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METHODOLOGY FOR JUSTIFYING THE DERIVATIVE PROCEDURE FOR FORMING THE NATIONAL GUARD OF UKRAINE FOR LONG-DISTANCE MARCHES IN TIMES OF WAR

The article analyzes the current experience gained by the formations of the National Guard of Ukraine and substantiates modern approaches to solving the tasks of building the marching order of NGU formations for long-distance marches. A methodology for building the marching order of NGU formations for long distances is proposed. The procedure for the commander and staff of the National Guard of Ukraine formation to organize the march is considered. It is concluded that the marching order of the NGU formation for long-distance marches is established depending on the conditions of the situation. It is noted that in order to increase the capability of the formation during movement, it is necessary to fully utilize unmanned aerial vehicle units.

Keywords: *tasks, formation, march, marching order, operational brigade, column, battle order, advance routes.*

Statement of the problem. The full-scale invasion of Ukraine by the russian federation continues, and units of the National Guard of Ukraine (NGU) are actively involved in repelling the armed aggression. Due to the constant rotation of NGU formations, there is a need to move close to the line of combat, which necessitates determining the appropriate order of march for NGU formations. Under these conditions, the topic of this article becomes even more relevant.

Due to the unstable situation, a presidential decree has introduced martial law in all regions of Ukraine. In accordance with the Law of Ukraine ″On the National Guard of Ukraine,″ the NGU is successfully performing its assigned tasks, for which NGU formations will carry out marches over both short and long distances [1].

This article, based on an analysis of the movements of the National Guard units during the war, substantiates approaches to solving the tasks of building a marching order for the National Guard units for long-distance marches.

Analysis of recent research and publications. The timely arrival in a designated area and the protection of moving units and subunits depend on the formation of a marching column [3, 4].

The march is carried out by a formation that advances to the combat zone from deep within the country, and any forms of maneuvering carried out during the battle are also inextricably linked to them [3, 5]. In this regard, it is necessary to: pay more attention to justifying the establishment of a marching order for long-distance marches in difficult road conditions, in case of a threat of enemy attack; train commanders and staff to lead columns; maintain stable control during the march in conditions where the enemy uses high-precision weapons (HPW), electronic warfare means, and aerial reconnaissance.

The aggression of the Russian Federation has fully revealed the specifics and peculiarities of conducting a march and has shown that some commanders of formations have no experience in commanding during marches in anticipation of an encounter with the enemy.

Illegal armed groups (IAGs) have begun to operate more frequently in small, scattered groups, using sabotage and terrorist tactics such as surprise attacks, fire raids, ambushes, etc. Incorrect column formation and lack of security are prompting commanders to review the methods of using mobile security units.

The experience of combat operations in Ukraine shows that there is a need to find new ways to combat IAG, to rethink and assess trends in the development and methods of armed struggle, given the need to counter an enemy armed with completely new means of combat and methods of

armed confrontation. Thus, analysis of the experience of combat operations in Ukraine has made it possible to move on to analyzing the determination of the mobile order of formation of the NGU when moving over long distances.

The purpose of the article is to develop a methodology for justifying the derivative order of formation of the National Guard of Ukraine for long-distance marches.

Summary of the main material. Analysis of options for the order of formation of the NGU for long-distance marches based on the experience of NGU military units in modern conditions. Analysis of the order of formation of the NGU for marches is related to the tasks assigned to the NGU [1]. Among the main functions of the NGU during special operations are the neutralization of armed criminals, the suppression of armed groups and criminal organizations, and participation in measures to suppress terrorist activity. The NGU must move to designated areas as quickly as possible to carry out its assigned tasks.

To carry out the march, a marching order is created [3, 5], the structure of which depends on the task at hand, the plan for future actions, the number of routes, the conditions of the situation, and other factors. As a rule, it consists of a marching guard, columns of main forces, and columns of technical, logistical, and medical support units [5].

Analyzing the movement of the NGU formations to the combat zone, it can be noted that throughout the entire period, the marching order of the NGU formations remained virtually unchanged, with only the composition of the marching guard changing.

