with maximum efficiency in the regulatory period. The capacity of the EMTB is determined as follows:

$$C = \frac{C_{avaible}}{C_{nec}}, \tag{6}$$

Where $\mathrm{C}_{avaible}$ – available bandwidth of EMTB, characterizing the number of personnel OR-1, which can be prepared using EMTB for a fixed period of time;
C_{nec} – the required capacity of the EMTB for a fixed period of time.

4. Determining the required frequency of training meetings and the required duration of training meetings on the OR-1 of the Armed Forces of Ukraine.

Calculate the required frequency of training meetings with reservists. To develop a formula of the required duration (in years) of the inter-assembly period t_{iap} samples of data on changes in the level of training of reservists over time, obtained from the results of expert evaluation, were used. Approximation of these samples by different types of functions and comparison of the

obtained results using the coefficient of determination R^2 and *f* criterion allowed us to conclude that the dependence of the decline in the level of training of reservists in the intercollegiate period can be adequately described by the formula:

$$P = P_0 \cdot e^{-\left(\frac{t}{C}\right)^D}, \quad (7)$$

Where P – the current level of training of reservists at a certain point in time t (years);
P_0 – the level of training of reservists at the beginning of the inter-assembly period (at the time of discharge from military service or completion of the last training session) (t =0).

Let's determine the duration of the inter-assembly period with the personnel of the Armed Forces of the Armed Forces of Ukraine.

$$t_{\text{iap}} = C\left(\ln\left(\frac{P_{aver}}{P_{\min}}\right)\right)^{\frac{1}{D}}, \quad (8)$$

Where C – function scale parameter, years;
D – function form parameter;
P_{aver} – the average value of the acquired level of training of reservists (conscripts) at the time of discharge from military service or completion of the last training camp;
P_{min} – the minimum level of training of reservists that allows them to perform their duties.

Formula (1) is used to determine the length of the intercollegiate period during which the level of training of reservists will not fall below the minimum allowable level, which allows them to perform their duties.

Determine the required duration (in weeks) of training sessions (t_{train}) to achieve the required level of training of reservists (P_{aver}).

To develop a formula of the required duration (in weeks) of training sessions t_{train} in order to achieve the required level of training of reservists P_{aver} Samples of data on changes in the level of training of reservists during the training meeting were used, also obtained from the results of expert evaluation.

Approximation of these samples by different types of functions and comparison of the obtained results using the coefficient of determination R^2 and *f*- criterion allowed us to conclude that the dependence of the growth of the level of training of reservists during the training meeting can be adequately described by the formula:

$$P = 1 - (1 - P_0) \cdot e^{-\left(\frac{t}{E}\right)^F}, \quad (9)$$

Where P – the current level of education at a certain point in time t (weeks);
P_0 – the level of training of reservists at the beginning of the meeting (t = 0).

Formula to determine the required duration (in weeks) of training sessions t_{train}, which will achieve the required level of training of reservists P_{nec}:

$$t_{train} = E\left(\ln\left(\frac{1-P_{\min}}{1-P_{nec}} \right) \right)^{\frac{1}{F}}, \quad (10)$$

Where E – function scale parameter, years;
F – function form parameter.

It is used to determine the duration of training sessions at which the training of reservists will reach a given level.

5. Distribution of personnel of the Armed Forces of Ukraine by units.

In different subject areas, there is often a problem of allocating different resources (financial, material, time, human, etc.) to a set of objects, taking into account their priority. One of such tasks is the distribution of the reserve of personnel between the units of the Armed Forces of Ukraine in the conditions of possible losses when the enemy strikes with means of destruction. In solving it, it is necessary to take into account the significance (importance) of the entire list of tasks assigned to a particular unit of the Armed Forces of Ukraine. Assessment of the importance of the tasks assigned to them by units can be carried out on the basis of calculating the appropriate coefficient of significance, which are normalized values.