Concealment and high speed of movement played an important role during the march. At the beginning of the war, during the march, the formations of the Armed Forces of Ukraine (AFU) and the NGU suffered heavy losses from artillery shelling by illegal armed groups, directly at their rest stops. The enemy conducted reconnaissance using unmanned aerial vehicles (UAVs) and local residents, who transmitted data on the movement and deployment of our formations.

Currently, marches from the permanent deployment point of the National Guard units [2] to the combat zone are usually carried out at their own pace, and only escort vehicles are assigned to the marching guard.

The most expedient marching order for NGU formations over long distances should be organized in battalions, and tracked vehicles should be transported on trawls to preserve engine resources and increase marching speeds [3, 4].

Thus, the analysis of the formation of the marching order of the NGU during movement made it possible to move on to the development of guidelines for determining the marching order of the NGU for long-distance marches.

Initial data for developing the methodology. The NGU units march to the combat zone as part of combined detachments (battalion groups) of 200–400 personnel, so commanders have virtually no experience in managing the movement of the entire formation.

It should be understood that during military operations, the NGU formations may be subject to missile strikes and air strikes, enemy UAVs, and may encounter enemy paratroopers and sabotage and reconnaissance groups (SRG) from the outset of their movement. Given the level of equipment available to the NGU formations, it is advisable to move long distances under their own power [3, 4].

To determine the marching order of a formation for long-distance marches in wartime, it is necessary to establish the method of movement of the formation, study the route of movement, and determine the marching order.

In this case, we consider the movement of an operational brigade (brops) by long-distance march [2].

A marching order is created to ensure that the march is carried out within the specified time frame, that the combat readiness of the troops is maintained, and that they can be quickly deployed into battle formation. When establishing the marching order, attention is paid to creating reliable marching security, assigning units to the head of the columns, which during deployment will form the first echelon of the combat order with the necessary means of reinforcement. The place of each unit in the column is determined taking into account the plan for the future battle [3].

The marching order of the NGU *brops* [5] must ensure: rapid deployment into combat order, high speed, minimal vulnerability to weapons of mass destruction, air strikes, protection against attacks by enemy paratroopers and illegal armed groups, and support for stable unit control.

It is proposed to develop a methodology for building the marching order of the NGU formation based on the example of the training staff structure of the NGU brop. In the course of developing the methodology, the following restrictions were adopted: the route of movement is determined; the

marching capabilities of the formation are in accordance with the training staff; the time for the march (movement) is limited.

The following assumptions were made: personnel, weapons, and military equipment (WME) are capable of performing tasks; units are 100 % equipped in accordance with training requirements.

The structural diagram of the developed methodology is shown in Figure 1.

The following initial data were assumed (block 1, Figure 1): mode of movement – march; type of terrain – moderately rugged; level of driver training – sufficient; composition of the column – mobile security, column of main forces (MF), column of technical support (TS) and rear (RR) units, and medical support; meteorological conditions, season, and time of day – real.

As a result of understanding the task of carrying out the march, the following are determined (block 2, Figure 1): route length, boundaries, areas, stops, time of passage, duration of the march; average speed of the column; order of interaction – with the National Police, Armed Forces, etc.; time to prepare for the march.

When assessing the situation, the following are determined (block 3, Figure 1): the capabilities and influence of the enemy on their units; the possibility of the enemy using WMD and aviation; probable areas of action of sabotage and reconnaissance groups and enemy landings; the marching capabilities of their units; the time and order of refueling equipment; the type of terrain. When forming the commander's plan, the following are noted (block 4, Figure 1): the practical work of the commander and staff in preparing the plan and the level of preparation of the staff.

The content of the preparation of units for the march includes (block 5, Figure 1): preparation of personnel; preparation of equipment; preparation of material resources.

Reconnaissance is usually conducted in advance [3]. To conduct reconnaissance of movement routes and staging areas (concentration areas) [5], reconnaissance groups are sent out to study (block 6, Figure 1): the characteristics of the movement route and staging areas (concentration areas).

The most difficult stage is conducting tactical calculations, which determine (block 7, Figure 1): the number of personnel and equipment required for the march; the characteristics of the equipment; the amount of fuel and lubricants required for the march; marching security – advance guard (AG), movement support detachment (MSD), main force column (MFC), technical support and rear units column (TSU and ReUn), rear marching guard (RMG); locations and times of rest stops and control points.

First, it is necessary to determine the length of the march L [4] from the starting line to the rear border in the concentration area; the refined result is multiplied by the corresponding correction factor [5] specified in Table 1.

Then it is necessary to determine the time *T* allocated for the march. It is usually specified by the senior commander (the start and end times of the march). The time *Tcon* (in hours) required for the concentration (drawing in) of the marching column of each unit to a new area is determined by dividing the difference between the depths of the column and the concentration area by the speed of movement of the troops during concentration (drawing in), i.e.

$$Tcon = \frac{Dc - Dcon}{Vd}, \quad (1)$$

where Dc is the depth of column, km;

Tcon is the depth of the concentration area, km, i.e., the distance from its front edge to the furthest point;

Vd is the speed of troop movement during concentration (drawback), km/h, equal to 10–15 km/h (1/2 or 3/4 of the average speed of movement).

The time *Ttr* for movement is determined by subtracting the total march time *Trest* (for rest stops) and time *Tcon* (for concentration in the area) from the total time:

$$Ttr = T - Trest - Tcon. \quad (2)$$

The average speed *Vav* is determined by dividing the length of the march by the time spent on movement, i.e.