In determining the number of personnel allocated to each unit, it is also necessary to take into account the total number of specialists who are part of the OR-1, and the value of the shortage of personnel in each unit, due to:

- the current shortage of personnel of units;
- temporary shortage of personnel of units;
- losses of personnel under the influence of enemy fire.

Thus, the task of determining the number of personnel allocated from the reserve to each unit, in fact, is to determine:

- coefficients of the significance of tasks assigned to units of the Armed Forces of Ukraine;
- the number of personnel allocated from the reserve to each unit, taking into account the total number of personnel included in the reserve, the coefficients of the importance of tasks, and the shortage of personnel in the units of the Armed Forces of Ukraine.

The most difficult partial task is to determine the coefficients of the significance of the tasks assigned to the units of the Armed Forces of Ukraine, which can be formulated as follows:

for next:

$D = (d_1, d_2, \ldots, d_n)$ – the set of positions and relevant military number that need to be completed;

$Q = (q_1, q_2, \ldots, q_n)$ – the set of available and trained specialists with the appropriate military number;

t_{ij} – time of entering the position of the *j*-th reservist when appointing him to *i*-th post.

Then the rational distribution of personnel of the Armed Forces of Ukraine by units so that the total time of entry into the position was minimal is determined from the following formula:

$$\mathrm{T} = \min_{x_{ij}} \sum_{i=1}^{n} \sum_{j=1}^{n} t_{ij} x_{ij}, \quad (11)$$

with the following restrictions:

$$\sum_{i=1}^{n} x_{ij} = 1, j = \overline{1,n}, \sum_{j=1}^{n} x_{ij} = 1, j = \overline{1,n}, x_{ij} = 0 \text{ or } 1,$$

the value x_{ij} equal to one if the reservist is appointed to a position corresponding to his military number and 0 – if not corresponds.

Formulas (1) – (11) together are the basis of the proposed method of assessing the effectiveness of the formation of the operational reserve of the first turn of the Armed Forces of Ukraine.

Conclusions

There is truth in Damos Dumoli Agusman's explanation that the South China Sea issue is China's success in shifting the legal issue of island ownership to the politicization of regional security. It is almost the same as Syamsul Bahri's opinion that the South China Sea issue is not enough from a legal perspective alone, but efforts to control more potential by politicizing security issues need to be anticipated early. The increase in China's military power title and the emergence of the AUKUS defense alliance shows that Indonesia's prediction not to become a claimant country is more appropriate. Not only is Indonesia's desire to continue to host ASEAN countries, but Indonesia is a pioneer that the politicization of South China Sea security has undermined ASEAN's regional power. Indonesia's interest in China's BRI Program is not only to maintain economic interests with China but Indonesia is not part of a hidden alliance of America in the region.

The strengthening of China's military by the United States and Britain shows Australia's policy of abandoning some of its traditional alliances. Perhaps judging from the benefits of a closed country and participating in submarine patrols together with Japan and Canada, it might be considered lagging. If Australia sees China as a threat that should bypass Indonesia, it also does not appear to be part of the defense agreement. If Indonesia is a threat, neither will nuclear-powered submarines deal with threats from Indonesia. The construction of nuclear-powered submarines will become an unrivaled force in the region of archipelagic countries, including Indonesia. Therefore, Indonesia emphasizes the importance of Australia's commitment to continue to fulfill its obligations which have ratified the Non-Proliferation of Nuclear Weapons (NPT) since 1970.

Thus, the reorientation of Indonesia's defense diplomacy shifted from the SBY administration, which was closer to the United States, to China in the Jokowi era. Indonesia's proximity to China in the Jokowi administration is more motivated by economic needs and infrastructure development. Meanwhile, Indonesia's security issues show independence even in the face of China. Indonesia's caution in dealing with China is the same as a caution against the west, including the AUKUS defense alliance, which uses nuclear as part of Australia's submarines.

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