$$Vav = Lkm \div Ttr. \quad (3)$$

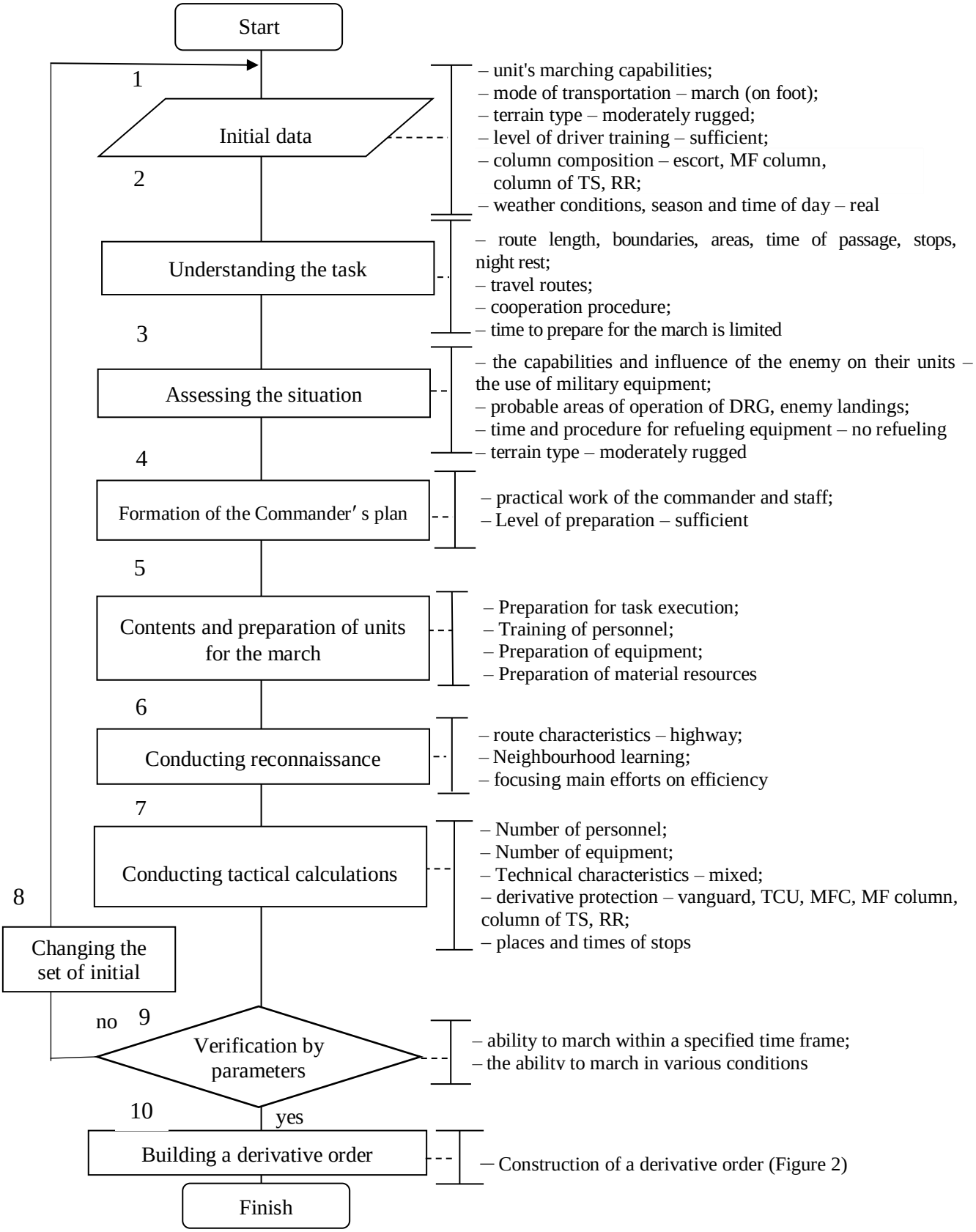

Figure 1 – Structural diagram of the methodology for substantiating the derivative order of forming of the National Guard of Ukraine over long distances

Table 1 – Correction factors for determining length

Terrain type	Map scale		
	1 : 200 000	1 : 100000	1 : 50 000
Very rugged	1.25	1.20	1.15
Average	1.15	1.10	1.05
Slightly rugged	1.05	1.00	1.00

The time required for the formation to move along the route sections is determined by dividing the length of each section by the speed of the column moving along it, i.e.

$$T_1 = L_1 \div V_1,\ T_2 = L_2 \div V_2,\ T_3 = L_3 \div V_3. \quad (4)$$

The depth of the column is calculated by multiplying the number of vehicles by the distance between them, adding the total distance between battalions and columns of TSU and ReUn units.

The depth of the NGU formation column is determined by the expression

$$D_C = N_C \times D_{Cr} + (N_{bat} - 1) \times D_{bat} + D_{col}, \quad (5)$$

where D_C is the depth of column, km;

N_C is the total number of cars;

D_{Cr} is the distanve between cars;

N_{bat} is the number of battalion columns and equivalent units, pcs.,

D_{bat} is the distance between battalions and their equivalents,

D_{col} is the distance between the main forces and the columns of TSU and ReUn, m.

It is necessary to determine the time of crossing the starting line and the control lines by the columns of units following ahead and behind the main unit, relative to the time of crossing these lines by the main unit by subtracting from it (those going ahead) or adding to it (those going behind) the time for approaching the line at the set speed and at the set distances. Accordingly, the start of the movement of units from the starting areas is determined using the expression

$$Tst = T_1 \pm \frac{Dc + Dbat}{V}, \quad (6)$$

where Tst is the time of passing the starting and control points, hours;

T_1 is the time of crossing these lines by the head of the main forces column, hour;

Dc is the depth of the vanguard column or main batallion column, km;

$Dbat$ is the distance between batallions;

V is the speed of column movement.

The expression with the sign (–) is used to determine the time of crossing the boundaries by the heads of those columns that are moving ahead of the main forces. The expression with the sign (+) is used to determine the time of crossing the boundaries by the heads of the columns that are following the main battalion.

The following parameters are checked (block 8, Figure 1): ability to march within a specified time frame; ability to march in various conditions (in cases of enemy contact, possible use of weapons of mass destruction, difficult weather conditions, etc.).

Based on the calculations, we build a marching order (block 10, Figure 1) for the march: marching guard, column of technical and logistical units and medical support, column of main forces, rear marching guard (Figure 2).

Therefore, the implementation of the NGU march [2, 3, 5] over long distances requires: high training of personnel; a large amount of work by the headquarters to calculate the march; timely communication of tasks to subordinates; ensuring a quick departure to the starting area; organization of air defense, combat, technical, and logistical support; management during the march; organization of reconnaissance, commandant's service, engineering, technical, and logistical support.

In modern conditions, the march is carried out under the influence of the constant threat of the enemy's use of weapons, aviation, airborne troops, and sabotage and reconnaissance groups, with the need to overcome areas of destruction, flooding, and contamination, which requires careful preparation of personnel and equipment for the march, skillful organization, comprehensive support, and high marching skills of units and subunits [3, 4].

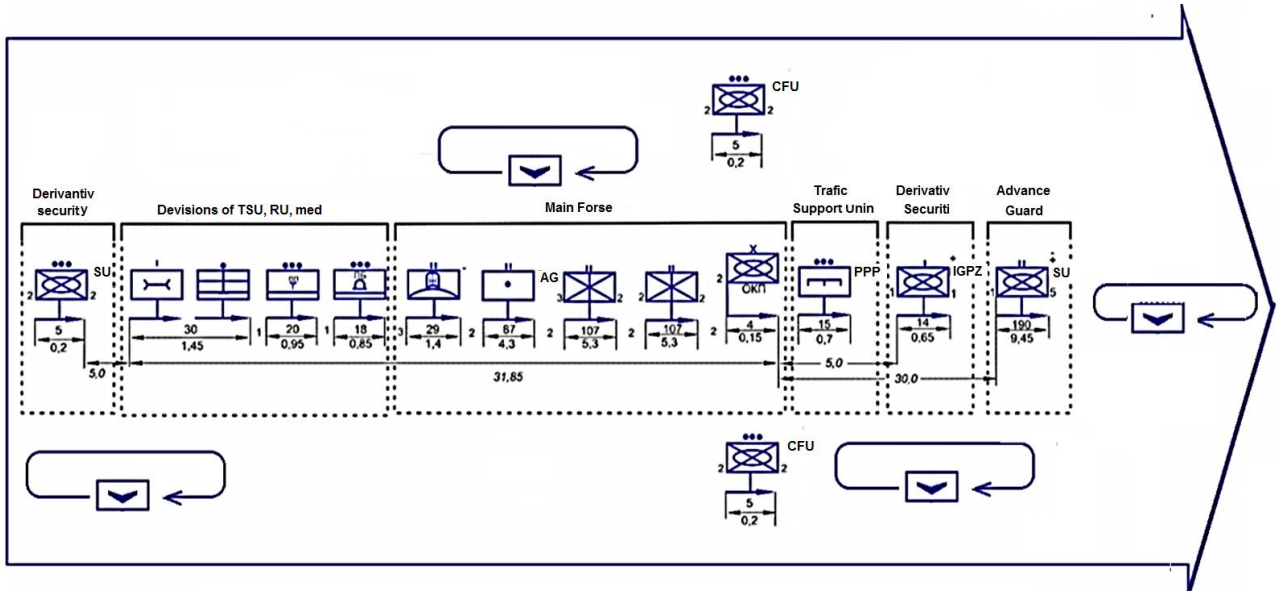

Figure 2 – Derived order of formation of the National Guard of Ukraine for marching (variant)

Marching provides the greatest degree of tactical independence for the NGU formation, its combat integrity, and fairly reliable control of units. It also provides it with high speed of deployment for entering combat, the ability to immediately maneuver to bypass a hard-to-reach area or move to a new direction.

However, it should be noted that during the preparation and execution of the march, personnel experience significant physical and psychological stress, and combat equipment on the march consumes a lot of engine power and a significant amount of material resources, especially fuel. Therefore, a large number of measures are taken during the march to ensure its comprehensive support [3, 4].

When assessing the situation, the commander must pay particular attention to studying: the probable nature of the enemy's actions in the march zone, the maximum range of its reconnaissance and strike capabilities, possible areas of action for landing forces and DRG; the condition and capabilities of units to carry out the march; the presence of barrier lines (sections); the route of movement, its length and passability, the terrain in the areas of stops (concentration); the socio-economic, political, and crime situation [3].

When planning the march, the commander and staff must determine: the order of march and the distribution of forces and means among the designated columns; the average speed of movement on sections of the route and the distance between vehicles; the composition, tasks, and distance of the marching guard; the starting line, control lines, places and times of stops and rest; actions in case of enemy attack and in case of ambush, the order of repelling air strikes; the start and end times of the march. In preparation for the march, in anticipation of an encounter with the enemy, the commander and staff must calculate the lines and time of a possible encounter, the plan for a counterattack and combat tasks for units to conduct a counterattack, the order of deployment and opening of artillery fire, and the call for aviation and helicopters [3].

When setting tasks in a combat order for a march, the following shall be specified [3]:

– for marching guard units: composition; tasks for guarding the main forces; route of movement, final destination, time of passing through departure and control points; areas and times of stops, specific tasks to be prepared for; actions in case of encountering the enemy and during the blocking of sections of the route by civilians; the procedure for reporting on the situation;

– main force units: means of reinforcement; route of movement, area of concentration and time of arrival there; place in the marching order; time of passing the lines; areas and times of stops and rest; procedure for actions in case of encountering the enemy, repelling air strikes, during the blocking of sections of the route by civilians;

– artillery units: procedure for taking up positions at the lines of possible encounter with the enemy and tasks for its fire destruction;

– air defense units: positions in marching columns; tasks to cover units from enemy strikes during the march, in areas of concentration and rest

stops; procedures for conducting aerial reconnaissance, warning, and firing to destroy enemy aircraft;

– technical and rear units: route, time of concentration in the area; place in columns; time of passing the starting and regulation lines; places and times of rest stops; specific tasks that must be prepared for.

When organizing cooperation, it is necessary to coordinate the actions of the mobile guard units and the main forces at the following stages: withdrawal from the area of location; crossing the starting line, barrier areas, and lines of withdrawal into the concentration area; during rest stops; at the final destination; in cases of enemy attack, repelling air strikes, use of weapons of mass destruction and military equipment by the enemy; regarding fire support [3].

In the command instructions, the commander must specify: the locations of command posts in the columns; the procedure for their protection and cover in the event of an enemy air attack; the organization of communications; his and his deputies' places in the column; in the event of a command post failure, the procedure for transferring command [3].

With regard to comprehensive support for the march, the formation commander shall specify the procedure for: conducting reconnaissance and observation, camouflaging and guarding units, countering enemy technical reconnaissance means; overcoming areas of destruction, contamination, remotely installed minefields, the scope and sequence of engineering equipment in the rest area and concentration area; protection against weapons of mass destruction, military equipment, and enemy air strikes; taking measures to counter enemy information influence; organizing rest, refueling equipment, replenishing ammunition and other material and technical resources, repairing and evacuating damaged equipment; providing food, emergency medical care, and evacuation of the wounded [3, 4].

In order to protect units from WMD, UAVs, and FPV drones on the march, the authors of the article propose the following measures: increasing the distance between vehicles and columns, prohibiting the accumulation of units and equipment before control lines and when overcoming barrier areas; dispersed location in rest areas, camouflage measures, and engineering equipment of areas; prohibition of the use of mobile communications, transmission of information using the commandant's service communication network, coded communications, and mobile means with specific signals.

To increase the ability to form during movement, ensure situational awareness of commanders, protect convoys, ensure the stability of unit control on the march, and increase their survivability, it is necessary to fully utilize unmanned aerial vehicle (UAV) units which conduct aerial reconnaissance to provide commanders and staff with operational intelligence on the position and actions of the enemy, routes of advance, natural and man-made obstacles, and to provide commanders and staff with information on the actual status and position of their units on the routes of movement and compliance with time and space indicators during the march.

When organizing a march, the NGU headquarters must develop: a calculation of the time needed to prepare for the march; preliminary combat orders; a march plan; combat orders; instructions for comprehensive support; a march plan; requests for material support for units; reports on combat and numerical strength; reports on logistical support [3].

Conclusions

The proposed methodology makes it possible to reduce the time required for the relevant calculations for the march and to determine the structure of the marching order depending on the task, the timing of the march, and the characteristics of the route [5].

Calculations show that the Ukrainian National Guard has quite high marching capabilities. The main ways to realize the marching capabilities of the formation are: improving the marching training of troops; flexibility of command during the march; to ensure high speeds of movement – the creation of rational marching orders; careful organization of reconnaissance and commandant services; widespread use of FPV drones by marching guard units; escorting individual columns on the route with reconnaissance UAVs; widespread use of camouflage and anti-drone protective nets in open areas. In addition, the marching capabilities of the NGU formation will be significantly influenced by: the choice of routes (with reconnaissance of the routes); engineering, technical, and logistical support.

To improve marching training, training centers should make extensive use of simulators, combine

driving lessons with tactical training, train substitute mechanics and drivers, and teach driving in convoys not only on highways but also on dirt roads using navigation equipment and guides assigned from each battalion. To train staffs, conduct staff and radio training.

Currently, the units and formations of most foreign armies are equipped with the latest weapons and equipment, and new air reconnaissance and attack units have been added to their staff, which significantly affects the conduct of combat and increases marching capabilities. Modern combat has become more dynamic, requiring commanders to be ready to carry out deep maneuvers and movements to and along the line of contact with the enemy. Therefore, in the current conditions, the commander will have little time to organize the march. The success of a march depends not only on its clear organization, but also on the art of managing the NGU units during its implementation. Under any conditions, the NGU units must arrive at the designated area or line on time, in full strength, and ready to perform the assigned combat mission.

Further scientific research in this field should focus on improving computer programs for calculating and modeling marches in order to save time and resources for their organization and implementation.

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МЕТОДИКА ОБҐРУНТУВАННЯ ПОХІДНОГО ПОРЯДКУ ФОРМУВАННЯ НАЦІОНАЛЬНОЇ ГВАРДІЇ УКРАЇНИ ДЛЯ ЗДІЙСНЕННЯ МАРШУ НА ВЕЛИКУ ВІДСТАНЬ У ВОЄННИЙ ЧАС

Аналіз варіантів похідного порядку формування Національної гвардії України для здійснення маршу на великі відстані з досвіду військових частин НГУ в сучасних умовах пов'язаний із завданнями, які покладені на НГУ. Для здійснення маршу формування НГУ створюється похідний порядок. Побудова похідного порядку залежить від отриманого завдання, замислу майбутніх дій, кількості доданих сил і засобів, умов здійснення маршу, кількості маршрутів, умов обстановки та інших чинників і зазвичай складається із передового загону, якщо він висилається, похідної охорони, загонів забезпечення руху, колон головних сил і колон частин (підрозділів) матеріально-технічного та медичного забезпечення.

Похідний порядок повинен забезпечити: здійснення маршу у призначений термін, збереження боєздатності військ, швидке розгортання у бойовий порядок. Під час побудови похідного порядку на марші велика увага приділяється створенню надійної похідної охорони і загонів забезпечення руху, призначенню у голову колон сил і засобів, що у ході розгортання повинні складати перший ешелон бойового порядку з необхідними засобами посилення і підтримки, а також розподілу сил і засобів по колонах. Місце кожної частини і підрозділу в похідному порядку визначається з урахуванням замислу майбутнього бою та використання їх у складі певного елементу бойового порядку.

Похідний порядок формування НГУ має забезпечувати: швидке розгортання у передбойовий і бойовий порядки; високу швидкість руху; найменшу уразливість від високоточної зброї, ударів ракет та авіації противника; захист від нападу десантів противника, дій незаконних збройних формувань; підтримку стійкого управління підлеглими частинами та підрозділами.

Ключові слова: *завдання, формування, марш, похідний порядок, бригада оперативного призначення, бойовий порядок, маршрути висування.*

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